



2005-09

Proof of concept Iraqi enrollment via voice authentication project

Lee, Samuel K.

Monterey California. Naval Postgraduate School

<http://hdl.handle.net/10945/1954>



Calhoun is a project of the Dudley Knox Library at NPS, furthering the precepts and goals of open government and government transparency. All information contained herein has been approved for release by the NPS Public Affairs Officer.

Dudley Knox Library / Naval Postgraduate School
411 Dyer Road / 1 University Circle
Monterey, California USA 93943

<http://www.nps.edu/library>



**NAVAL
POSTGRADUATE
SCHOOL**

MONTEREY, CALIFORNIA

THESIS

**PROOF OF CONCEPT: IRAQI ENROLLMENT VIA
VOICE AUTHENTICATION PROJECT**

by

Samuel K. Lee

September 2005

Thesis Advisor:

James F. Ehlert

Thesis Co-Advisor:

Pat Sankar

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE September 2005	3. REPORT TYPE AND DATES COVERED Master's Thesis	
4. TITLE AND SUBTITLE: Proof of Concept: Iraqi Enrollment via Voice Authentication Project			5. FUNDING NUMBERS	
6. AUTHOR(S) Samuel K. Lee				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) Office of the Secretary of Defense Pentagon, Washington DC 20301-6000			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			12b. DISTRIBUTION CODE	
13. ABSTRACT: This thesis documents the findings of the Naval Postgraduate School (NPS) research team's efforts on the initial phase of the Iraqi Enrollment via Voice Authentication Project (IEVAP). The IEVAP is an Office of the Secretary of Defense sponsored research project commissioned to study the feasibility of speaker verification technology in support of the Global War on Terrorism security requirements. The intent of this project is to contribute toward the future employment of speech technologies in a variety of coalition military operations by developing a pilot proof-of-concept system that integrates speaker verification and automated speech recognition technology into a mobile platform to enhance warfighting capabilities. In this first phase of the IEVAP, NPS developed with the assistance of Nuance Communications, Inc. and the Defense Language Institute, a bilingual (English and Jordanian-Arabic) speech application that demonstrates the viability of speaker verification technology for use in operations in Iraq. Additionally, NPS conducted a test to assess the accuracy claim of Nuance's packaged speaker verification application, Nuance Caller Authentication 1.0 (for North American English). The NPS test consisted of 68 speaker enrollments and 411 speaker verification attempts. Upon completion of the test, NPS conducted a single data-point analysis yielding a system accuracy of 95.87%.				
14. SUBJECT TERMS Speaker verification, voice authentication, voice verification, voice biometrics			15. NUMBER OF PAGES 292	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited

**PROOF OF CONCEPT: IRAQI ENROLLMENT VIA
VOICE AUTHENTICATION PROJECT**

Samuel K. Lee
Captain, United States Marine Corps
B.S., State University New York at Maritime College, 1997

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY MANAGEMENT

from the

**NAVAL POSTGRADUATE SCHOOL
September 2005**

Author: Samuel K. Lee

Approved by: James F. Ehlert
Thesis Advisor

Pat Sankar
Thesis Co-Advisor

Dan Boger
Chairman, Department of Information Science

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

This thesis documents the findings of the Naval Postgraduate School (NPS) research team's efforts on the initial phase of the Iraqi Enrollment via Voice Authentication Project (IEVAP). The IEVAP is an Office of the Secretary of Defense (OSD) sponsored research project commissioned to study the feasibility of speaker verification technology in support of the Global War on Terrorism security requirements. The intent of this project is to contribute toward the future employment of speech technologies in a variety of coalition military operations by developing a pilot proof-of-concept system that integrates speaker verification and automated speech recognition technology into a mobile platform to enhance warfighting capabilities.

In this first phase of the IEVAP, NPS developed with the assistance of Nuance Communications, Inc. and the Defense Language Institute, a bilingual (English and Jordanian-Arabic) speech application that demonstrates the viability of speaker verification technology for use in operations in Iraq. Additionally, NPS conducted a test to assess the accuracy claim of Nuance's packaged speaker verification application, Nuance Caller Authentication 1.0 (for North American English). The NPS test consisted of 68 speaker enrollments and 411 speaker verification attempts. Upon completion of the test, NPS conducted a single data-point analysis yielding a system accuracy of 95.87%.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	OVERVIEW	1
B.	BACKGROUND	2
C.	RESEARCH QUESTIONS	2
D.	SCOPE OF THESIS	3
E.	RESEARCH METHODOLOGY	3
F.	THESIS ORGANIZATION	4
II.	SPEAKER VERIFICATION TECHNOLOGY.....	5
A.	OVERVIEW	5
B.	SPEAKER VERIFICATION PROCESS	6
C.	PERFORMANCE MEASURES.....	7
D.	SYSTEM ACCURACY	10
E.	COMPARISON OF VARIOUS BIOMETRICS.....	11
III.	NUANCE COMMUNICATION, INC	13
A.	OVERVIEW	13
B.	CORE TECHNOLOGIES	13
C.	VOICE PLATFORM.....	16
D.	PACKAGED SPEECH APPLICATIONS	18
IV.	BILINGUAL VOICE-ACTIVATED MENU-DRIVEN SYSTEM	21
A.	PHASE 1A OVERVIEW.....	21
B.	EQUIPMENT LIST	24
1.	Hardware.....	24
2.	Software	25
C.	APPLICATION DEVELOPMENT PROCESS.....	28
1.	Requirements Collection	29
2.	User Definition	29
3.	User Expectation	30
4.	User Success Criteria.....	30
D.	APPLICATION CALL-FLOW.....	31
1.	Start (WelcomeBCCF).....	32
2.	Language Selection (SelLanguage).....	32
3.	Language Specific Main Menu (MainMenu)	32
4.	Visitation Information (VisitInformation)	32
5.	Directions to BCCF (Directions).....	33
6.	Visitation Scheduling (Scheduling)	33
7.	Confirm Visitor Registration (Account) Number (NbrCount2)	34
8.	Make or Confirm Appointment (DetailScheduling).....	35
9.	Confirm Detainee ISN (DetaineeISN)	35
10.	New Appointment (GetVisitInfo)	36
11.	Confirm New Appointment (ConfirmDateTime)	37
E.	PHASE 1A SUMMARY	37

V.	NPS SPEAKER VERIFICATION TEST	39
A.	PHASE 1B OVERVIEW	39
B.	EQUIPMENT LIST	39
	1. Hardware	39
	2. Software	40
C.	TEST ENVIRONMENT	41
D.	TEST SCHEDULE	42
E.	TEST PROTOCOL	42
F.	TEST ANALYSIS	43
	1. Basic Statistics	43
	2. Nuance ROC Curve Analysis	46
	3. Comparison Analysis (Single Data-point versus ROC Curve)	50
G.	COMPARISON WITH PREVIOUS SPEAKER VERIFICATION TEST WITH NUANCE TECHNOLOGY	52
	1. The University of Edinburgh Speaker Verification Test	52
	2. International Biometrics Group Speaker Verification Test	53
H.	TEST LIMITATIONS	53
I.	PHASE 1B SUMMARY	54
VI.	CONCLUSIONS	55
A.	SUMMARY DISCUSSION	55
B.	RECOMMENDATIONS FOR FURTHER RESEARCH	56
	APPENDIX A. BCCF DIALOG SPECIFICATION	57
	APPENDIX B. NPS SPEAKER VERIFICATION TEST INVITATION LETTER	249
	APPENDIX C. NPS SPEAKER VERIFICATION CALL LOG SUMMARY	257
	APPENDIX D. NPS SPEAKER VERIFICATION REJECT CALL SUMMARY	259
	APPENDIX E. NUANCE'S ANALYSIS SUMMARY	261
	LIST OF REFERENCES	271
	INITIAL DISTRIBUTION LIST	273

LIST OF FIGURES

Figure 1.	Speech and Language Process Taxonomy	5
Figure 2.	Speaker Verification Process	7
Figure 3.	Receiver Operating Characteristic (ROC) Curve	8
Figure 4.	ROC Curve and DET Curve	9
Figure 5.	DET Curve Accuracy Constraints	10
Figure 6.	Architecture View of Nuance Voice Platform 3.0.....	17
Figure 7.	High Level Diagram For BCCF Visitor Center Application	23
Figure 8.	Diagram of BCCF Visitor Center Application System.....	25
Figure 9.	BCCF Visitor Application within NAE.....	27
Figure 10.	Detail Call-Flow Diagram For BCCF Application.....	31
Figure 11.	Diagram of NCA Speaker Verification System.....	40
Figure 12.	Speaker Enrollment Report.....	44
Figure 13.	Speaker Verification Report	45
Figure 14.	Number of Verification Attempts Per Voice Model (Caller) Report	45
Figure 15.	ROC Curve for NPS Speaker Verification Test	47
Figure 16.	ROC Curves (with and without Identical Speakers).....	47
Figure 17.	ROC Curves (with and without Outliers)	48
Figure 18.	PROC Curves (by Test Phase).....	48
Figure 19.	Data-Set Comparison with Expected Performance.....	49

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

Table 1.	Comparison of Biometrics	11
Table 2.	Phase 1B Test Schedule	42
Table 3.	NPS Speaker Verification Test Analysis Comparison.....	51

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ABBREVIATIONS

ASR	Automated Speech Recognition
BCCF	Baghdad Central Correctional Facility
BFC	Biometric Fusion Center
CONOPS	Concept of Operations
COTS	Commercial Off The Shelf
CTI	Computer Telephony Integration
DLI	Defense Language Institute
DoD	Department of Defense
EER	Equal Error Rate
EIS	Enterprise Information Systems
FAR	False Accept Rate
FMR	False Match Rate
FNMR	False Non-Match Rate
FRR	False Reject Rate
GUI	Graphical User Interface
GWOT	Global War on Terrorism
IEVAP	Iraqi Enrollment via Voice Authentication Project
ISN	Internment Serial Number
IZ	International Zone
JVM	Java Virtual Machine
MIT	Massachusetts Institute of Technology
NAE	Nuance Application Environment
NCA	Nuance Caller Authentication
NCS	Nuance Call Steering
NL	Natural Language
NPS	Naval Postgraduate School
NVP	Nuance Voice Platform
OSD	Office of the Secretary of Defense
PIN	Personal Identification Number
POC	Proof of Concept
ROC	Receiver Operating Characteristics
ROI	Return on Investment
SIP	Session Initiation Protocol
SLM	Statistical Language Model
SOP	Standard Operations Procedures
TTS	Text to Speech
VA	Voice Authentication
VLV	Variable Length Verification
VOIP	Voice over Internet Protocol
VUI	Voice User Interface
VV	Voice Verification

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENTS

I would like to acknowledge the financial support of the Office of the Secretary of Defense in sponsoring this research project, specifically, I would like to thank, Dr. Linton Wells II and Mr. Brian Fila for championing this research project.

I would also like to thank Nuance Communications and the Defense Language Institute for assisting in the development and testing of the proof-of-concept system.

Lastly, I would like to thank my thesis advisors, Mr. Jim Ehlert and Dr. Pat Sankar for their guidance and encouragement throughout the past year while I worked on this project.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

A. OVERVIEW

This master thesis documents the findings of the initial phase of the Iraqi Enrollment via Voice Authentication Project (IEVAP). The IEVAP is an Office of the Secretary of Defense (OSD) sponsored research project that studies the feasibility of speaker verification and speech recognition technology in support of the Global War on Terrorism (GWOT) security requirements.

Currently, there is no consistent method of personal identification for the Iraqi populace. This lack of consistent identification contributes to an overall lack of security and impacts stabilization efforts by the sovereign Iraqi Government and Coalition forces. An urgent need exists for a means to accurately identify individuals who require access through controlled entry points to secure areas. The IEVAP responds to this need by drawing on a key biometric technology—speaker verification—and coupling it with identification data to enhance force protection and to control entry into secure points within the country [1].

The intent of the IEVAP is to contribute toward the future employment of speech technologies in a variety of coalition military operations by developing a pilot proof-of-concept (POC) system that integrates commercial-off-the-shelf (COTS) speaker verification and automated speech recognition (ASR) technologies into a mobile platform to enhance warfighting capability.

It is envisioned that when used in conjunction with other biometric systems and security procedures, speaker verification applications can become a primary tool in positively identifying individuals and in controlling access to secure areas. Once the POC has been established, additional applications using speaker verification and ASR technologies may be developed to enable the delivery of additional services. Moreover, IEVAP is an initiative that transcends the potential implementation in Iraq. A successful POC could lead to applications in other stabilization and reconstruction efforts elsewhere, such as in Afghanistan.

B. BACKGROUND

The Naval Postgraduate School (NPS) has been tasked by the OSD with developing and demonstrating a pilot POC system in support of the IEVAP. The IEVAP is organized into several project phases that are intended to take the POC system from concept development to operational testing in Iraq. This thesis documents the findings of the first two sub-phases (Phase 1A and Phase 1B) within Phase 1 of this project, which are as follows:

- **Phase 1.** Pilot menu-driven laptop system and demonstration that voice authentication technology can work with sufficient accuracy.
 - **Phase 1A.** Develop and demonstrate a bilingual voice-activated menu-driven phone system in English and Arabic.
 - **Phase 1B.** Test and demonstrate speaker verification technology in English.
 - **Phase 1C.** Test and demonstrate speaker verification technology in Iraqi-Arabic.
- **Phase 2.** Detailed development of enrollment applications
- **Phase 3.** Preparation of systems/applications for deployment
- **Phase 4.** Deployment
- **Phase 5.** Operational testing in Iraq
- **Phase 6.** Broader deployment decision

C. RESEARCH QUESTIONS

- Is it possible to create and deploy a mobile speaker verification platform using existing COTS technologies to assist in operations in support of the GWOT security requirements?
- What COTS applications are currently available to perform speaker verification capabilities?

- What are the performance measures of a speaker verification system?
- What are the strengths and limitations of existing COTS speaker verification technology?

D. SCOPE OF THESIS

This thesis focuses on the technologies addressed in support of Phase 1A and 1B of the IEVAP, which includes the development and demonstration of a bilingual (English and Jordanian-Arabic) voice-activated menu-driven telephone system and an analysis of results of the NPS Speaker Verification Test. The value of this research includes:

- Demonstrating the viability of speaker verification and ASR technology for subsequent research, development, and possible real-world implementation.
- Providing a “quick response” research and development capability to address external customer requirements.
- Selecting the most appropriate hardware, software, and peripherals for a mobile demonstration kit (laptop, voice input devices, etc) for implementing speaker verification and ASR technologies.

E. RESEARCH METHODOLOGY

This research uses the quantitative approach for data collection and analysis. This research consists of the development of a bilingual (English and Jordanian-Arabic) application to assist in detainee visitation at the Baghdad Central Correction Facility (BCCF), formerly known as the Abu Ghraib Detention Facility. This research also consists of an analysis of the COTS speaker verification software, Nuance Caller Authentication (NCA) 1.0 (for North American English). Additionally, a literature review consisting of various studies, reports, and other documentation related to the field of speaker verification technology is also presented.

F. THESIS ORGANIZATION

Chapter II introduces speaker verification technology. Chapter III provides an overview of Nuance Communication, Inc. and its core technologies, operating platform and packaged applications. Chapter IV describes the development of the bilingual (English and Jordanian-Arabic) voice-activated menu-driven phone system application, including the identification of the equipment (hardware, software, and peripherals) used to develop and demonstrate the pilot POC system and the design methodology and application features of the bilingual voice-activated menu-driven system. Chapter V describes a test to assess the performance of the NCA speaker verification application using the Nuance's North American English language verification master package (language module), to include the identification of equipment (hardware, software and peripherals) used to conduct this test and an analysis of the results of the NPS Speaker Verification Test. Finally, Chapter VI concludes with recommendations for future work.

II. SPEAKER VERIFICATION TECHNOLOGY

A. OVERVIEW

Speaker verification also known as voice authentication or voice verification is not a new technology.¹ Dating back to the 1960s, considerable research in this field has occurred in academia and the commercial sectors [2] [3]. And with the exponential growth in technological advances in computational processing power and in communication, speaker verification has become a viable form of biometric technology.

In the taxonomy of Speech and Language Processing (see Figure 1), Speaker Verification falls under the classification of Speaker Recognition with the goal to extract, characterize and recognize the information in the speech signal conveying speaker identity [3]. Within speaker recognition, there are two fundamental tasks, which are often mistaken for one another, speaker identification and speaker verification.

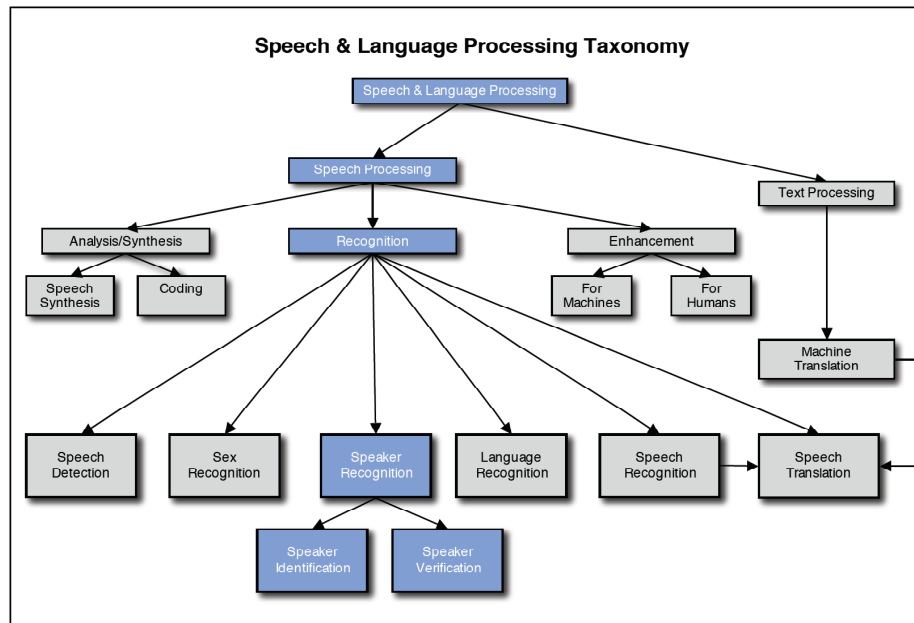


Figure 1. Speech and Language Process Taxonomy [After Ref. 4]

¹ Though the terms verification and authentication are generally used interchangeably, there is a subtle difference in the actual interpretation of these terms. Verification refers to the process of comparing (matching) a presented voice sample against another voice sample in the system with a previously claimed identity. Authentication refers to a process similar to verification with the additional constraint of an independent means, such as, a personal identification number (PIN) or a fingerprint biometric to validate the identity of the claimant other than voice verification alone.

The first task, speaker identification, is the task of determining who is talking from a set of known voices or speakers. In speaker identification, the unknown person makes no identity claim, so the system must perform a 1:N classification. The second task, speaker verification, is the task of determining whether a person is who he or she claims to be. In speaker verification applications, the system validates a person's identity by comparing the captured voice biometric data with his or her stored voice biometric data, which is to say that a system performs a 1:1 classification [3].

Most commercial applications today fall in the category of speaker verification vice speaker identification. The main reason is because it is far easier and quicker (and vastly more accurate) to determine a 1:1 classification than 1:N classification. However, this does not mean that advances have not been achieved in speaker identification technology. Today, there is a great deal of research in the advancement of speaker recognition technologies, such as, improving the performance of speaker recognition systems using high-level information [5], developing recognition techniques for multi-speaker environments [6], developing and evaluating corpora for speech processing systems [7], and developing and testing of multi-modal biometric systems, e.g., fusion of fingerprint and speaker verification systems [8]. For additional information regarding the topic of speaker recognition refer to references [2], [3], [9], [10] and [11].

B. SPEAKER VERIFICATION PROCESS

The basic structure for a speaker verification system is shown in Figure 2. A speaker verification system has two distinct phases, the first is the enrollment phase and the second is the verification phase. In the enrollment phase, the speech signal is first processed to extract features conveying speaker information, and then a voice model is created based on the collected data from the speech signal, which is then stored in a database for later reference during the verification phase. In the verification phase, the speech signal is again processed to extract features conveying speaker information; however, this time instead of creating a voice model, the speaker verification system implements a likelihood ratio test to distinguish between two hypotheses to determine if the speech sample comes from the claimed speaker or from an imposter. Features extracted from the speech signal are compared to a model representing the claimed

speaker (obtained from a previous enrollment) and to some background or composite model representing potential imposter speakers. The ratio of the speaker and the imposter match scores is the likelihood ratio statistic, which is then compared to a set threshold to decide whether to accept or reject the speaker [12].

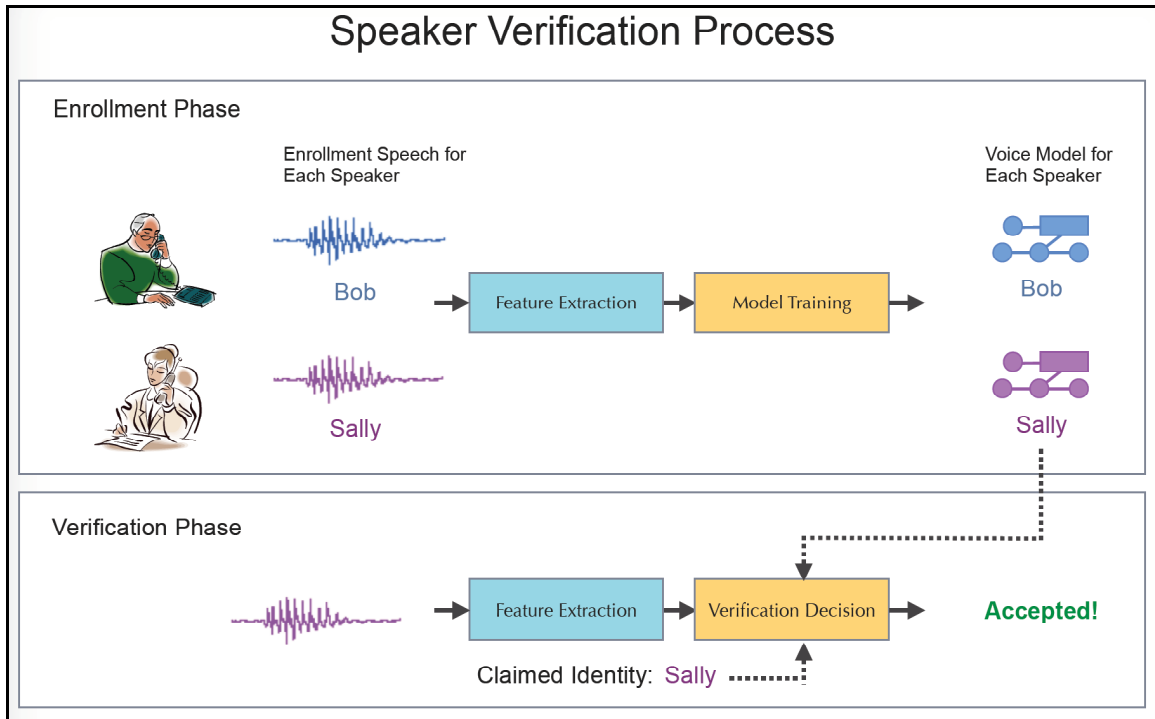


Figure 2. Speaker Verification Process [After Ref. 13]

C. PERFORMANCE MEASURES

Performance of a speaker verification system is based on the measure between two types of errors found in biometrics system. The two types of errors that can occur in biometrics systems are False Match Rate (FMR) and False Non-Match Rate (FNMR), more commonly referred as False Accept Rate (FAR) and False Reject Rate (FRR) [10].

- False Accept is the false acceptance of an invalid user, such as in the case of an impostor breaking into a system (also known as a Type-I error).
- False Reject is the false rejection of a valid user, such as in the case of rejecting a true speaker (also known as a Type-II error).

The tradeoff between FAR and FRR exists in every biometric system. For instance, if a system's threshold is set to allow for greater user convenience, the probability of false rejections (FRR) decreases, and the likelihood that an imposter can break into the system (FAR) increases. Likewise, the opposite would hold true, if a system's threshold is set to allow for greater user security, the probability of false rejections increases (FRR rises) while the likelihood that an imposter breaks into the system decreases (FAR diminishes). System performance at all the operating points (thresholds) can be depicted in the form of a receiver operating characteristic (ROC) curve.² A ROC Curve is a plot of FAR against FRR for various threshold values for a given application. An example of an ROC Curve is shown in Figure 3, in which the desired area for a given application is at the lower left of the plot, where both types of errors are minimized.

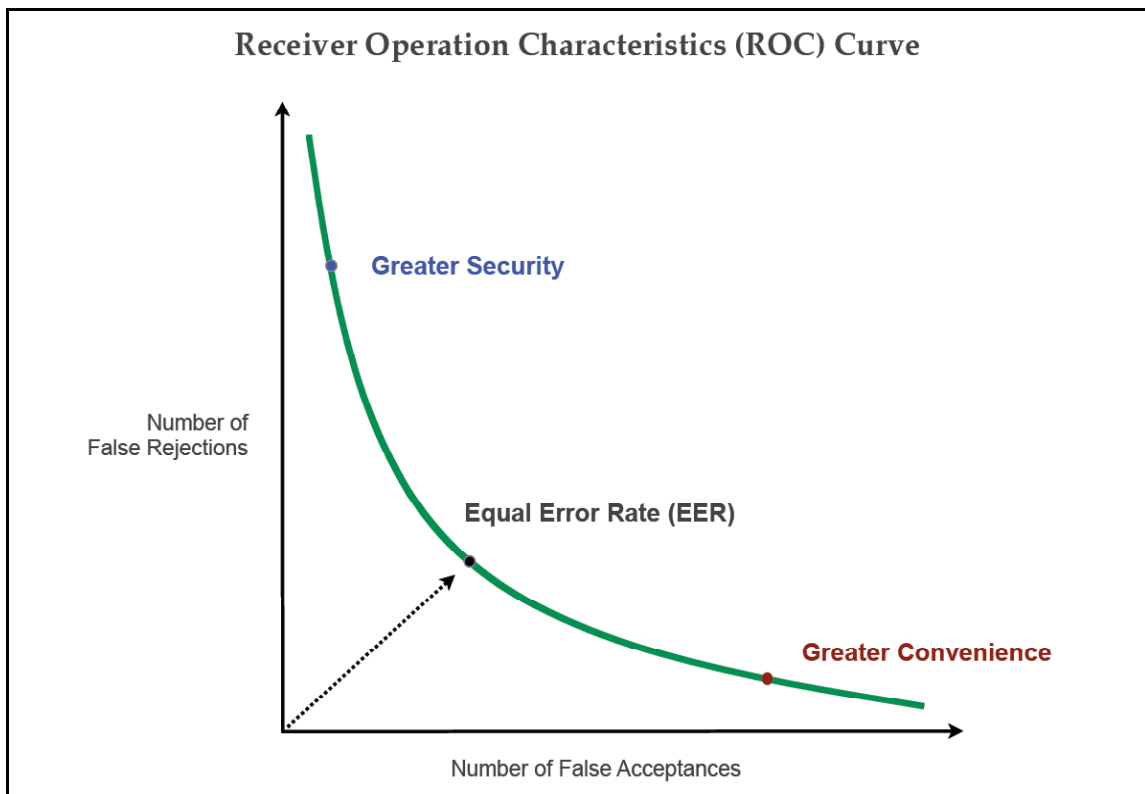


Figure 3. Receiver Operating Characteristics (ROC) Curve

² Fukunaga, K., *Introduction to Statistical Pattern Recognition*, Academic Press, 1990. ROC curve analysis was developed in the early 1950's during World War II to detect weak radio signals in noise. Since then it has become the de facto standard statistical tool for quantifying and measuring system performance.

In Figure 3, the point where the FRR and FAR are equal is called the equal error rate (EER). Often the EER is used as the single summary number to gauge the performance of a speaker verification application [14]. The green line shown in Figure 3 represents the various pairs of (FAR, FRR) values corresponding to a possible set of thresholds to which a given application can be set. For instance, in applications that required greater security, one would set the threshold of an application to the left of the ERR along the green curve, reflecting a lower probability of false accept but at the same time accepting a higher probability of false reject.

More recently, a variant of an ROC curve, called the detection error tradeoff (DET) curve has been employed, especially in the academic and national research institutions. The DET curve plots the same tradeoff shown in a ROC curve using a normal deviate scale [12]. This has the effect of moving the curves away from the lower left corner when performance is high and producing linear curves. The advantage of a DET curve over a ROC curve is that it allows easier comparisons of multiple data sets. Figure 4 shows the comparison of a data set plotted on two different curves, the DET Curve and the ROC Curve. For additional information on the ROC analysis and hypothesis testing principles note references [9], [10] and [15].

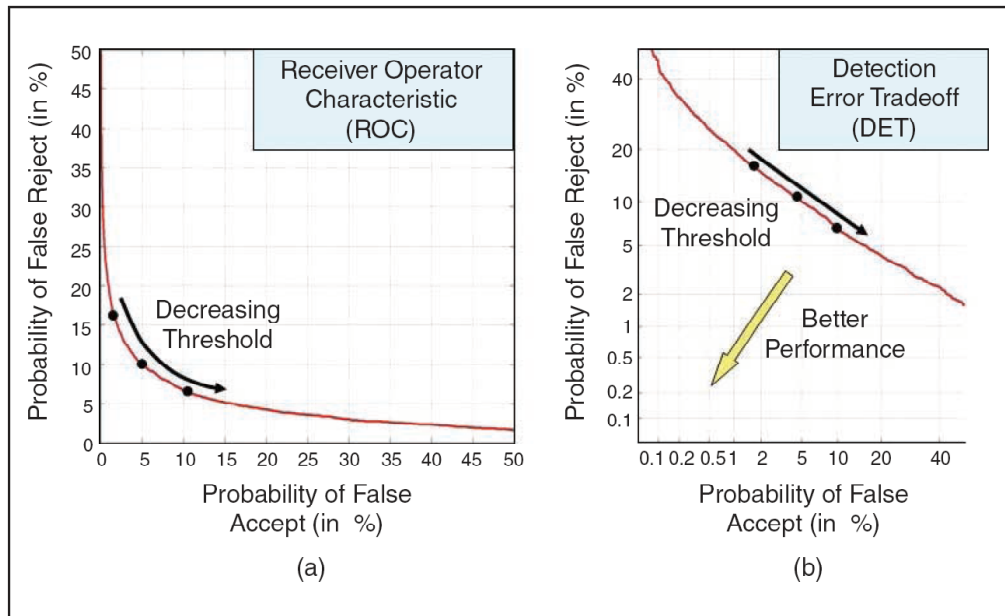


Figure 4. ROC Curve and DET Curve [From Ref. 14]

D. SYSTEM ACCURACY

Within the context of speaker verification technology, system accuracy is dependent on numerous factors, such as the level of user cooperation and the type of system constraints levied on a given application. In speaker verification applications, speech used for system enrollment and verification can span from text-dependent to text-independent, resulting in different levels of system performance. In a text-dependent application, a speaker states the same text during enrollment and verification and the speaker-verification system has prior knowledge of this text. Whereas in a text-independent application, the system has no prior knowledge of the text to be spoken, which makes it more complex for the system to process [12]. Figure 5 depicts a DET curve with a different level of constraints for four speaker verification experiments. The data represented in Figure 5 are based on verification experiments conducted by Reynolds, D.A. [12]. With each level of constraints, ranging from category 4 (text-independent using read sentences) to category 1 (text-dependent using combination lock phrases) the level of system performance increases; however, a caveat to increasing the level of constraints on a system is that the system becomes less user friendly.

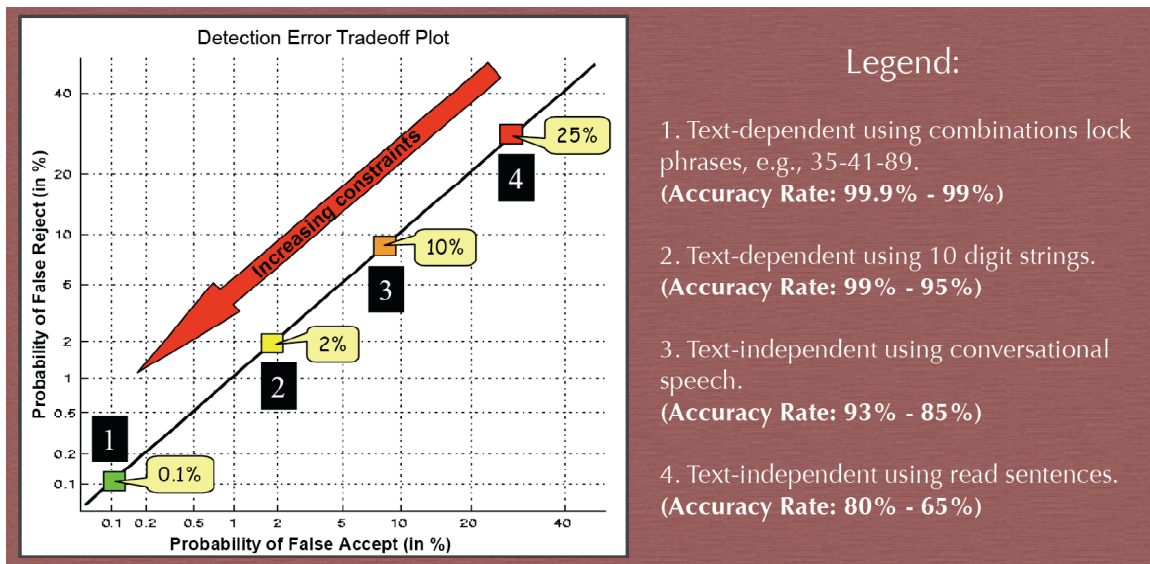


Figure 5. DET Curve Accuracy Constraints [After Ref. 12]

E. COMPARISON OF VARIOUS BIOMETRICS

How does speaker verification compare to other forms of biometrics? A number of biometric characteristics exist and are used in various applications. Each biometric has its strengths and weaknesses and the choice depends on the application. No single biometric is expected to meet the requirements of all the applications effectively. The match between a specific biometric and an application is determined depending upon the perceived user profiles, the need to interface with other systems or databases, environmental conditions, cost, and the properties of the biometric characteristic [15]. Table 1 presents a comparison of the leading forms of biometric system.

Comparison of Biometrics							
Characteristics	Fingerprint	Hand	Retina	Iris	Face	Signature	Voice
Ease of Use	High	High	Low	Medium	Medium	High	High
Error Incidence	Dryness, dirt, age	Hand injury, age	Glasses	Poor lighting	Lighting, age, glasses, hair	Changing Signatures	Noise, colds, channel variables
Accuracy	High	High	Very high	Very high	High	High	High
User Acceptance	Medium	Medium	Medium	Medium	Medium	Very high	High
Required Security Level	High	Medium	High	Very high	Medium	Medium	Medium
Long Term Stability	High	Medium	High	High	Medium	Medium	Medium

Table 1. Comparison of Biometrics [After Ref. 16]

In addition to the characteristics compared in Table 1, there are other characteristics that favor the use of voice biometrics, which are remote-ability, flexibility, maintenance and cost. In terms of perceived applications for operations in Iraq, these characteristics are unmatched when contrasted to other forms of biometrics.

First, voice biometrics uses existing telecommunication infrastructures (landline, cellular or Voice over Internet Protocol [VoIP]), as such, a new infrastructure is not required to be built around the deployment/employment of this technology, which reduces costs and deploys technology rapidly. Second, voice biometrics allows dissemination and collection of information other than key biometric data, such as, the

collection of names, addresses, and telephone numbers of high-target individuals. Third, voice biometrics can be employed in multilingual applications without the aid of a trained linguist or a translator, which results in manpower savings. And fourth, voice biometrics rely on a signal that is natural and unobtrusive to produce and is easily obtainable with no special user equipment or training, which results in the rapid deployment of technology without adding additional training requirements for troops serving in Iraq and Iraqi citizens.

However, as with any given biometric system, there are limitations in addition to its strengths. First, speech is a behavioral signal that may not be consistently reproduced by a speaker and can be affected by a speaker's health, emotions, and age. Second, voice biometrics is dependent on the communication infrastructure; therefore, if the transmission quality of the communication infrastructure is poor, it may hamper the performance of the voice biometric system. Third, remote-ability, which is one of voice biometrics greatest strengths is also one of its limitations. Without placing constraints on the remote-ability of a speech application, one cannot control the type of channel (e.g., landline or different types of cell phones) or the environment (e.g., noisy or quiet background) that a user selects to dial-up the speech application. And fourth, as with other forms of biometrics system, system spoofing (identify thief) is a concern that requires careful consideration of employment tactics, techniques, and procedures (TTP).

III. NUANCE COMMUNICATIONS, INC.

A. OVERVIEW

Headquartered in Menlo Park, California, Nuance Communications, Inc., is a publicly held company that develops speech recognition, speaker verification and text-to-speech applications. Nuance is an industry leader in the deployment of voice interfaces that provide automated speech applications to enterprise telecommunications and web-based applications. Nuance currently has over 1,000 customers who have purchased their software for applications ranging from banking, stock trading, product ordering, personal assistants, voice-activated dialing, call routing, and voice portal services. Some of their clients includes: Cingular Wireless, Sprint PCS, T-Mobile, Japan Telecom, Banco Bradesco, British Airways, Charles Schwab, Merrill Lynch, General Motor's OnStar and United Parcel Services [17].

More recently on May 9th, 2005, ScanSoft (another industry leader in voice interfaces) and Nuance announced that they have signed a definitive agreement whereby ScanSoft will acquire all of the outstanding common stock of Nuance, merging the two organizations into a single company—retaining the corporate identity of Nuance Communications, Inc. [18].

Provided in this chapter is a general overview of Nuance's core technologies, platform and packaged applications. The below information was gathered from datasheets that are readily accessible from Nuance's website at <http://www.nuance.com/prodserv/prodnuance.html> and can also be found in Nuance's "Nuance Voice Platform (NVP): Getting Started Guide" [19].

B. CORE TECHNOLOGIES

Nuance's core technologies are comprised of three primary engines: speech recognition, text-to-speech, and speaker verification that enable recognition and understanding of simple responses and complex conversational requests, the conversion of written information into speech, and the authentication of an individual's identity.

First is Nuance's current release of speech recognition software, **Nuance 8.5**, which is based on a distributed client/server architecture that provides scalable operation. A major advantage of Nuance 8.5 is that it supports simultaneous load balancing and fault tolerance across speech recognition, speaker verification and text-to-speech operations to ensure efficient use of system resources.

Nuance 8.5 supports many languages, including American English, Australian/New Zealand English, Canadian French, Cantonese, European French, German, Italian, Japanese, Jordanian Arabic, Mandarin, Portuguese, Spanish, Swedish and UK English. In addition to multilingual support, Nuance 8.5 also offers numerous advanced features and capabilities. Listed below are some of the advanced features and capabilities available using Nuance 8.5 (for a complete listing of these features refer to Nuance's website):

- **Say Anything™** is a feature that includes Nuance's statistical language models (SLM) and robust natural language interpretation (robust NL) technologies. It enables automation of complex and open-ended dialogs that are difficult or impossible to implement using traditional grammars.
- **Listen & Learn™** is a task adaptation feature. Task adaptation is a self-tuning feature of the Nuance System that automatically improves recognition performance of deployed applications.
- **AccuBurst™** is a dynamic accuracy feature that allows the recognizer to trade off accuracy against speed according to the load of the machine on which it is running. With dynamic accuracy turned on, the system uses resources when they are available. The recognition rate is then improved during non-busy hours without any noticeable slowdown for the user.

Second is Nuance's text-to-speech (TTS) software, **Nuance Vocalizer 4.0**, which delivers text-based, frequently changing information over the telephone with a natural sounding voice. It also reduces the need to pre-record information required in applications, reducing the overall costs of voice-driven application development. Nuance Vocalizer 4.0 is currently available in U.S., U.K. and Australian English, in both male

and female voices, and Canadian French and Latin American Spanish in female. Nuance also supports a total of 18 TTS languages through a combination of Nuance Vocalizer 4.0 and partner languages. Arabic TTS is currently not available in Vocalizer 4.0.

Third is Nuance's voice authentication software, **Nuance Verifier 3.5**. Verifier 3.5 enables users to be identified and authenticated simultaneously based on their voice biometrics. The technology is not currently BioAPI-compliant. The technology supports several languages including: Australian/New Zealand English, Brazilian Portuguese, Canadian French, Cantonese Chinese, Dutch, European French, European Spanish, German, Italian, Japanese, Korean, Latin American Spanish, Mandarin Chinese, South African English, Swedish, US/Canadian English and UK English. Arabic is currently not supported.

Nuance Verifier 3.5 has several features that place it prominently above many of its competitors:

- Verifier offers three modes of operation for enrollment and verification: Text-dependent, Text-prompted, and Text-independent modes. In text-dependent mode, the same utterance is used for enrollment (training) and verification. In text-prompted mode, verification is performed against a phrase that was not necessarily used for training, but the Verifier knows what the verification phrase should be. In text-independent mode, verification is performed against a phrase that was not necessarily used for training and the Verifier does not know what the verification phrase should be.
- Verifier uses variable-length-verification (VLV), a mechanism that provides accurate results with the smallest number of verification utterances.
- Verifier uses online adaptation, which is a feature that allows a system to adapt a stored voice model automatically during a verification session if it determines that the user is the true speaker.

- Verifier can accurately verify individuals across cross channels. For instance, a person can enroll using a landline telephone and be verified on a cellular phone.
- Verifier can effectively filter out background noises. This is one reason Nuance notes that Sprint PCS and GM OnStar use Nuance technology for their voice interface.
- Verifier's voice model, referred to as a “voiceprint” by Nuance, remains at a constant size of 20 kilobytes. Nuance's voice models are encrypted and stored in standard scalability databases, such as Oracle and ODBC-compliant databases. These databases can be networked so that one centralized repository can serve multiple call-centers.

C. VOICE PLATFORM

Nuance core technologies reside on a platform called **Nuance Voice Platform (NVP) 3.0**. Platforms are the foundation on which voice applications are developed and deployed. They execute the commands and logic specified by the voice application, provide the speech processing capabilities, enable application creation, interface to back-end systems and call center infrastructure, and provide system management and administration capabilities.

NVP 3.0 is based upon Voice Extensible Markup Language (VoiceXML) 2.0 markup language standard. VoiceXML 2.0 is the current international standard developed by World Wide Web Consortium (W3C) VoiceXML Forum. VoiceXML 2.0 is used to define a standard dialog design language that developers could use to build conversational applications. VoiceXML is designed to create audio dialogs that feature synthesized speech, digitized audio, recognition of spoken and DTMF key input, recordings of spoken input, telephony, and mixed initiative conversations [20].

NVP 3.0 consists of four major components, which are described below, and is shown in Figure 6.

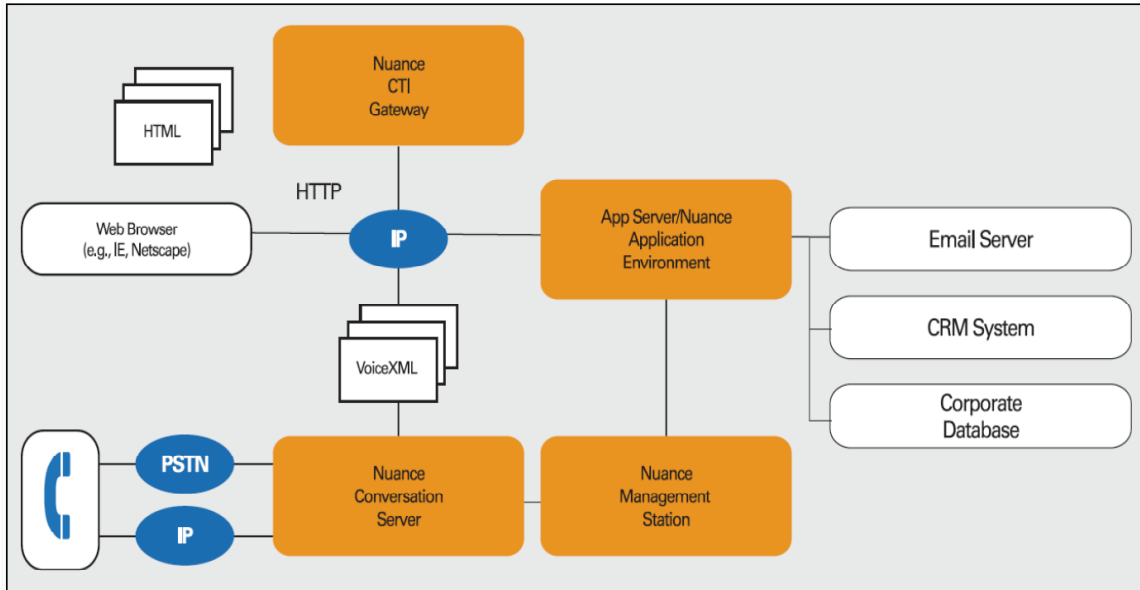


Figure 6. Architecture View of Nuance Voice Platform 3.0 [From Ref. 19]

- The **Nuance Conversation Server** includes a VoiceXML Interpreter integrated with Nuance’s speech recognition, text-to-speech and voice authentication technologies. Using standard Internet protocols, the Nuance Conversation Server fetches VoiceXML applications generated by the Nuance Application Environment or other application frameworks. The Nuance Conversation Server also provides the interfaces to the telephony network via support for commercial-off-the-shelf (COTS) telephony network interface cards or through support for Voice over Internet Protocol (VoIP) through Session Initiated Protocol (SIP).
- The **Management Station** provides an intuitive graphical user interface (GUI) for configuring, deploying, administering, and managing voice applications. It also provides centralized management of the services on the Conversation Server hosts. The three main functions of the management station are System Management and Control, System Performance Analysis and Data Management.

- The **Nuance Application Environment (NAE)** is an integrated graphical application development and runtime environment that facilitates the design, development, deployment, and maintenance of speech applications. This framework can run on widely used application servers to create dynamically generated VoiceXML applications. The voice application can readily integrate to a broad range of backend databases, applications, and legacy systems using web services standards and a variety of pre-packaged interfaces offered by application server vendors. Application developers can also analyze and tune voice application performance and usability. Additionally, a key feature of NAE is that it is an intuitive development environment that enables reusability of application modules.
- The **Nuance Computer Telephony Integration (CTI) Gateway** provides packaged integrations to leading CTI servers. NVP 3.0 can be integrated into CTI environments from leading vendors such as Aspect, Cisco, and Genesys, allowing enterprises to deploy a best-of-breed, integrated contact center solution that can provide callers with a consistent, high-quality user experience.

D. PACKAGED SPEECH APPLICATIONS

Nuance also offers several packaged off-the-shelf and easily configurable products that can enable enterprises to shorten application development and deployment time dramatically, accelerate return on investment, and cost-effectively access advanced application design and development experience. Provided below are two packaged applications that Nuance currently offer.

- **Nuance Caller Authentication (NCA) 1.0** is a packaged application that automatically authenticates callers prior to accessing account or personal information using automated systems or talking with a customer service representative. Powered by Nuance Verifier, NCA 1.0 authenticates callers based on the unique characteristics of their voice. Using voice

authentication results in higher levels of security than more traditional means of identifying callers, such as touch-tone systems that require personal identification numbers (PINs) or agent questions.

- **Nuance Call Steering (NCS) 1.0**, powered by Say Anything™ technology, allows callers to interact with an automated speech-recognition based solution that enables them to speak naturally and then to be quickly routed to the correct destination. NCS 1.0 serves as a gateway to an organization's contact center, enabling companies to establish a single point of contact and instantly route callers to the customer care solution best equipped to meet their needs.

THIS PAGE INTENTIONALLY LEFT BLANK

IV. BILINGUAL VOICE-ACTIVATED MENU-DRIVEN SYSTEM

A. PHASE 1A OVERVIEW

The primary objective of this phase of the IEVAP is to develop a bilingual (English and Jordanian-Arabic) speech application that demonstrates the viability of speech technology to support operations in Iraq.

The purpose of the bilingual Baghdad Central Correctional Facility (BCCF) Visitor Center Application is to demonstrate the feasibility of using COTS technology in order to create a pilot proof-of-concept (POC) system in order to expedite a visitor's entry to a controlled facility/secure space and to assist in managing detention visitation at BCCF. It is envisioned that this application would assist in:

- Expediting and improving the visitation process at the BCCF, thereby improving the overall force protection, security, and the management of the detention facility and the detainees.
- Reducing the necessity for travel by visitors to schedule meetings with detainees at BCCF and to better manage access to detainees on the day of visitation.
- Providing a method of generating a voice biometric database that will be of potential value in combating the insurgency in Iraq.
- Improving public relations with the Iraqi people by providing improved and safer access to detainees.

There are two applications envisioned for the demonstration of this pilot system:

- **BCCF Visitor Verification and Access Application.** An application is envisioned whereby an Enrollee would arrive at a predetermined visitation time at BCCF, speak into a device, have his or her voice authenticated, and be granted access to the visitor's area. The BCCF visitor verification application is intended to reduce the level of "hands on" validation required by security personnel and to increase the speed with which an Enrollee can have a scheduled meeting with a Detainee. The BCCF application is expected to complement or improve on existing visitation procedures. The improved ease of access might encourage individual enrollment [1].
- **BCCF Visitation Scheduling Application.** Visitation scheduling is a complementary application. A previously enrolled individual would have the ability to gain access to a BCCF visitation scheduling application. This application would be remotely accessible by landline or cell phone. When the application is accessed, the BCCF would take the applicant through a series of steps to authenticate the requestor's voice biometric, and only upon successful authentication would the requestor be granted access to the detainee visitation scheduling application. Voice prompts or some other method would guide the Enrollee through a scheduling system with the result being the generation of a designated time to arrive at BCCF for a visit. There is potential for a corollary use of voice authentication, where the requestor, by stating the name of the Detainee, could be added to the Detainee's visitor schedule, allowing detainment facility staff to pre-screen visitors [1].

The application whose requirements are specified in this document allows callers to obtain information on visitation information, obtain general directions to the BCCF, and schedule appointments (simulated) to visit detainees at BCCF in both English and Jordanian-Arabic, see Figure 7.

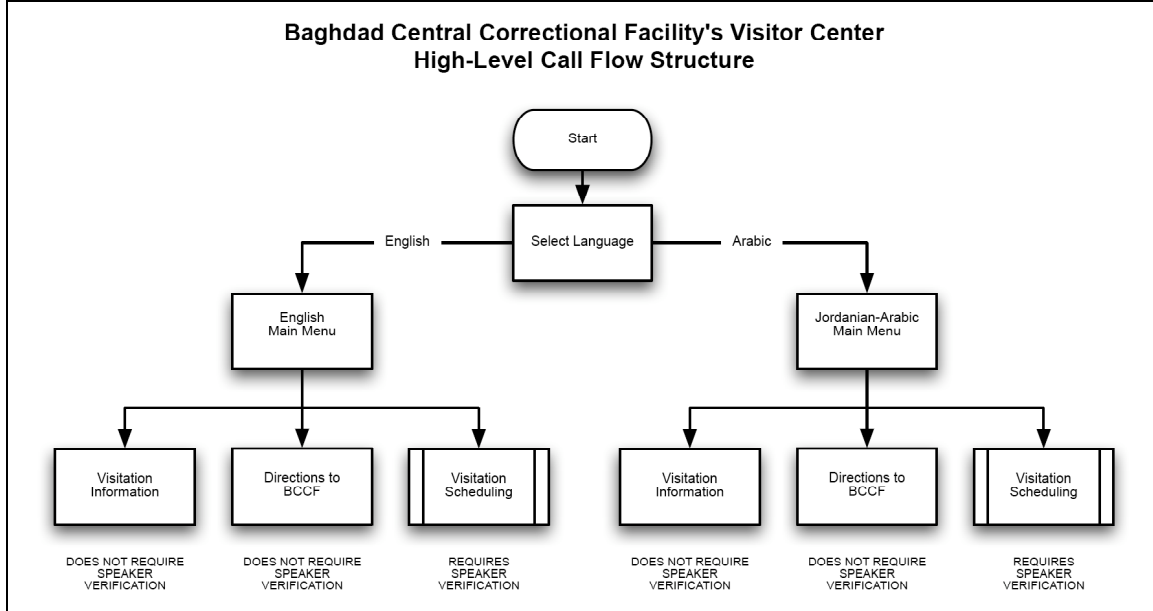


Figure 7. High-Level Diagram for BCCF Visitor Center Application

Figure 7 (as depicted above) is a high-level call-flow diagram for the BCCF Visitor Center Application. In this application, a Caller is prompted by the system to choose a language to proceed in, either in English or in Jordanian-Arabic. Once a Caller selects a language, the system then proceeds to the language specific main menu. At this point, the system asks the Caller to select an application to obtain information on visitation information, to obtain general directions to the detention facility (BCCF), or to schedule an appointment (simulated) to visit a detainee at BCCF.³ If the Caller chooses to receive visitation information or obtain directions to the detention facility, speaker verification is not required. The prerecorded prompts will automatically play when required. If the Caller chooses to schedule a new appointment or to check up on an existing appointment, speaker verification is required before the Caller is granted access to the automated scheduling system. This is to ensure that access is only given to authorize visitors of the BCCF detainees.

³ This prototype application is intended to demonstrate the call-flow of the BCCF application in English and in Jordanian-Arabic, and it is not connected to a backend database, as such, the appointment scheduling is a simulated process.

B. EQUIPMENT LIST

The pilot POC system used the following equipment (hardware, software, and peripherals) to develop and demonstrate the application.

1. Hardware

Based on the software requirements of Nuance, NPS purchased the following hardware to develop and demonstrate this application, see Figure 8.

- Dell Latitude 15.4" D810 Intel Pentium M770 Processor (2.13 GHz), 2 GB DDR2-533 SDRAM, 80GB Hard Drive, Intel Pro/Wireless 2915 (802.11 a/b/g, 54 Mbps) and integrated Bluetooth
- Dell Latitude 12" D410 Intel Pentium M755 Processor (2.00 GHz), 2 GB DDR2-533 SDRAM, 80GB Hard Drive, Intel Pro/Wireless 2915 (802.11 a/b/g, 54 Mbps) and integrated Bluetooth
- Sony F-V420 Unidirectional Natural Sound Vocal Microphone.

Two computers (host) are required to demonstrate the bilingual application [21].⁴ The laptop computers listed above were chosen for their processing power, memory capability, and mobility. The input device (microphone) was selected based on its ease of use in developing and testing the speech application.

⁴ Currently, Nuance cannot run multilingual applications on the same host. Thus two hosts are required, one operating under English locale in Windows 2000 and the other operating under Jordanian-Arabic locale in Windows 2000. Locale is an environment variable that is set within the Microsoft Windows Operating System. Locale is a set of information that corresponds to a given language and country. The code locale setting affects the language of terms such as keywords and defines locale-specific settings such as the decimal and list separators, date formats, and character sorting order. Nuance uses the locale environment variable to identify the primary locale for the platform.



Figure 8. Diagram of BCCF Visitor Center Application System

2. Software

Listed below are the software applications used to develop and demonstrate this application:

- Microsoft's Windows 2000 Professional
- Sun's Java 2 SDK 1.3.1_15
- Nuance Voice Platform 3.0. SP4
- Nuance Application Environment 3.0 SP4
- Nuance Vocalizer 4.0
- SIPFoundry's SipXphone.

Currently, Nuance is only tested against Microsoft Windows 2000 operating system. However, Nuance is capable of operating under Microsoft's Windows 2003 and Windows XP Professional operating systems. Sun's Java 2 SDK is a development environment for building applications, applets, and components using the Java programming language. This software is downloadable from Sun's website at <http://java.sun.com/j2se/1.3/download.html>. The SIPfoundry SipXphone was selected for its compatibility with Nuance's software. SIPfoundry's SipXphone is shareware

program that can be downloaded at SIPfoundry's website at www.sipfoundry.org. SipXphone was formerly known as Pingtel's instant xpressa softphone, and it is a fully functional SIP softphone that runs on Microsoft Windows and Linux operating systems.

The bilingual BCCF Visitor Center Application was designed and developed using Nuance Application Environment (NAE). As mentioned in Chapter III, NAE is an environment within NVP where applications can be developed, tested, and executed. Information provided on the following pages was referenced from Nuance's V-Builder 3.0 Feature Pack 1 User's Guide [22]. NAE consists of two components: V-Builder and V-Server.

V-Builder is the design component of NAE. V-Builder is a productivity tool that facilitates many of the functions required to develop open, standards-based speech applications, such as:

- VoiceXML code generation
- Grammar development and testing
- Prompt recording and playback
- Voice application testing.

V-Builder also facilitates many tasks common to all application development, including project management, version control, and application deployment. Additionally, V-builder allows developers to instant generate preformatted Dialog Specifications document, which affords developers the ability to document their applications design. Figure 9, is a screenshot of the bilingual BCCF Visitor Center Application within the V-builder environment.

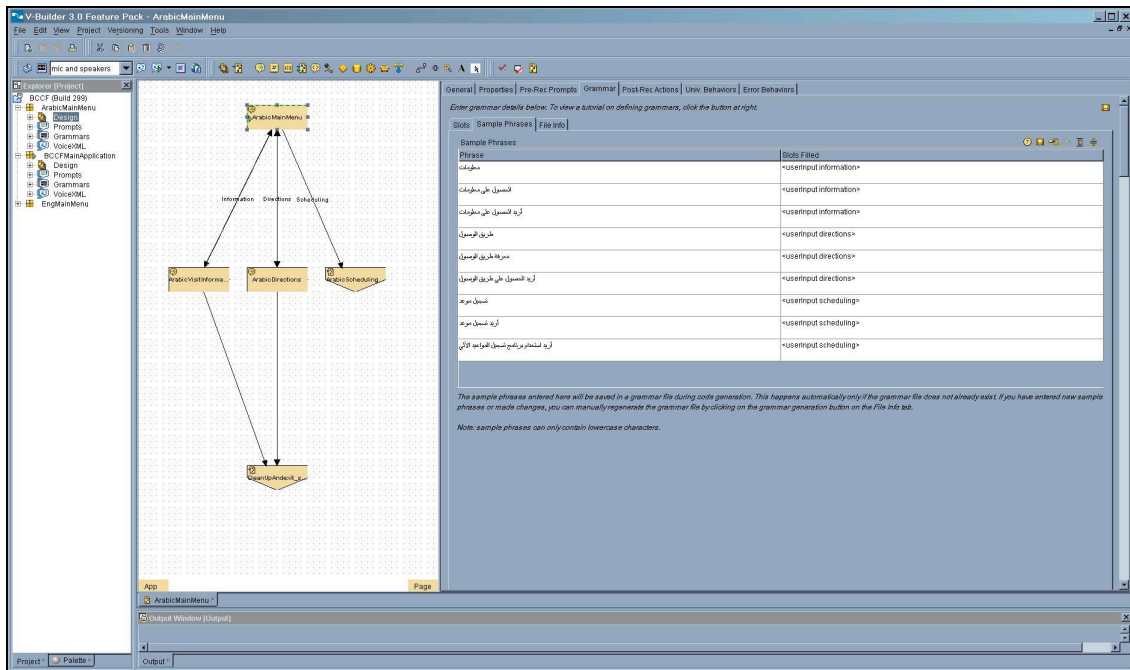


Figure 9. BCCF Visitor Center Application within NAE

V-Builder provides an integrated environment for developing and testing voice-enabled applications based on the VoiceXML 2.0 markup language standard. V-builder's primary goal is to bring the advantages of web-based development and content delivery to interactive voice response applications. It simplifies speech application development by allowing a developer to create speech applications graphically. A developer can pick dialog states from a palette of choices and drop them into the graphical call flow. The developer then defines the state details in related property sheets. Based on the design created, V-Builder then generates the VoiceXML code for the application. The advantage of using V-builder is that no knowledge of VoiceXML or programming is required to create a working sample or prototype speech application.

The other component of NAE is V-Server. V-Server is the runtime component of the NAE. V-Server is a web application that runs inside a J2EE web server. It currently supports the JBoss, WebLogic, and WebSphere web servers. V-Server manages and exposes functionality for V-Builder speech applications at runtime, enabling them to:

- Access data from Enterprise Information Systems (EIS) such as Oracle, PeopleSoft, and Siebel that hold customer data.
- Integrate with third-party Computer Telephony Integration (CTI) servers like the Genesys IVR server and CiscoICM, which provide features like screen pops, call routing based on callers' needs and agents' skills, and universal queue management (that is, using a single queue to manage telephony and web-based queries.)

V-Server also provides operation, administration and maintenance integration with NVP so that when speech application is generated by V-Builder, a user can monitor and control it through the Nuance Management Station.

C. APPLICATION DEVELOPMENT PROCESS

The BCCF Visitor Center Application was developed using Nuance's project methodology as described in the Nuance NVP Application Developer's Guide [23]. The Nuance methodology consists of five phases which are

- Phase 1: Requirement Analysis consists of identifying the business, user, and application requirements
- Phase 2: Design focuses on the user interface by defining dialogs, prompts, and grammars, as outlined in the requirement phase
- Phase 3: Implementation consists of building the speech application, recording audio prompts, and completing the recognition package
- Phase 4: Testing focuses on testing the speech application for dialog traversal and system load, speech-recognition performance, and usability testing
- Phase 5: Tuning and Monitoring is the process of improving a speech application based on deployment data.⁵

⁵ For the development of this prototype POC system, only the first four phases were implemented. Phase 5—Tuning and Monitoring was not conducted because this application is a proof-of-concept application that was not deployed as an operational application, as such, no deployment data was collected.

Appendix A of this thesis provides the Dialog Specification for the bilingual BCCF Visitor Center Application. The Dialog Specification document encapsulates all of the required information to create this program. Provided below is the pertinent information regarding the development of this pilot POC system.

1. Requirements Collection

The requirements used to develop this application were gathered from the following sources:

- E-mail correspondence from Mr. Doman McArthur, OSD dtd 22 Feb 05 and 11 Dec 04
- E-mail correspondence from Maj Robert Berry, USA dtd 25 Jan 05
- Iraqi Enrollment via Voice Authentication Project Concept of Operations Version 2.0
- Naval Postgraduate School Proof-of-Concept: Iraqi Enrollment via Voice Authentication Project Test Plan Version 1.0
- Baghdad Central Correctional Facility Standard Operating Procedure (SOP) 10: SOP Family Visitation dtd 3 Jun 04
- BCCF SOP 14: SOP Visitation Center dtd 30 Aug 04.

2. User Definition

Based on email correspondence with the Operations Officer of the BCCF [24], the following user profile was generated: Visitors of detainees are between the ages of 18 and 50. They consist mostly of family members of the detainees, often wives, children, mother, and fathers. It is assumed that the visitors are generally repeat visitors. It is also assumed that visitors are unfamiliar with the use of speaker verification and ASR technology.

3. User Expectation

Based on the data collected in support of defining this pilot POC application, the following are assumed user expectations:

- It is assumed that Callers of this pilot POC system will be unfamiliar with the use of speaker verification and automated speech recognition (ASR) technology. As such, a help menu and a directed dialog are required to assist Callers to complete calls.
- This is an official Department of Defense (DoD) system; as such a persona of professionalism is required. However special attention must be given to the fact that the majority of Callers to this system will be the family members of the Detainees; therefore, careful consideration of their culture and customs is also a necessity. Additionally, as with the existing US Correction Facility visitation information system, Callers of this system are expected to request directions to the detention facility and will request visitation information, such as hour of operations or general visitation procedures.
- For the purposes of the pilot POC system, it is assumed that Callers will follow the prompted menu structure. This POC system will employ a directed dialog vice a mixed-initiative dialog. In a directed dialog, the system gives the Caller a list of options at the beginning of the interaction; it then prompts the Caller to make a selection. In a mixed-initiative dialog, a Caller chooses what he or she wants to do and describes it in natural language.

4. User Success Criteria

It is assumed that the user success criteria for this application are task completion, ease of call, and speed of call.

D. APPLICATION CALL-FLOW

Provided on the following pages is a description of the BCCF Visitor Center Call-Flow to include the actual system prompts. Figure 10 is a diagram of the described process. For additional information regarding the BCCF Visitor Center Call-Flow refer to Appendix A (Dialog Specification for BCCF Visitor Center Application) of this thesis.

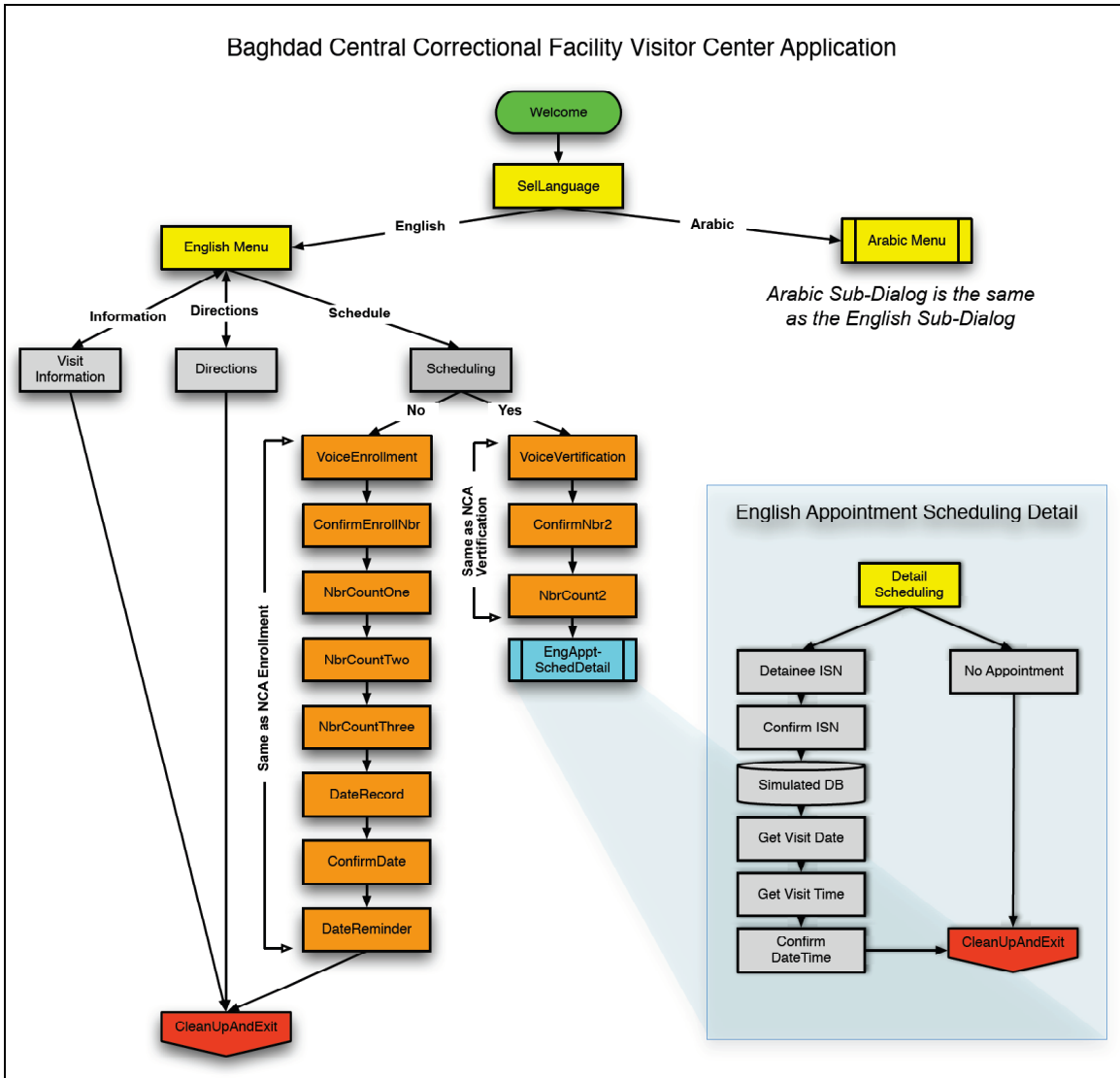


Figure 10. Detailed Call-Flow Diagram for the BCCF Application

1. Start (WelcomeBCCF)

When initially calling the system, the Caller is greeted with a bilingual welcome message: "Hi, Welcome to Baghdad Central Correctional Facility's Visitor Center (same prompt repeated in Arabic)."

2. Language Selection (SelLanguage)

After the initial greeting, a Caller is prompted to select a language: "To continue in English, say 'English.' To continue in Arabic, say 'Arabic' (Arabic welcome prompt spoken in Jordanian-Arabic)." Once a Caller has chosen a language, the system proceeds to the language specific main menu.

3. Language Specific Main Menu (MainMenu)

Upon reaching the language specific main menu, a Caller is given the option to hear visitation information, obtain general direction to BCCF, or schedule an appointment to visit a detainee: "Thanks. Please select from the following options. To get general visitor information, including visiting hours, say 'information.' To get directions to our facility, say 'directions.' To set up a meeting using our automated scheduling system, say 'scheduling.' "

4. Visitation Information (VisitInformation)

If a Caller selects this option, the system plays back a prerecorded prompt stating the hours of operation for the BCCF Visitor Center: "Baghdad Central Correctional Facility is open for visitors from 8 AM to 4 PM, Monday through Saturday. Would you like to hear that information again or return to the main menu? If you're done for now, please feel free to hang up."⁶

⁶ The system demonstration in Phase 1A is limited only to the playback of hours of operations for BCCF. Future prerecorded prompts can contain additional sub-dialogs detailing additional visitation information, such as BCCF's Visitation Operation Standard Operations Procedure (SOP).

5. Directions to BCCF (Directions)

If a Caller selects this option, the system plays back a prerecorded prompt stating general directions to the detention facility: “Baghdad Central Correctional Facility is located 20 miles west of Baghdad, in the town of Abu Ghraib. From Baghdad, go west on highway six for 18 miles then take exit nine at Abu Ghraib. Our facility is located two miles southwest of exit nine. Would you like to hear the directions again or return to the main menu? If you’re done for now, please feel free to hang up.”

6. Visitation Scheduling (Scheduling)

If a Caller selects this option, the system plays back an initial prompt asking the Caller if he or she has enrolled in the system. If the Caller replies "yes," then the system will proceed to the speaker verification dialog. If the Caller replies "no," the system will proceed to the speaker enrollment dialog.

***System:** “In order to use our automated scheduling system, you must be an enrolled user. Are you an enrolled user? If you are, say ‘yes.’ If you’re not, say ‘no’ and I’ll help you to enroll in our system.”*

***Caller:** “Yes.”*

***System:** “To get started, go ahead and say or key-in your 10-digit account number.”*

***Caller:** “No.”*

***System:** “To get started on the voice enrollment process, I need your 10-digit account number. If you don’t have an account number, or if you’ve lost it, please go to your nearest police station to register for a new account. If you have the account number, go ahead and say or key it in now.”*

Note: In this POC application, NPS is using a Caller’s registration number as the unique identifier to match a Caller’s voice sample with his or her stored voice model. As mentioned in paragraph 1.1 of the IEVAP CONOPS 2.0, “There is no consistent method of personal identification for the Iraqi populace” [1]. In order to make this particular technology work, a Caller must be assigned a unique identifier to match a Caller’s voice

sample with the Caller's stored voice model. It is not practical to use names as the unique identifier because numerous people can have the same name.

Also, the designated remote system enrollment facility, whether it is a police station or other designated facility, must have the capability to assign visitor registration or account numbers and to have access to the BCCF detainee database in order to retrieve and to associate a visitor's registration/account number with a Detainee's Internment Serial Number (ISN).

7. Confirm Visitor Registration (Account) Number (NbrCount2)

If the caller provides a 10-digit account number, the system asks the Caller to confirm his or her answer. If the Caller confirms his or her answer, the system then checks to see if the account number is valid or not. Once, the system has validated the account number, the system then asks the Caller to repeat from one to nine in order to authenticate the Caller's voice biometric. If the system authenticates the Caller, the system proceeds to the next dialog. If the system does not authenticate the Caller, the system repeats the authentication process. If on the third attempt the system cannot authenticate the Caller, then the system plays back a prompt informing the Caller to re-register or will connect the Caller to a live agent (if available).⁷

System: *"Thanks, I heard 8005551212 is that right?"*

Caller: *"Yes."*

System: *"Now to verify your voice, please count out-loud from one up to nine."*

Caller: *"1-2-3-4-5-6-7-8-9"*

System: *"You're been verified."*

⁷ The system demonstration in Phase 1A does not demonstrate speaker verification technology. This feature will be simulated with ASR prompts.

8. Make or Confirm Appointment (DetailScheduling)

If the system authenticates the Caller, the system asks the Caller if he or she wants to schedule a new appointment or whether he or she wants to check to see if a requested appointment is scheduled. If the Caller chooses to schedule a new appointment, then the system asks the Caller to provide the ISN of the Detainee the Caller wishes to visit. If the Caller chooses to check to see if an appointment is scheduled, then the system informs the Caller if an appointment is scheduled or not.⁸

System: “Next, please select from the following options. If you’d like to make a new appointment, say ‘new appointment.’ If you’d like to check the status of a pending appointment, say ‘check appointment.’”

Caller: “New Appointment.”

System: “In order to make a new appointment, you must have the detainee’s Internment Serial Number, or ISN. Do you have the ISN?”

Caller: “Yes.”

System: “Please say or key in all 9-digits of the detainee’s ISN.”

Caller: “111222333.”

9. Confirm Detainee ISN (DetaineeISN)

The system asks the Caller to confirm the ISN of the Detainee the Caller wishes to visit. If the system verifies that the Caller is a registered visitor of the Detainee, then the system allows the Caller to proceed to scheduling. If the system does not verify that this is a registered visitor of the Detainee, then the system repeats a prompt to inform the Caller that he or she is not a registered visitor of the Detainee. The system then prompts the Caller to proceed to his or her initial system enrollment facility to add the Caller to the Detainee’s list of registered visitors.

System: “Thanks, I heard 111222333 is that right?”

⁸ The system demonstration in Phase 1A does not provide the option to check if an existing appointment request is scheduled. A prerecorded prompt replies that there are no pending appointments. “Based on our records, you have no scheduled appointments at this time. If you’ve called earlier to set up an appointment, note that it takes 24 hours for the appointment to get scheduled. Please check back at a later time.”

Caller: “Yes.”

System: “Next, please wait while I check to see if you’re a registered visitor of the detainee with ISN 111222333.”

System: “Thanks. I’ve confirmed that you’re a registered visitor of Abu Musab Al-Zarqawi.”

10. New Appointment (GetVisitDate)

Once the system has verified the Caller’s identity and that the Caller is a registered visitor of the Detainee, the system then prompts the Caller to provide the day and time of the requested visit in a prescribed format such as May 21, 2005, 12 PM.⁹

System: “Please tell me the date for when you’d like to visit Abu Musab Al-Zarqawi. Please say a complete date, including the month, day and year. For example, you could say May 18, 2005.”

Caller: “June 23, 2005.”

System: “Next, tell me the time you’d like to visit. You can choose any time between the hours of 8 AM to 4 PM.”

Caller: “2:30 PM.”

System: “Thanks, I heard that you’d like to visit Abu Musab Al-Zarqawi on June 23, 2005 at 2:30 PM is that right?”

⁹ There is a difference in the concatenation strategy for the reply of dates in Arabic as compared to English. For instance, in English, a Caller is expected to say a date in the following format "May 21, 2005"; however, in Arabic, Callers use digits to describe dates, such as "21-5-2005." To adjust for difference in this concatenation strategy, an application developer can write a grammar file (code) that allows for the input of dates in the following format dd-mm-yyyy. Additionally, Nuance’s also offers “Say Anything” grammars, which is a feature that includes Nuance’s statistical language models (SLM) and robust natural language interpretation (robust NL) technologies. This enables automation of complex and open-ended dialogs that are difficult or impossible to implement using traditional grammars. For this pilot POC system, neither strategy was implemented due to time and budgetary constraint. For the Jordanian-Arabic scheduling application, a recording prompt was substituted for the date recognition process.

11. Confirm New Appointment (ConfirmDateTime)

Once the caller has provided the required information, the system asks the Caller to confirm the appointment. If the Caller replies "yes," the appointment is stored in a database for processing. If the Caller replies "no," the system asks the Caller what variables, date or time, the Caller would like to change. Once the change is completed, the information is stored in a database for processing.

Caller: "Yes."

System: Thanks; I've submitted the details of your request for this visit. Please call us back in 24 hours to see if your requested visit has been scheduled. Thank you for Baghdad Central Correctional Facility Visitor Center, Good Bye."

The demonstration of Phase 1A concludes with a playback confirmation of the requested appointment.

E. PHASE 1A SUMMARY

In this chapter, NPS has successfully developed and demonstrated a bilingual voice-activated menu-driven system based upon the BCCF scenario, as defined by the sponsor of this project, OSD. The purpose of the BCCF Visitor Center Application was to demonstrate the feasibility of using low-cost COTS technologies in order to create a pilot proof-of-concept (POC) system in order to expedite a visitor's entry to a controlled facility/secure space and to assist in managing of detention visitation at the BCCF.

THIS PAGE INTENTIONALLY LEFT BLANK

V. NPS SPEAKER VERIFICATION TEST

A. PHASE 1B OVERVIEW

The purpose of the NPS Speaker Verification Test was to test the accuracy claims of Nuance's speaker verification technology based on the performance measures of false reject rate (FRR) and false accept rate (FAR).¹⁰ This test was conducted using Nuance's packaged speaker verification application, Nuance Caller Authentication (NCA) 1.0 using their North American English Language Verification Master Package. Powered by Nuance's Verifier, NCA uses voice biometric technology to capture the physical and behavioral characteristics of the human voice in a voice model [25].

B. EQUIPMENT LIST

For this test, the following equipment (hardware, software, and peripherals) were used to test and to demonstrate this application.

1. Hardware

Based on the software requirements of Nuance, NPS purchased the following hardware in order to conduct this test, see Figure 11.

- Dell Latitude 15.4" D810 Intel Pentium M770 Processor (2.13 GHz), 2 GB DDR2-533 SDRAM, 80GB Hard Drive, Intel Pro/Wireless 2915 (802.11 a/b/g, 54 Mbps) and integrated Bluetooth.
- Intel NetStructure PBX-IP Media Gateway, 8 Ports (Analog Model).

The laptop computer was chosen for its processing power, memory capability, and mobility. Nuance recommends (at a minimum) using a 1 GHz processor with 2 GB RAM on Microsoft Windows 2000 based system. In distributed architectures, the minimum requirement is 3 GB RAM. The Intel NetStructure PBX-IP Media Gateway

¹⁰ The initial objective of Phase 1B of the IEVAP was to compare the accuracy claims of the three best-of-breed COTS speaker verification vendors, which were Nuance Communications, Inc., ScanSoft, Inc., and Voicevault Ltd, currently known as Biometric Security Ltd. The original goal was to compare the performance of best-of-breed speaker verification vendors and select an individual vendor to develop the pilot POC speaker-verification system. However, due to self-elimination, two out of the three voice vendors, namely, ScanSoft, Inc., and Voicevault Ltd., were not evaluated in this research. Hence, Nuance Communications, Inc. was evaluated in this project.

was selected for its compatibility with Nuance's software. The Intel PBX-IP Media Gateway is a telephony gateway appliance that connects to as many as eight analog phone lines through its digital telephony interface and connects to a LAN via a 10 BaseT or 100 BaseT Ethernet connector. For this test, an analog gateway model was chosen over a digital gateway for its flexibility in connecting to various telephone line connections.

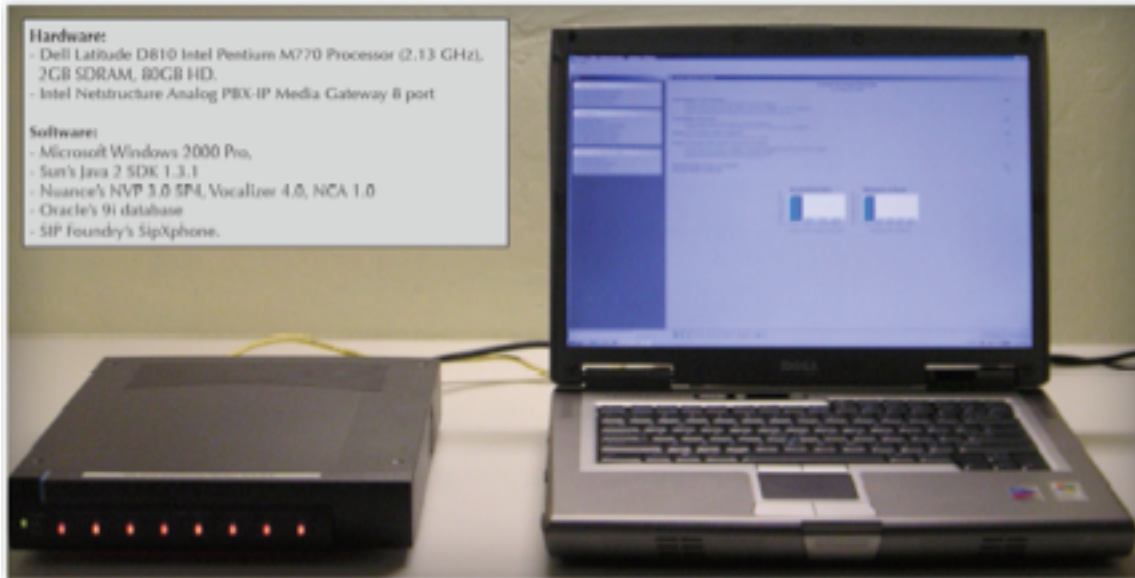


Figure 11. Diagram of NCA Speaker Verification System

2. Software

Listed below are the software applications used to conduct this test:

- Microsoft's Windows 2000 Professional
- Sun's Java 2 SDK 1.3.1_15
- Nuance Voice Platform 3.0. SP4
- Nuance Caller Authentication (NCA) 1.0
- Nuance Vocalizer 4.0
- Oracle's 9i Database
- SIPFoundry's SipXphone.

Currently, Nuance is only tested against Windows 2000 operating system. However, it is noted that Nuance is capable of operating with Microsoft's Windows 2003 and Windows XP Professional operating system. Sun's Java 2 SDK is a development environment for building applications, applets, and components using the Java programming language. This software is downloadable from Sun's website at <http://java.sun.com/j2se/1.3/download.html>. The SIPfoundry SipXphone was selected for its compatibility with Nuance's software. SIPfoundry's SipXphone is a shareware program that can be downloaded at SIPfoundry's website at www.sipfoundry.org. SipXphone was formerly known as Pingtel's instant xpressa softphone, and it is a fully functional SIP softphone that runs on Microsoft Windows and Linux.

C. TEST ENVIRONMENT

The NPS Speaker Verification Test was conducted remotely. All calls made to the system were routed from the Caller's choice of communication medium (landline, cell phone or VoIP) to the NCA system via three analog phone lines connected to the Intel PBX-IP Media Gateway. The NCA system was setup in the Wireless Warfare Laboratory located in Glasgow Hall (Room 103) at NPS in Monterey, California. During the setup of the speaker verification test, special features of the NCA application were intentional disabled in order to determine the raw estimates of the accuracy of the system without any fine-tuning. The two features that were disabled included: Variable Length Verification (VLV) and Online Adaptation [25].

- Variable Length Verification is a mechanism used by NCA for providing the most accurate results based on the fewest utterances. In the NPS Speaker Verification Test, this feature was intentionally disabled in order to collect more voice data for the offline impostor test.
- Online Adaptation is a feature that allows a system to adapt a stored voice model automatically during a verification session if it determines that the user is the true speaker. For the majority of calls, the system collected two utterances during the verification process.

D. TEST SCHEDULE

Table 2 presents the planned and actual completion test schedule for Phase 1B.

Task	Planned Completion Date	Actual Completion Date
System Installation	1 Apr 05	On Schedule
System Design (Phase 1B Test Plan)	1 Apr 05	On Schedule
System Test 1B.1 (English Speaker Verification Test 1)	21-22 Apr 05	20-24 Apr 05*
System Test 1B.2: (English Speaker Verification Test 2)	5-6 May 05	2-8 May 05*
Nuance Offline Analysis	13-20 May 05	On Schedule
NPS Analyze Data/Draft Report	21-30 May 05	On Schedule
Conduct Demonstration & Preliminary Report Submission	31 May 05	6 Jun 05
<i>Note (*): Test dates were expanded to allow for additional caller participation.</i>		

Table 2. Phase 1B Test Schedule

E. TEST PROTOCOL

The test protocol for the speaker verification test consisted of four steps. In step one, invitation letters were sent via email to participating organizations (OSD, Massachusetts Institute of Technology (MIT) and NPS) requesting volunteers to participate in this research. The invitation letter provided the prospective volunteers with a general overview of the NPS Speaker Verification Test, to include a sample call dialog of the speaker enrollment and speaker verification process, applicable participation consent forms, and post-test survey. And as part of the NPS/DOD regulations for the use

of human subjects, the NPS research team obtained permission from the NPS Human Resource Board prior to conducting any testing. For additional information on the Invitation Letter for the NPS Speaker Verification Test refer to Appendix B of this thesis. In step two, on specified test dates, participants were asked to dial a given telephone number to enroll and to verify their voice biometric. Participants were given the opportunity to call into the test system during a 24-hour period on four successive days to make their call(s). In step three, participants were asked to enroll once and then verify four times during the first test (20-24 Apr 05) and to verify again six times during the second test (2-8 May 05). During the enrollment process, participants were asked to register with the system with a unique 10-digit identification number and an arbitrary 4-digit personal identification number. Participants were then asked to say the numbers 1 to 9 three times. These three instances of voice samples were used for generating a unique model of the participant's voice pattern. During the verification process, the participants registered with the unique ID and then were asked to speak the sequences of numbers 1 to 9, a total of two times. Finally, in step four, the results of the NPS Speaker Verification Test was published and disseminated.

F. TEST ANALYSIS

The analysis of the NPS Speaker Verification Test was conducted in three phases. The first phase consisted of an analysis of the call log (basic statistics) of the verification test, resulting in a single data-point analysis. The second phase consisted of an analysis of the off-line impostor test conducted by Nuance on the NPS data set, resulting in a ROC Curve analysis. Lastly, the third analysis phase consisted of a comparison of the single data-point analysis with the results of the ROC Curve analysis.

1. Basic Statistics

Provided in Figures 12 through 14 are the summary of the basic statistics of the NPS Speaker Verification Test.

Figure 12 presents the aggregate speaker enrollment data, which consisted of 68 test subjects enrolled during the two test phases, with a 51-speaker enrollment during the first test phase and a 17-speaker enrollment during the second test phase.

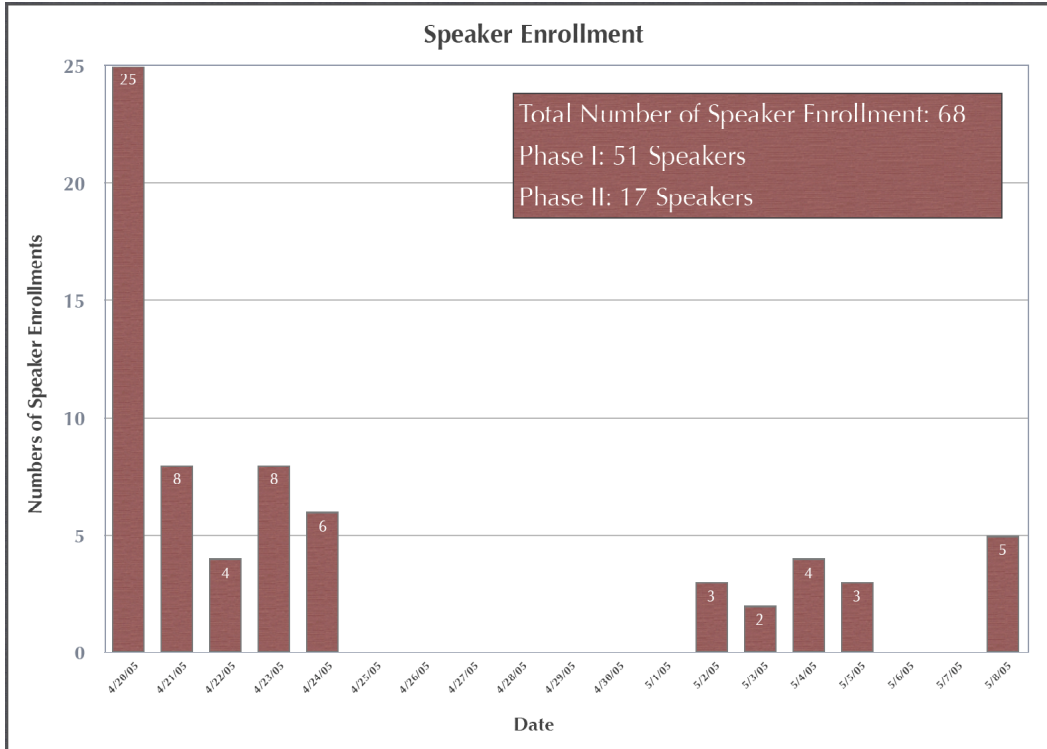


Figure 12. Speaker Enrollment Report

Figure 13 (on page 45) presents the aggregate speaker verification data, consisting of 411 verification attempts equally divided between the two test phases, with 204 verification attempts during the first test phase and 207 verification attempts during the second test phase. Figure 14 (on page 45) presents the number of verification attempts per voice model (Caller). Note that in Figure 14, two callers had a very large number of verification attempts (combined total of 77 calls), compared to others (334 calls) for a total of 411 speaker verification attempts in the dataset. In a subsequent analysis, this outlier effect is accounted for by computing the FRR and FAR with and without including the two-outlier cases.

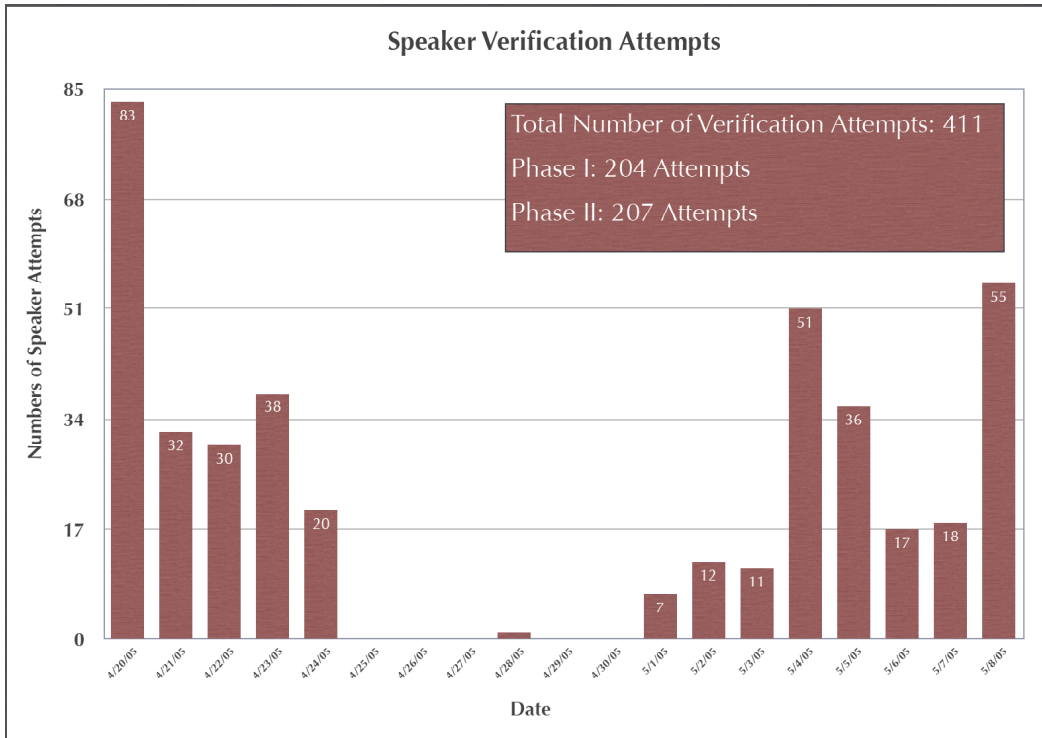


Figure 13. Speaker Verification Report

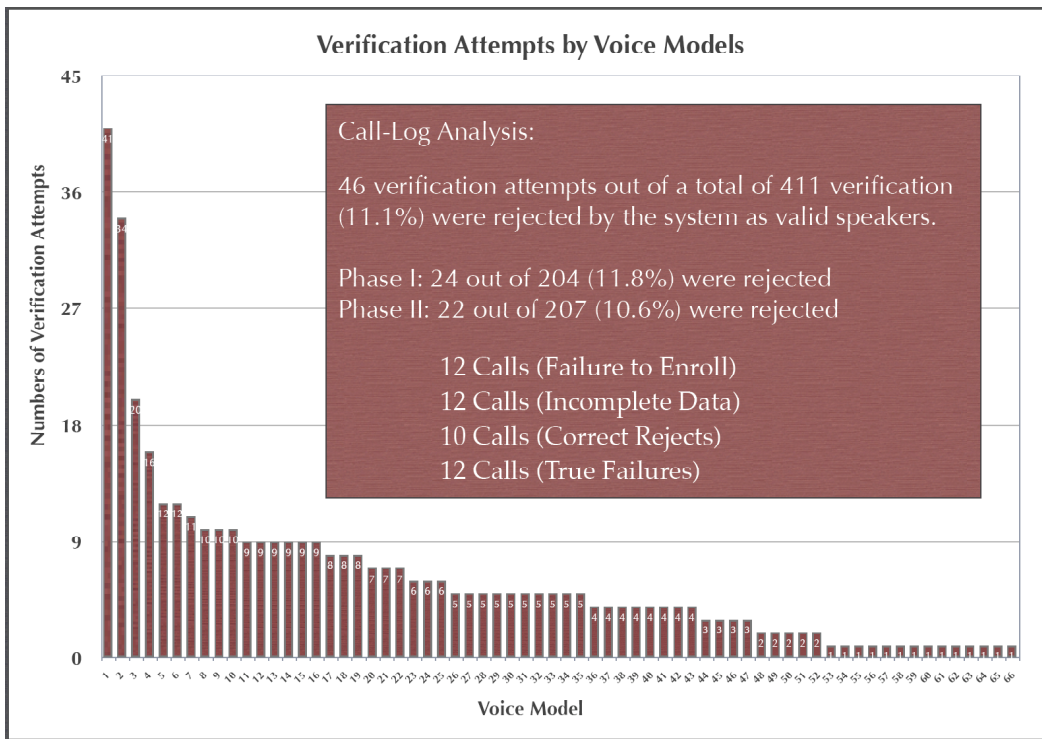


Figure 14. Number of Verification Attempts per Voice Model (Caller) Report

2. Nuance ROC Curve Analysis

Upon completion of the NPS Speaker Verification Test, the raw test data were extracted from the system and sent to Nuance for their offline analysis. The offline-test performed by Nuance consisted of a test whereby each speaker's verification attempt was tested against every enrolled voice model in the database. This offline impostor test resulted in a series of ROC Curves that plotted the FAR versus the FRR at various system defined thresholds. The EER of the system, the points on the ROC Curve at which the FAR equals the FRR, was also measured and reported. The process for the ROC Curve generation consisted of five steps. In step one, raw data from the NCA application was extracted via a program called "TuningExport" [25]. In step two, a pass at generating the basic statistics of the NCA test application was generated. In step three, the failed verification attempts were validated to determine which calls were correct rejects. In step four, a second pass at the basic statistics of the NCA test application was generated (incorporating the correct rejects from the previous step). And in step five, the ROC Curve was generated using a Nuance utility called "batchrec" [25].

Figures 15 to 18 are the ROC Curves plots generated from Nuance's offline analysis. Figure 15 is the ROC Curve diagram of the NPS Speaker Verification Test data set. An inspection of Figure 15 shows an EER of 3.0%. Figure 16 is a ROC Curve plot with and without the inclusion of identical speakers. Figure 17 is a ROC Curve plot with and without the inclusion of the two most frequent speakers, termed outliers. Finally, Figure 18 is a ROC Curve plot by test phases. Note that in Figure 18, Phase Two's EER of 3.4% was slightly higher versus the Phase One's EER of 2.5%. This may be explained due to the session effect.¹¹

¹¹ A session effect refers to the nature of the variation in the voice quality.

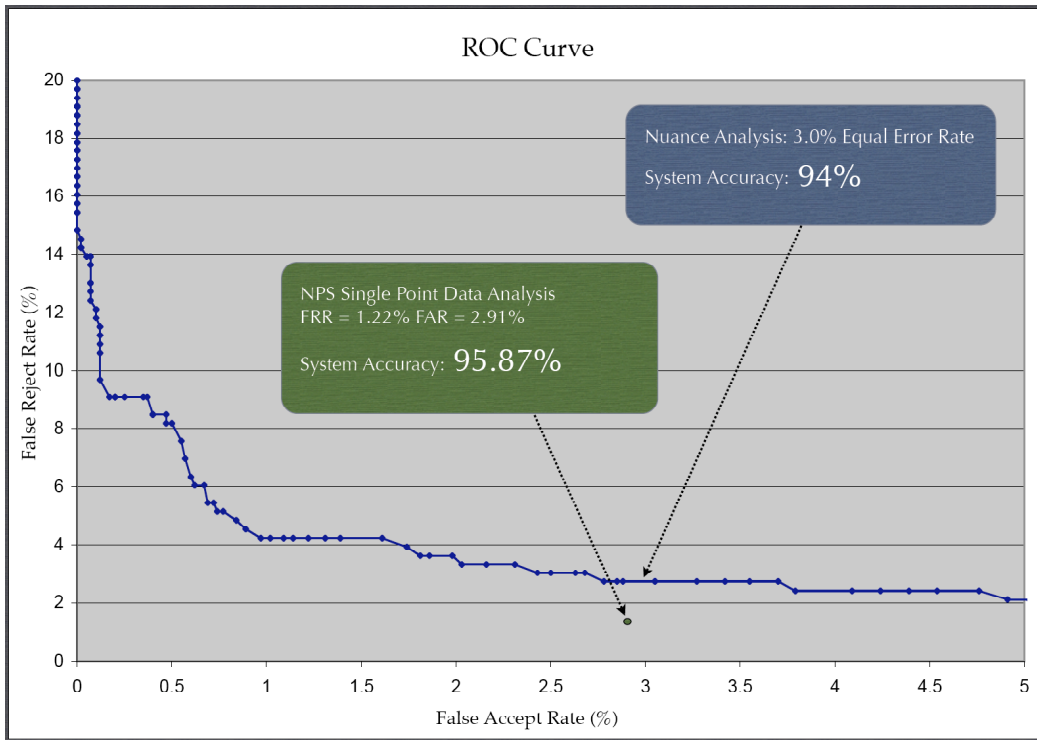


Figure 15. ROC Curve for NPS Speaker Verification Test

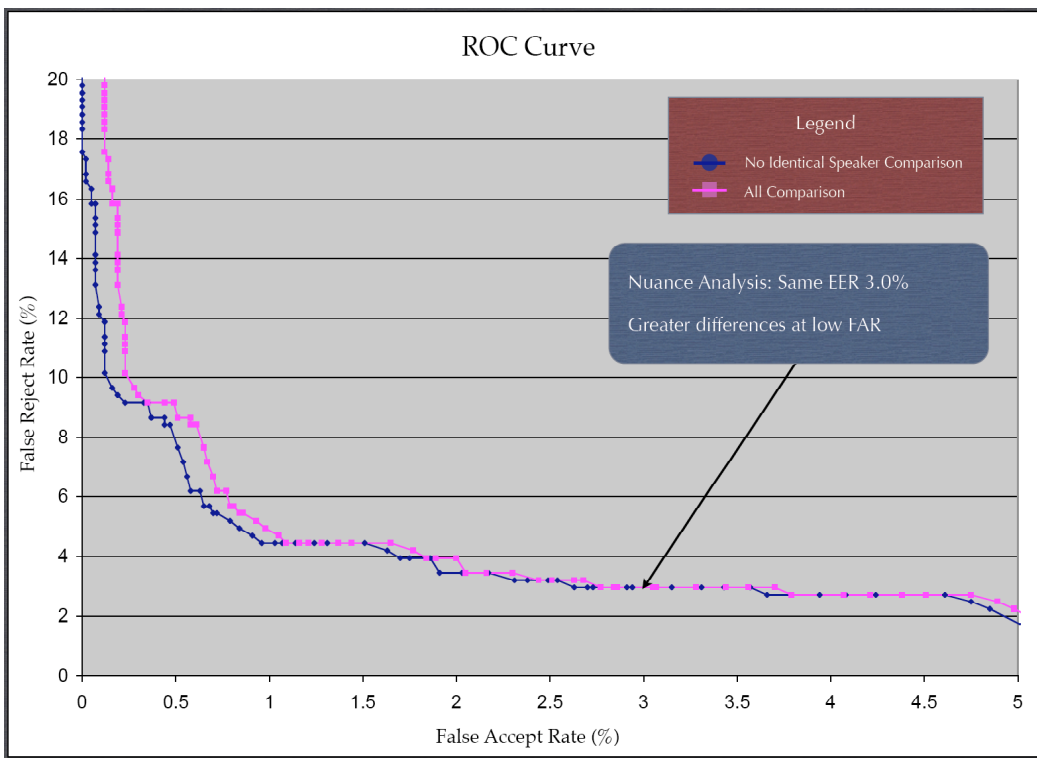


Figure 16. ROC Curves (with and without Identical Speakers)

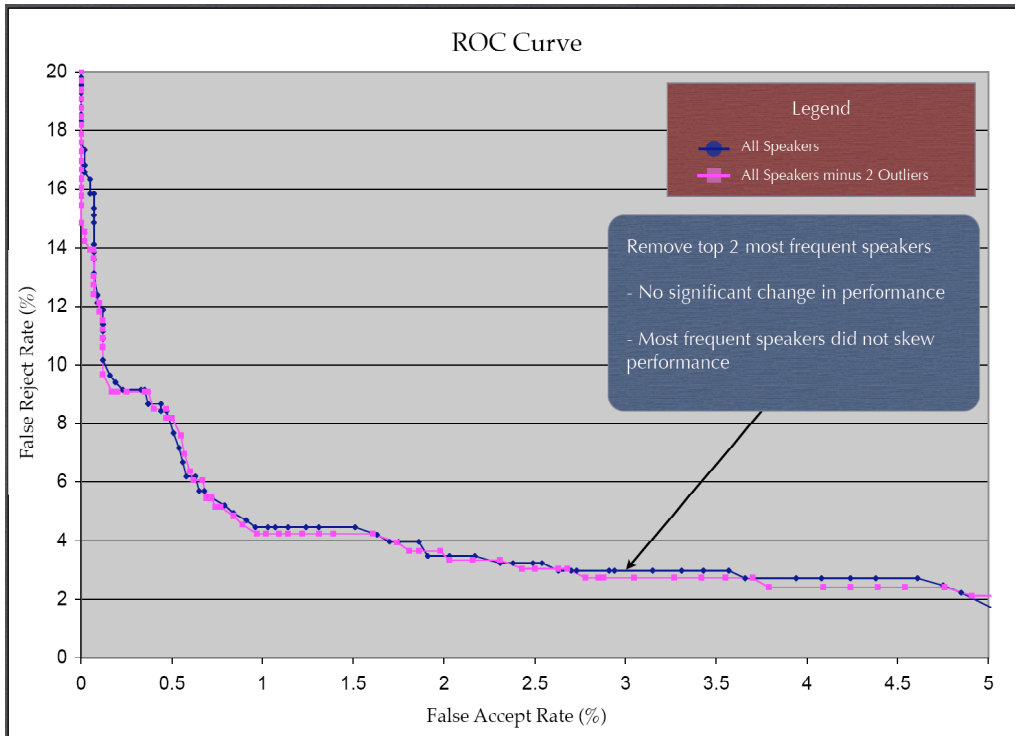


Figure 17. ROC Curves (with and without Outliers)

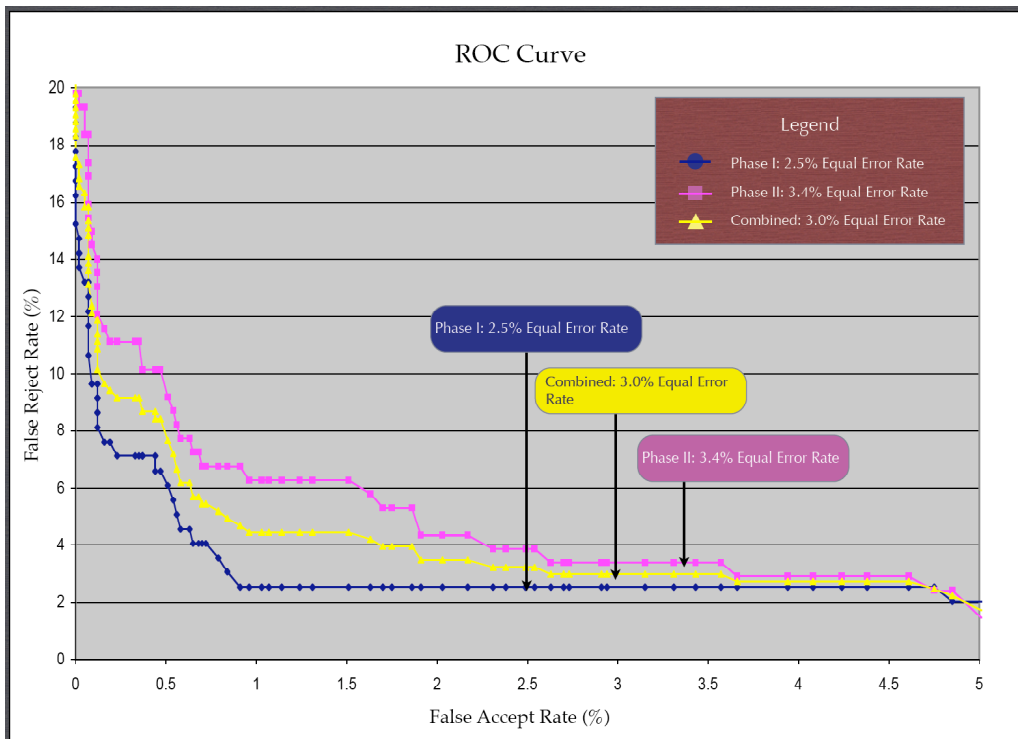


Figure 18. ROC Curves (by Test Phase)

Figure 19 compares the NPS Speaker Verification Test data set with Nuance's comparison data set. When compared to the NPS data set, the average values of FRR and FAR from Nuance's similar data sets fell within the expected range, specifically around 3% EER.

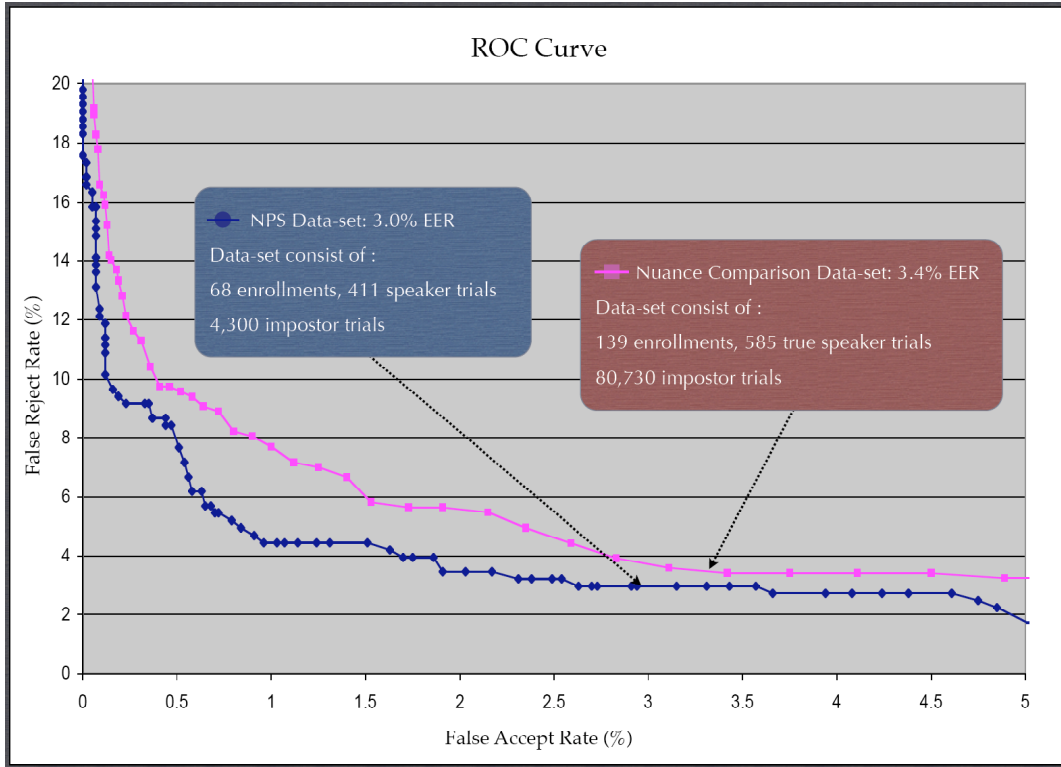


Figure 19. Data-Set Comparison with Expected Performance

On average, the Nuance comparison data set exhibits an EER of 3.4%. The reason for the slight difference may be explained by the fact that the Phase Two test was conducted within only two weeks of the Phase One test, whereas in reality the Nuance technology can verify voice signals recorded over a longer period (months or years).

3. Comparison Analysis (Single Data-Point versus ROC Curve)

The detailed analysis by NPS resulted in a sub-classification of many rejected attempts as false rejections, incomplete data sets, correct rejections, imposter attempts, as well as enrollment failures. In the context of the single data-point analysis, NPS defines the total number of valid verification attempts as:

$$NT = NTAR + NFRR + NFAR + NTFR.$$

where,

NT The total number of valid verification attempts

NTAR The total number of true accepts

NFRR The total number of false rejects

NFAR The total number of false accepts

NTFR The total number of true failures.

$$\text{False Reject Rate (FRR)} = NFRR / NT$$

$$\text{False Accept Rate (FAR)} = NFAR / NT$$

$$\begin{aligned} \text{Accuracy of the System} &= (NT - (NFRR + NFAR)) / NT \\ &= (NTAR + NTFR) / NT \end{aligned}$$

Note: Nuance presents only FRR and FAR. However, it is NPS' contention that the accuracy of the system = 100 – (FRR+FAR). See Table 3 on the next page for a comparison of the NPS analysis versus the Nuance analysis and Appendices C, D, and E for additional details.

DISCUSSION ITEM	NUANCE ANALYSIS	NPS ANALYSIS	NPS ANALYSIS (EXCLUDES 2 OUTLIERS)
1. Enrollment	Total Speakers Enrollment: 71 Phase 1 (15-24 Apr 05): 54 Phase 2 (2-8 May 05): 17 Note: Nuance considered enrollment data from 15 Apr 05 to 8 May 05.	Total Speakers Enrollment: 68 Phase 1 (15-24 Apr 05): 51 Phase 2 (2-8 May 05): 17 Note: NPS considered enrollment data from 20 Apr 05 to 8 May 05.	Total Speakers Enrollment: 66 Phase 1 (15-24 Apr 05): 49 Phase 2 (2-8 May 05): 17 Note: Two high callers (outliers) were excluded from this analysis.
2. Total Nbr of Rejected Calls	Total Nbr of Rejected Calls: 46 (Details not provided)	Total Nbr of Rejected Calls: 46 Failure to Enroll: 12 Incomplete Data: 12 Correct Rejects: 10 True Failures: 12	Total Nbr of Rejected Calls: 39 Failure to Enroll: 12 Incomplete Data: 10 Correct Rejects: 9 True Failures: 8
3. Valid Verification Attempts	Valid Verification Attempts: 411 Phase 1: 204 Phase 2: 207 Note: Identified by Phase only	Valid Verification Attempts: 411 Successes: 389 True Failures: 12 Correct Rejects: 10 Note: Identified by Call Type	Valid Verification Attempts: 336 Successes: 319 True Failures: 8 Correct Rejects: 9 Note: Identified by Call Type
4. True Failures	True Failures: 7	True Failures: 12	True Failures: 8
5. False Acceptance	(Details not provided)	False Acceptance: 5	False Acceptance: 5
6. Accuracy Analysis	Nuance ROC Analysis FRR = 3.0% FAR = 3.0% Accuracy = 94.0%	NPS Single Data-point Analysis FRR = 2.91% FAR = 1.22% Accuracy = 95.87% This data point is slightly better than what Nuance expects their system to do on such a test.	NPS Single Data-point Analysis FRR = 2.38% FAR = 1.48% Accuracy = 96.14% This data point is slightly better than what Nuance expects their system to do on such a test.
<p>Nuance claims:</p> <p>For the impostor test, a total of 4,300 trials matched against each other and found an EER of 3%.</p> <p>Nuance claimed this is slightly better than their average EER of 3.4% over many such data-sets. For a FAR of 1%, Nuance expects FRR of 5% (system accuracy of 94%)</p> <p>When Nuance repeated the ROC analysis without the user accounts with multiple enrollments, the EER remained the same.</p> <p>Similarly removing the two most frequent speakers did not affect the EER of the ROC analysis. In other words, the most frequent speakers did not skew the results.</p> <p>Note: Speaker adaptation was not enabled during this test. Had this been done, Nuance claims that the EER will decrease by 25% after 3 calls resulting in a new EER of 1% or system accuracy of 98% and after 6 calls the EER will be reduced by 35%.</p>			

Table 3. NPS Speaker Verification Test Analysis Comparison

G. COMPARISON WITH PREVIOUS SPEAKER VERIFICATION TESTS USING NUANCE'S TECHNOLOGY

1. The University of Edinburgh Speaker Verification Test (May 2000)

The UK Edinburgh test, conducted in May 2000, claims 1.2% half total error rate (FRR+FAR/2). This corresponds closely with the NPS test with a FRR of 2.7% at a FAR of 1% yielding a half total error rate of 1.85%. This difference can be explained based on the observations in the Edinburgh report reproduced below [26]:

- The Edinburgh test had more enrollment and verification data (one thousand users) as opposed to the NPS trial (68 users).
- The Edinburgh test's verification error rates were reduced by increasing the amount of enrollment data used to train the models for each client speaker. For example, training on three utterances of a nine-digit membership number instead of on a single utterance reduced the error rate by about one-third (from 2.7% to 1.8% with both male and female impostors, or from 3.5% to 2.4% with same-sex impostors); comparable improvements were obtained on other verification phrases.
- The Edinburgh test used multiple digit phrases (a nine-digit account number, an eight-digit membership number and two single digits) yielding an error rate of 1.2% with both male and female impostors or 1.4% with same-sex impostors, with speaker models trained on three enrollment utterances per phrase.
- The great majority of the calls made to the Edinburgh speaker verification system were made from landline telephones, usually at the participants' workplaces or homes.

2. The International Biometrics Group (IBG) Test (2004)

The IBG test reports a worst-case estimate of a FAR of 0.818% versus an FRR of 1.04% for landline calls and a FAR of 2.0% versus a FRR of 2.27% for cellular calls. This was on a database of 200 callers and the estimates on a second visit after a period of 4 to 5 weeks (test results provided by Nuance) [27] [28].

- Testing occurred in a sterile environment. The room was reasonably isolated from external noise. A manually adjustable thermostat controlled the room's air conditioning. Air conditioning was set to "off" during testing, as the climate control fans were sufficiently loud to potentially impact testing if they had engaged.
- IBG used completely matched handsets. Landline testing took place through an AT&T Trimline Caller ID Telephone Model 260. Cellular phone testing took place on a Samsung S105.
- IBG also used three utterances of 16-digits for both enrollment and verification. (The NPS test used three utterances of 9-digits for enrollment and two utterances of 9-digits for verification.)

H. TEST LIMITATIONS

For purposes of this test, participants were expected to be who they claimed to be and hence no separate and independent identity checks were planned, either during or prior to enrollment. Furthermore, in this test, NPS did not keep records of the type of phone lines used, e.g., whether calls were received from landline or cell phone. NPS expected to have a random mix of the two.

Another variable of this test was the number of test subjects. The total number of speaker enrollments was 68 speakers; however, only 64 out of the 68 speakers who initially enrolled made subsequent calls to the system to verify their voice biometrics (It would have been preferable to have at least a 100 enrollments and at least a thousand speaker verification attempts).

Given the limited scope of this test, gauging how the error rates will scale up for the speaker verification technology as the background database grows is difficult. No statistics are available for speaker verification against very large voice background databases. Nor it is clear what the error rates and accuracy would be for the Arabic speaker verification system. NPS can only say that the Arabic speaker verification accuracy would be no higher than that for the English speaker verification module. Nuance has 13 million English voice models in its database and continues to fine-tune speaker verification performance as new data are collected. Presently, they have no Arabic voice models in its database system for fine-tuning purposes.

I. PHASE 1B SUMMARY

In Phase 1B of this project, NPS successfully conducted a speaker verification test to assess Nuance's speaker verification technology based on the performance measures of the FRR and FAR. During the test, NPS did not impose any restrictions on the callers in terms of the type of phone used or from where the calls originated. And while the Nuance ROC analysis yields an equal error rate of 3% (FRR based on 411 trials, FAR based on 4300 trials) and a system accuracy of 94%, the NPS analysis yields a FRR of 2.91% and a FAR of 1.2% (based on 411 verification attempts) and a system accuracy of 95.87%. The ROC analysis equal error estimates of the NPS test are in the same range as the average estimates of the equal error rate (FRR = 3.4%, FAR = 3.4% and system accuracy = 93.2%) by Nuance based on other similar datasets. This validates the NPS test in spite of the smaller number of enrollments and speaker verification attempts.

VI. CONCLUSIONS

A. SUMMARY DISCUSSION

Speaker verification is a viable form of biometric technology and merits further research. In terms of perceived applications for operations in Iraq, voice biometrics offers unique capabilities that are unmatched in terms of remote-ability, flexibility, maintenance and cost. First, voice biometrics uses existing telecommunication infrastructures (landline, cellular or VoIP), as such, a new infrastructure is not required to be built around the deployment/employment of this technology, which reduces costs and time to deploy the technology. Second, voice biometrics allows dissemination and collection of information other than key biometric data. Third, voice biometrics can be employed in multilingual applications without the aid of a trained linguist or a translator, which results in manpower savings. And fourth, voice biometrics rely on a signal that is natural and unobtrusive to produce and requires no special user equipment or training, which results in the rapid deployment of technology without adding additional training requirements for troops serving in Iraq and Iraqi citizens.

This thesis has documented the results of the NPS research team's efforts on the initial phase of the IEVAP. The intent of this project was to contribute to the future employment of speech technologies in a variety of coalition military operations by developing a pilot POC system that integrates COTS speaker verification and ASR technologies into a mobile platform to enhance warfighting capabilities.

In Phase 1A of the IEVAP, NPS successfully developed a bilingual (English and Jordanian-Arabic) speech application that demonstrated the viability of speaker verification technology for use in operations in Iraq.

In Phase 1B of the IEVAP, NPS successfully conducted a test to assess the accuracy claim of Nuance's packaged speaker-verification application, Nuance Caller Authentication 1.0 (for North American English). The NPS test consisted of 68 speaker enrollments and 411 speaker verification attempts. Upon completion of the test, NPS conducted a single data-point analysis yielding a system accuracy of 95.87%.

B. RECOMMENDATIONS FOR FURTHER RESEARCH

As the preliminary phase of the IEVAP comes to a completion, it is evident that the objectives for Phase 1A and 1B of the IEVAP have been accomplished. However, further research is required to achieve the main objective of the IEVAP, which is to develop and demonstrate a speaker verification system in Iraqi-Arabic. The following is a list of recommended further studies for NPS students in support of this research project.

- Develop a test to assess the performance of the Iraqi-Arabic speaker verification and speech recognition language modules for Phase 1C of the IEVAP.
- Conduct a cost-benefit analysis on the deployment of speaker verification technology in Iraq.
- Conduct a comparative analysis on the communication infrastructure of Iraq, e.g., comparison of 802.11, 802.16, cellular, and landline technologies in support of the employment of speaker verification technology in Iraq.

APPENDIX A. BCCF DIALOG SPECIFICATION



**NAVAL
POSTGRADUATE
SCHOOL**

MONTEREY, CALIFORNIA

DIALOG SPECIFICATION

**BAGHDAD CENTRAL CORRECTION FACILITY (BCCF)
VISITOR CENTER APPLICATION**

APPLICATION VERSION 1.0

by

Samuel K. Lee

June 2005

Dialog Development Support:
Technical Support:
Technical Support:
Linguistic Support:

Shamitha Somashekar (Nuance)
Torsten Zeppenfeld (Nuance)
Ralf Schiffert (Nuance)
Motasem Mansi (DLI)

APPENDIX A. TABLE OF CONTENTS

A.	BILINGUAL BCCF APPLICATION OVERVIEW	61
1.	REVISION HISTORY.....	61
2.	TYPOGRAPHICAL CONVENTIONS.....	61
3.	DIALOG STATE FORMAT.....	61
B.	BILINGUAL BCCF APPLICATION SUMMARY.....	62
1.	FUNCTIONALITY AND FEATURES.....	62
2.	USERS.....	65
3.	PERSONA.....	65
4.	VARIABLE DEFINITIONS.....	65
C.	BILINGUAL BCCF APPLICATION DIALOG FLOW.....	65
1.	UNIVERSAL BEHAVIORS.....	65
D.	BILINGUAL BCCF APPLICATION DIALOG STATES.....	68
1.	WELCOMEBCCF PAGE INFORMATION.....	68
2.	WELCOMEBCCF#WELCOMEBCCF.....	68
3.	LANGUAGESELECTION PAGE INFORMATION.....	69
4.	LANGUAGESELECTION#LANGUAGESELECTION.....	70
5.	LANGUAGESELECTION#ARABMAINMENU.....	74
6.	LANGUAGESELECTION#ENGMMAINMENU.....	74
7.	CLEANUPANDEXITENGLISH PAGE INFORMATION.....	75
8.	CLEANUPANDEXITENGLISH#SAYGOODBYE.....	76
9.	CLEANUPANDEXITENGLISH#HANGUP.....	76
E.	BILINGUAL BCCF APPLICATION APPENDICES.....	77
1.	GRAMMAR AND SLOT DEFINITIONS.....	77
2.	PROMPT LIST.....	77
F.	ARABICMAINMENU OVERVIEW.....	78
1.	APPLICATION SUMMARY.....	78
2.	DIALOG FLOW.....	78
G.	ARABICMAINMENU DIALOG STATES.....	81
1.	ARABICMAINMENU PAGE INFORMATION.....	81
2.	ARABICMAINMENU#ARABICMAINMENU.....	82
3.	ARABICMAINMENU#ARABICDIRECTIONS.....	85
4.	ARABICMAINMENU#ARABICVISITINFORMATION.....	88
5.	ARABICSCHEDELING PAGE INFORMATION.....	92
6.	ARABICSCHEDELING#ARABICSCHEDELING.....	95
7.	ARABICSCHEDELING#CONFIRMACCOUNTNBR.....	97
8.	ARABICSCHEDELING#CONFIRMACCOUNTNBR2.....	101
9.	ARABICSCHEDELING#CONFIRMENROLLPIN.....	104
10.	ARABICSCHEDELING#ENROLLCHECK.....	107
11.	ARABICSCHEDELING#ENROLLMENTPIN.....	109
12.	ARABICSCHEDELING#NBRCOUNTONE.....	112

13.	ARABICSCHEMULING#NBRCOUNTTHREE	114
14.	ARABICSCHEMULING#NBRCOUNTTWO.....	116
15.	ARABICSCHEMULING#NBRCOUNTVERIFY	118
16.	ARABICSCHEMULING#RECORDREMINDER.....	120
17.	ARABICSCHEMULING#RECORDSECRETDATE	122
18.	ARABICSCHEMULING#VOICEENROLLMENT	123
19.	ARABICSCHEMULING#VOICEVERIFICATION	128
20.	ARABICDETAINEEAPPT PAGE INFORMATION.....	132
21.	ARABICDETAINEEAPPT#ARABICDETAINEEAPPT.....	133
22.	ARABICDETAINEEAPPT#CHECKAPPOINTMENT	136
23.	ARABICDETAINEEAPPT#CHECKDETAINEEISN.....	137
24.	ARABICDETAINEEAPPT#CONFIRMDETAINEEISN.....	138
25.	ARABICDETAINEEAPPT#ENTERDETAINEEISN	141
26.	ARABICDETAINEEAPPT#NEWAPPOINTMENT	145
27.	ARABICDETAINEEAPPT#RECORDVISITATIONDATE	148
28.	CLEANUPANDEXIT_SAYGOODBYEARABIC PAGE INFO.....	149
29.	CLEANUPANDEXIT_SAYGOODBYEARABIC#SAYGOODBYE	150
30.	CLEANUPANDEXIT_SAYGOODBYEARABIC#HANGUP.....	151
H.	ARABICMAINMENU APPENDICES	151
1.	GRAMMAR AND SLOT DEFINITIONS.....	151
2.	PROMPT LIST	155
I.	ENGMMAINMENU OVERVIEW	160
1.	APPLICATION SUMMARY.....	160
2.	ENGMMAINMENUMIALOG FLOW	161
J.	ENGMMAINMENU DIALOG STATES	163
1.	ENGMMAINMENU PAGE INFORMATION	163
2.	ENGMMAINMENU#ENGMMAINMENU	164
3.	ENGMMAINMENU#ENGDIRECTIONS.....	168
4.	ENGMMAINMENU#ENGVISITINFORMATION.....	171
5.	ENGSCHEDULING PAGE INFORMATION	174
6.	ENGSCHEDULING#ENGSCHEDULING.....	176
7.	ENGSCHEDULING#CONFIRMACCOUNTNBR	178
8.	ENGSCHEDULING#CONFIRMACCOUNTNBR2	181
9.	ENGSCHEDULING#CONFIRMENROLLPIN.....	184
10.	ENGSCHEDULING#CONFIRMSECRETDATE.....	186
11.	ENGSCHEDULING#ENROLLCHECK	190
12.	ENGSCHEDULING#ENROLLMENTPIN.....	192
13.	ENGSCHEDULING#GETSECRETDATE.....	195
14.	ENGSCHEDULING#NBRCOUNTONE.....	198
15.	ENGSCHEDULING#NBRCOUNTTHREE	200
16.	ENGSCHEDULING#NBRCOUNTTWO.....	202
17.	ENGSCHEDULING#NBRCOUNTVERIFY	204
18.	ENGSCHEDULING#RECORDREMINDER.....	206
19.	ENGSCHEDULING#VOICEENROLLMENT	208

20.	ENGSCEDULING#VOICEVERIFICATION	210
21.	ENGDETAINEEAPPT PAGE INFORMATION	213
22.	ENGDETAINEEAPPT#ENGDETAINEEAPPT	214
23.	ENGDETAINEEAPPT#CHECKAPPOINTMENT	217
24.	ENGDETAINEEAPPT#CHECKDETAINEEISN.....	218
25.	ENGDETAINEEAPPT#CONFIRMDETAINEEISN.....	219
26.	ENGDETAINEEAPPT#CONFIRMVISITATIONDATETIME.....	222
27.	ENGDETAINEEAPPT#ENTERDETAINEEISN	226
28.	ENGDETAINEEAPPT#GETVISITATIONDATE	228
29.	ENGDETAINEEAPPT#GETVISITATIONTIME.....	232
30.	ENGDETAINEEAPPT#NEWAPPOINTMENT	235
K.	ENGMENMAINMENU APPENDICES	238
1.	GRAMMAR AND SLOT DEFINITIONS.....	238
2.	PROMPT LIST	240

A. BILINGUAL BCCF APPLICATION OVERVIEW

1. Revision History

This dialog specification document is produced and controlled by the Naval Postgraduate School. All requests to make changes to this document should be directed to the authors so that changes are made through the appropriate version control procedures.

2. Typographical Conventions

- Prompt text in sample dialogs is within quotes and bold (e.g., "May I help you?")
- Verbal responses from the user and sample phrases are within quotes (e.g., "Yes.")
- Natural language (NL) slots are bold and between angle brackets (e.g., <name>). NL slots, which are determined by the grammar being used, are filled with values based on what the user has said. Sometimes the values of NL slots are stored in system variables for later use.
- Text-to-speech (TTS) output is shown in Italics (e.g., Say-as expr: name.) If the TTS value is a literal, it is also placed in quotes (e.g., TTS: "The date I heard was.")

3. Dialog State Format

A dialog state represents one conversational interchange between the system and the user. Dialog states may contain the following elements:

- Description: Explains what interaction takes place in the dialog state.
- Special Features: Describes relevant special features, such as whether N-best processing is used or the state is a hot-word state and any universal behavior (whether there are exceptions, etc.).
- Entry and Exit States: Lists (as links) the possible preceding and following dialog states.

- Pre-rec Prompts: Lists the prompts that may be played prior to receiving the user’s input.
- Grammar: In a recognition state, defines the grammar used for recognizing the user’s input by showing slot names and values. Also shows sample phrases that fill the NL slots. The "Sample Phrases" list is not exhaustive.
- Actions: Lists the actions to be taken by the system (typically based on system variable values).
- Error Behaviors: If an error behavior for a dialog state differs from the application-level behavior, it is noted in this section.
- State-Specific Universal Behaviors: If a universal behavior (e.g., help) for a dialog state differs from the application-level behavior, it is noted in this section.

B. BILINGUAL BCCF APPLICATION SUMMARY

1. Functionality and Features

Automated Speech Recognition (ASR) application in support of the voice-activated menu-driven application for the Baghdad Central Correctional Facility (BCCF).

a. DTMF

Where applicable, callers can use DTMF (touch-tone) to enter such information as phone numbers, PINs, dates, and monetary amounts.

b. Text-to-Speech Output

Text-to-speech output is used in the application, if needed.

c. N-Best/Skiplists

The N-best list is where the recognizer stores not only the result that has the highest probability but also N other results in order of decreasing probability. To avoid caller frustration and to get more calls put through successfully, the application implements a “skip list.” Skip lists are used in combination with N-best lists and store items that have been negatively confirmed by the caller. When the caller is re-prompted in the same state, items in the N-best list that are present in the skip list are discarded and

the application skips over to the next result on the list. If all the results in the N-best list are on the skip list, the top choice on the N-best list should be selected.

N-best lists are also used in conjunction with checksum algorithms (e.g., for credit card numbers) and other data sources (e.g., customer databases). Cross-referencing the N-best results allows the application to eliminate incorrect recognition hypotheses. This technique is often combined with a skip list.

d. Filler - prefixes, suffixes

Fillers are incorporated in the grammar before (prefix) and after (suffix) the meaningful portion of the sentence. Examples of fillers are: "I want to," "I want," "please," "uh," and "um."

e. Barge-in

Barge-in is the ability of the system to recognize that a caller is speaking while a prompt is still playing, and to stop playing the prompt. Barge-in enables faster service for experienced callers who can interrupt prompts, quickly going through the dialog. Less-experienced callers are still guided by full prompts.

f. Randomization of prompts

Certain prompts that are heard over and over again may have variations that are played randomly. For example, the confirmation "okay" might be randomly varied with "sure" and "got it." This makes the system more conversational and natural.

g. Non-recognition States

Non-recognition states are used mainly in cases where the system needs to do data processing, such as sending or retrieving information from the back-end. Sometimes these states will also include brief informational prompts that are played back to the caller, such as "Sorry, but I was not able to complete your request. Now, hold on and I'll take you back to the Main Menu."

In non-rec states, barge-in is off, which means that if a caller says something during this state, nothing will happen. Barge-in will be turned back on when the caller reaches the next state.

h. Task Completion Tags

For VoiceXML applications, to add more accurate reporting, tasks can be labeled with task completion tags in the code to signify a task start and a task end. Where appropriate, task completion tags are noted in the dialog spec to be added to the code. For example, an end tag might look like this:

```
<nuance:taskend name="accountbalance" cond="true"/>
```

It is important to be careful with tags in the case of factors like “repeat” or switching between sub-applications, to make sure the taskbegin and taskend tags match up correctly.

In addition, states in which a task has already been completed (and no new task has been started) should override the max error and universals to make sure a task end tag is not written, to avoid mis-matched tags.

i. Hot-word

Hot-word states are used in cases where the system is not expecting the caller to say something in response to a prompt, but instead is playing back information to a caller. Examples of this include implicit confirmation (“Okay, fifty dollars.”) or general information playback (“The phone number is: 604 555 1234, and the amount owed is fifty-six dollars.”) However, rather than make these non-recognition states, hot-word allows the callers to say a small subset of things, such as “no!” or “repeat,” which gives the dialog more flexibility.

In a hot-word state, the prompt is only cut off if the user says something within grammar. All out of grammar utterances are ignored and the prompt continues playing as if the caller had not said anything.

Hot-word states generally have small grammars, such as just the universals.

j. VoiceXML Grammar Labels

A grammar label is automatically included for each state. Grammar labels are essential for efficient system tuning.

2. Users

It is assumed that the visitors of detainees are between the ages of 18 and 50. They consist mostly of family members of the detainees, often wives, children, mother, and fathers. It is assumed that the visitors are generally repeat visitors. It is also assumed that visitors are unfamiliar with the use of speaker verification and ASR technology

3. Persona

This is an official Department of Defense (DoD) system; as such a persona of professionalism is required. However special attention must be given to the fact that the majority of Callers to this system will be the family members of the Detainees, therefore, careful consideration of their culture and customs is also a necessity. Additionally, as with existing US Correction Facility visitation information system, Callers of this system are expected to request directions to the detention facility and will request visitation information, such as hour of operations or general visitation procedures.

4. Variable Definitions

There are no variables set in this application.

C. BILINGUAL BCCF APPLICATION DIALOG FLOW

1. Universal Behaviors

Certain capabilities and behaviors are available in all dialog states, unless otherwise specified. These are called "Universals."

a. Universal Actions

The "Universal Actions" grammar is active in all states that have recognition. This grammar is typically used to allow callers to ask for help, repeat prompts, or transfer to an operator. Examples of expressions and corresponding universal NL slot fill values are shown in the table below. The following table shows the universals available with the Nuance Voice Platform. These are not necessarily active in this application.

Universal Values	Sample Phrases
cancel	'cancel' 'go back'
exit	'exit' 'goodbye'
help	'help' 'I need help'
mainmenu	'main menu' 'start over'
operator	'Service Representative' 'I want to talk with an operator' 'agent'
repeat	'repeat'

The following table shows the universal behaviors specified in this application.

Universal Type	Action	Goto
help	Okay, here's some help. Details: help_universal "Okay, here's some help."	Continue with recognition in the state in which the universal was spoken.
repeat AND (_previousBehavior == undefined)		Continue with recognition in the state in which the universal was spoken.
repeat AND (_previousBehavior != undefined)		Throw the event: _previousBehavior
operator	I'm sorry, there are no representatives available.	Continue with recognition in the state in which the

	Details: operator_universal “I’m sorry, there are no representatives available.”	universal was spoken.
exit		CleanUpAndExitEnglish#say Goodbye
mainmenu	OK, Let’s start over. Details: mainmenu_universal “OK, Let’s start over.”	LanguageSelection#Language Selection

b. Universal Error Handling

Universal error handling is outlined below. This error behavior can be overridden in any given state.

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeectimeout	Sorry. Details: global_error1 “Sorry.”	Continue with state-specific behavior.
WHEN (COUNT = 2) nomatch noinput maxspeectimeout	Sorry, I still didn’t get that. Details: global_error2 “Sorry, I still didn’t get that.”	Continue with state-specific behavior.
WHEN (COUNT = 3) nomatch noinput maxspeectimeout	Sorry, we’re experiencing some technical difficulty right now. Please try again at a later time. Details: global_error3 “Sorry, we’re	CleanUpAndExitEnglish#say Goodbye

	experiencing some technical difficulty right now. Please try again at a later time.”	
--	--	--

D. BILINGUAL BCCF APPLICATION DIALOG STATES

This section provides details of the system behavior in each dialog state.

1. WelcomeBCCF Page Information

a. Description

Start page for Baghdad Central Correctional Facility (BCCF) Visitor Center Application.

b. Page Variables

There are no variables defined for this page.

c. Call Flow



2. WelcomeBCCF#WelcomeBCCF

a. Description

Plays welcome prompt to the Baghdad Central Correctional Facility’s Visitor Center. (This is a non-recognition processing state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
--	LanguageSelection#LanguageSelection

d. Actions

Condition	Action	Goto
--	<p>Hi, Welcome to Baghdad Central Correctional Facility’s Visitor Center. Hi, Welcome to Baghdad Central Correctional Facility’s Visitor Center.</p> <p>Details: WelcomeBCCF_English “Hi, Welcome to Baghdad Central Correctional Facility’s Visitor Center.” WelcomeBCCF_Arabic “Hi, Welcome to Baghdad Central Correctional Facility’s Visitor Center.”</p>	LanguageSelection#LanguageSelection

3. LanguageSelection Page Information

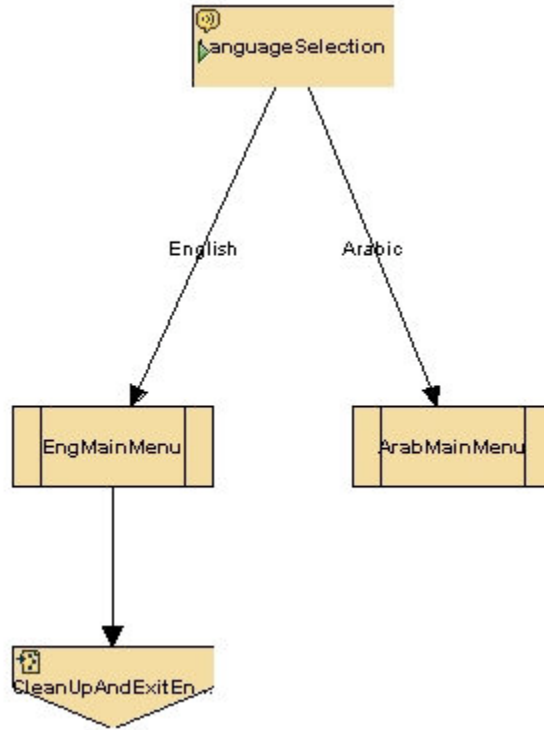
a. Description

Language selection page, allows callers to continue in either English or in Jordanian-Arabic.

b. Page Variables

There are no variables defined for this page.

c. Call Flow



4. LanguageSelection#LanguageSelection

a. Description

Prompts users to select a language: English or Arabic. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
WelcomeBCCF#WelcomeBCCF	LanguageSelection#EngMainMenu LanguageSelection#ArabMainMenu

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	To continue in English, say 'English'. To continue in Arabic, say 'Arabic'. Details: LanguageSelection_initEng "To continue in English, say 'English'." LanguageSelection_initArab "To continue in Arabic, say 'Arabic'."

e. Grammar: LanguageSelection_LanguageSelection.gsl

NL Slots	Values
<language>	english, arabic
Sample Phrases	Slots Filled
"english"	<language english>
"i'd like to continue in english"	<language english>
"continue in english"	<language english>
"uh english"	<language english>
"arabic"	<language arabic>
"uh arabic"	<language arabic>
"continue in arabic"	<language arabic>
"i'd like to continue in arabic"	<language arabic>
"araabic"	<language arabic>
"arabik"	<language arabic>
"araabik"	<language arabic>
"arabia"	<language arabic>
"araabia"	<language arabic>
"arabee"	<language arabic>
"araabee"	<language arabic>
"araabeah"	<language arabic>

"el arabic"	<language arabic>
"el araabik"	<language arabic>
"el araabia"	<language arabic>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.language == "english"	Thanks. Details: Generic_thanks "Thanks."	LanguageSelection#EngMainMenu
lastresult\$.interpretation.language == "arabic"	Thanks. Details: Generic_thanksArabic "Thanks."	LanguageSelection#ArabMainMenu

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	Please select a language. [50msecs] Please select a language. [50msecs] To continue in English, say 'English'. [50msecs] To continue in Arabic, say 'Arabic'. Details: LanguageSelection_errorEnglish "Please select a language." Silence: 50 msec LanguageSelection_errorArabic "Please select a language." Silence: 50 msec LanguageSelection_initEng "To continue in English, say 'English'." Silence: 50 msec LanguageSelection_initArab "To continue in Arabic, say 'Arabic'."	Continue with rec in this state.

<p>WHEN (COUNT = 2) nomatch noinput maxspechtimeout</p>	<p>Please select a language. [50msecs] Please select a language. [50msecs] To continue in English, say 'English'. [50msecs] To continue in Arabic, say 'Arabic'.</p> <p>Details: LanguageSelection_errorEnglish "Please select a language." Silence: 50 msec LanguageSelection_errorArabic "Please select a language." Silence: 50 msec LanguageSelection_initEng "To continue in English, say 'English'." Silence: 50 msec LanguageSelection_initArab "To continue in Arabic, say 'Arabic'."</p>	<p>Continue with rec in this state.</p>
---	---	---

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
<p>help</p>	<p>With this system, you have the option to continue in either English or in Arabic. With this system, you have the option to proceed in either English or in Arabic. To continue in English, say 'English'. To continue in Arabic, say 'Arabic'.</p> <p>Details: LanguageSelection_helpEnglish "With this system, you have the option to continue in either English or in Arabic." LanguageSelection_helpArabic "With this system, you have the option to proceed in either English or in Arabic." LanguageSelection_initEng "To continue in English, say 'English'." LanguageSelection_initArab "To continue in Arabic, say 'Arabic'."</p>	<p>Continue with rec in this state.</p>

5. LanguageSelection#ArabMainMenu

a. Description

Link to Arabic Main Menu (This is a subdialog calling the ArabicMainMenusubdialog)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
LanguageSelection#LanguageSelection	--

d. Actions

Condition	Action	Goto
--		

e. Inputs to the Subdialog

Name	Value
DATE_OUT_day	
DATE_OUT_month	
DATE_OUT_year	
TIME_OUT_AM_PM	
TIME_OUT_time	
accountNbr	
enrollmentPin	

6. LanguageSelection#EngMainMenu

a. Description

Link to English Main Menu (This is a subdialog calling the EngMainMenusubdialog)

b. Special Features

d. Entry and Exit States

Entry States	Exit States
LanguageSelection#LanguageSelection	CleanUpAndExitEnglish#sayGoodbye

e. Actions

Condition	Action	Goto
--		CleanUpAndExitEnglish#sayGoodbye

f. Inputs to the Subdialog

Name	Value
DATE_OUT_day	
DATE_OUT_month	
DATE_OUT_year	
TIME_OUT_AM_PM	
TIME_OUT_time	
accountNbr	
enrollmentPin	

7. CleanUpAndExitEnglish Page Information

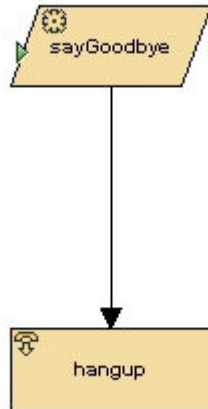
a. Description

Clean up and exit in English

b. Page Variables

There are no variables defined for this page.

c. Call Flow



8. CleanUpAndExitEnglish#sayGoodbye

a. Description

(This is a non-recognition processing state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
LanguageSelection#EngMainMenu	CleanUpAndExitEnglish#hangup

d. Actions

Condition	Action	Goto
--	Details: CleanUpAndExit_sayGoodbyeEnglish ""	CleanUpAndExitEnglish# hangup

9. CleanUpAndExitEnglish#hangup

a. Description

(This is a terminate state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
CleanUpAndExitEnglish#sayGoodbye	--

E. BILINGUAL BCCF APPENDICES

1. Grammar and Slot Definitions

Dialog State	Grammar	Slots	Slot Values
LanguageSelection#LanguageSelection	LanguageSelection_LanguageSelection.gsl	language	english, arabic,

2. Prompt List

Prompt File	Transcription
help_universal	"Okay, here's some help."
operator_universal	"I'm sorry, there are no representatives available."
mainmenu_universal	"OK, Let's start over."
global_error1	"Sorry."
global_error2	"Sorry, I still didn't get that."
global_error3	"Sorry, we're experiencing some technical difficulty right now. Please try again at a later time."
Generic_thanks	"Thanks."
Generic_thanksArabic	"Thanks."
CleanUpAndExit_sayGoodbyeEnglish	""
WelcomeBCCF_English	"Hi, Welcome to Baghdad Central Correctional Facility's Visitor Center."
WelcomeBCCF_Arabic	"Hi, Welcome to Baghdad Central Correctional Facility's Visitor Center."

LanguageSelection_initEng	”To continue in English, say ‘English’.”
LanguageSelection_initArab	”To continue in Arabic, say ‘Arabic’.”
LanguageSelection_helpEnglish	”With this system, you have the option to continue in either English or in Arabic.”
LanguageSelection_helpArabic	”With this system, you have the option to proceed in either English or in Arabic.”
LanguageSelection_errorEnglish	”Please select a language.”
LanguageSelection_errorArabic	”Please select a language.”

F. ARABICMAINMENU OVERVIEW

1. Application Summary

a. Variable Definitions

Application variable information is listed below (if available).

Application Variables Table		
Name	Initial Value	Description
accountNbr		another sample variable for the subdialog
enrollmentPin		
DATE_OUT_day		
DATE_OUT_month		
DATE_OUT_year		
TIME_OUT_AM_PM		
TIME_OUT_time		

2. Dialog Flow

a. Universal Behaviors

Certain capabilities and behaviors are available in all dialog states, unless otherwise specified. These are called ‘Universals.’

b. Universal Actions

The ‘Universal Actions’ grammar is active in all states that have recognition. This grammar is typically used to allow callers to ask for help, repeat prompts, or transfer to an operator. Examples of expressions and corresponding universal NL slot fill values are shown in the table below. The following table shows the universals available with the Nuance Voice Platform. These aren’t necessarily active in this application.

Universal Values	Sample Phrases
cancel	'cancel' 'go back'
exit	'exit' 'goodbye'
help	'help' 'I need help'
mainmenu	'main menu' 'start over'
operator	'Service Representative' 'I want to talk with an operator' 'agent'
repeat	'repeat'

The following table shows the universal behaviors specified in this application.

Universal Type	Action	Goto
help	حسناً، الـيـكـم بـعـض يـد الـمـسـاعـدـه. Details: “حسناً، الـيـكـم بـعـض يـد الـمـسـاعـدـه.”	Continue with recognition in the state in which the universal was spoken.
repeat AND (_previousBehavior == undefined)		Continue with recognition in the state in which the universal was spoken.
repeat AND (_previousBehavior != undefined)		Throw the event: _previousBehavior

operator	الرجاء قبول اعتذارنا لعدم وجود ممثلين تلكم. حاضرين لمساعد Details: operator_universal "الرجاء قبول اعتذارنا لعدم وجود ممثلين حاضرين لمساعدتلكم."	CleanUpAndexit_sayGoodbyeArabic#sayGoodbye
exit		CleanUpAndexit_sayGoodbyeArabic#sayGoodbye
mainmenu		ArabicMainMenu#ArabicMainMenu

c. *Universal Error Handling*

Universal error handling is outlined below. This error behavior can be overridden in any given state.

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	أنا آسف! Details: global_error1 "أنا آسف!"	Continue with state-specific behavior.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	أنا آسف! لم أفهم ذلك. Details: global_error2 "أنا آسف! لم أفهم ذلك."	Continue with state-specific behavior.
WHEN (COUNT = 3) nomatch noinput maxspeechtimeout	أنا آسف! يبدوا أننا نواجه بعض الصعوبات الفنيه. نرجوا منكم أن تحاولوا معنا في وقت لاحق. Details: global_error3 "أنا آسف! يبدوا أننا نواجه بعض الصعوبات الفنيه. نرجوا منكم أن	CleanUpAndexit_sayGoodbyeArabic#sayGoodbye

G. ARABICMAINMENU DIALOG STATES

This section provides details of the system behavior in each dialog state.

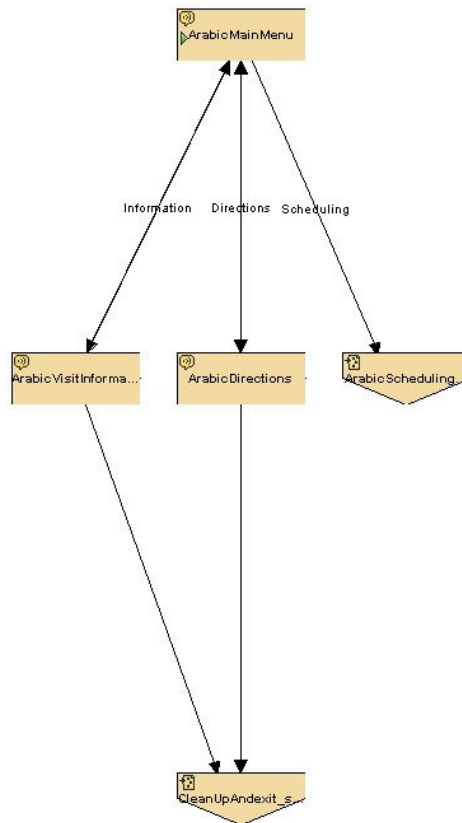
1. ArabicMainMenu Page Information

a. *Description*

b. *Page Variables*

There are no variables defined for this page.

c. *Call Flow*



2. ArabicMainMenu#ArabicMainMenu

a. Description

Arabic Main Menu, enables callers to get visitation information, get directions to BCCF, and use automated scheduling system. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicMainMenu#ArabicVisitInformation ArabicMainMenu#ArabicDirections	ArabicMainMenu#ArabicVisitInformation ArabicMainMenu#ArabicDirections ArabicScheduling#ArabicScheduling

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>الرجاء الأختيار من الخيارات التالية: للحصول على معلومات تتعلق بالزيارة، فالرجاء قول "معلومات". أما إذا كنتم تتودون معرفة طريق الوصول الى موقعنا فالرجاء قول "طريق الوصول". بالنسبة لاستعمال نظام التسجيل الألي، فالرجاء قول "تسجيل موعد".</p> <p>Details: "الرجاء الأختيار من الخيارات التالية: للحصول على معلومات تتعلق بالزيارة، فالرجاء قول "معلومات". أما إذا كنتم تتودون معرفة طريق الوصول الى موقعنا فالرجاء قول "طريق الوصول". بالنسبة لاستعمال نظام التسجيل الألي، فالرجاء</p>

e. Grammar:

ArabicMainMenu_ArabicMainMenu.gsl#Sample_Rule

NL Slots	Values
<userInput>	information, directions, scheduling
Sample Phrases	Slots Filled

”معلومات“	<userInput information>
”الحصول على معلومات“	<userInput information>
”أريد الحصول على معلومات“	<userInput information>
”طريق الوصول“	<userInput directions>
”معرفة طريق الوصول“	<userInput directions>
”أريد الحصول على طريق الوصول“	<userInput directions>
”تسجيل موعد“	<userInput scheduling>
”أريد تسجيل موعد“	<userInput scheduling>
”أريد استخدام برنامج تسجيل المواعيد الآلي“	<userInput scheduling>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == “information”	هل أنتم متأكدون؟ Details: Generic_sure”دون؟“ هل أنتم متأكدون؟	ArabicMainMenu#Arabic VisitInformation
lastresult\$.interpretation.userInput == “directions”	هل أنتم متأكدون؟ Details: Generic_sure”هل أنتم متأكدون؟“	ArabicMainMenu#Arabic Directions
lastresult\$.interpretation.userInput == “scheduling”	هل أنتم متأكدون؟ Details: Generic_sure”هل أنتم متأكدون؟“	ArabicScheduling#Arabic Scheduling

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput	هل تتودون الحصول على معلومات، طريق الوصول الى هذا الموقع أم استعمل نظام التسجيل الآلي؟ للحصول على	Continue with rec in this state.

maxspeechtimeout	<p>معلومات، الرجاء قول: "معلومات". بالنسبة للحصول على معلومات عن طريق الوصول الى هذا الموقع فالرجاء قول "طريق الوصول". أما بالنسبة لاستعمال نظام التسجيل الألي، فالرجاء قول: "تسجيل موعد".</p> <p>Details: "هل تودون الحصول على معلومات، ArabicMainMenu_error، طريق الوصول الى هذا الموقع أم استعمال نظام التسجيل جاء قول: "معلومات". الألي؟ للحصول على معلومات، الرجاء قول: "معلومات". الألي؟ للحصول على معلومات عن طريق الوصول الى هذا الموقع فالرجاء قول: "طريق الوصول". أما بالنسبة لاستعمال نظام التسجيل الألي، فالرجاء قول: "تسجيل موعد"."</p>	
<p>WHEN (COUNT = 2) nomatch noinput maxspeechtimeout</p>	<p>هل تودون الحصول على معلومات، طريق الوصول الى هذا الموقع أم استعمال نظام التسجيل الألي؟ للحصول على معلومات، الرجاء قول: "معلومات". بالنسبة للحصول على معلومات عن طريق الوصول الى هذا الموقع فالرجاء قول: "طريق الوصول". أما بالنسبة لاستعمال نظام التسجيل الألي، فالرجاء قول: "تسجيل موعد".</p> <p>Details: "هل تودون الحصول على معلومات، ArabicMainMenu_error، طريق الوصول الى هذا الموقع أم استعمال نظام التسجيل الألي؟ للحصول على معلومات، الرجاء قول: "معلومات". الألي؟ للحصول على معلومات عن طريق الوصول الى هذا بالنسبة للحصول على معلومات عن طريق الوصول الى هذا الموقع فالرجاء قول: "طريق الوصول". أما بالنسبة لاستعمال نظام التسجيل الألي، فالرجاء قول: "تسجيل موعد"."</p>	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	سيكون بإمكانكم الأخذتيار من عبر نظام التسجيل الألي الخيارات التاليه: اذا كنتم تودون الحصول على معلومات تتعلق بالزياره، فالرجاء قول: "معلومات". أما اذا كنتم	Continue with rec in this state.

	<p>تودون معرفة طريق الوصول الى مركز بغداد للأصلح، فالرجاء قول: "طريق الوصول". أما بالنسبة لاسعمال فالرجاء قول: "تسجيل موعده". نظام التسجيل الآلي، فالرجاء</p> <p>Details:</p> <p>"عبر نظام التسجيل الآلي ArabicMainMenu_help سيكون بإمكانكم الاختيار من الخيارات التالية: إذا كنتم تودون الحصول على معلومات تتعلق بالزيارة، فالرجاء قول: "معلومات". أما إذا كنتم تودون معرفة طريق الوصول الى مركز بغداد للأصلح، فالرجاء قول: "طريق الوصول". أما بالنسبة لاسعمال نظام التسجيل الآلي، فالرجاء قول: "تسجيل موعده"."</p>
--	--

3. ArabicMainMenu#ArabicDirections

a. Description

Get directions to Baghdad Central Correction Facility (BCCF). (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicMainMenu#ArabicMainMenu	ArabicMainMenu#ArabicMainMenu CleanUpAndexit_sayGoodbyeArabic#sayGoodbye

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	يقع مركز بغداد للأصلح على بُعد 20 ميلاً غرب مدينة بغداد في مدينة أبو غريب. من مدينة بغداد اتجهوا غرباً على الطريق السري رقم 6 لمسافة 18 ميلاً ثم خذوا المخرج رقم 9 الى أبو غريب. يقع مركز بغداد على بعد ميلين جنوب غرب لمخرج رقم 9. والآن، هل تودون سم طريق الوصول الى هذا الموقع مرة أخرى أم تودون العوده الى القائمه

	<p>الرئىسىسىيە؟ اذا انتەيتەم من مكالمەتەكم فالرجاء غلخاق الخط.</p> <p>Details:</p> <p>ArabicDirections_init “يقع مركز بغداد للأصلح على بُعد 20 ميلاً” يب. من مدينة بغداد اتجهوا غرباً على غرب مدينة بغداد في مدينة أبو غر الطريق السري ع رقم 6 لمسافة 18 ميلاً ثم خذوا المخرج رقم 9 الى أبو غربي. يقع مركز بغداد للأصلح على بعد ميلين جنوب غرب لمخرج رقم 9. والآن، مل تودون سماع طريق الوصول الى هذا الموقع مرة أخرى أم تودون ئيسىسىيە؟ اذا انتەيتەم من مكالمەتەكم فالرجاء غلخاق العوده الى القائمه الر الخط.”</p>
--	--

e. Grammar: ArabicMainMenu_ArabicDirections.gsl#Arabic_Rule

NL Slots	Values
<UserInput>	repeatDirections, returnMainMenu, exitSystem
Sample Phrases	Slots Filled
”أريد سماع طريق الوصول”	<UserInput repeatDirections>
”سماع طريق الوصول”	<UserInput repeatDirections>
”طريق الوصول”	<UserInput repeatDirections>
”أريد الحصول على معلومات”	<UserInput repeatDirections>
”الحصول على معلومات”	<UserInput repeatDirections>
”معلومات”	<UserInput repeatDirections>
”أريد العوده الى القائمه الرئىسىسىيە”	<UserInput returnMainMenu>
”القائمه الرئىسىسىيە”	<UserInput returnMainMenu>
”خروج”	<UserInput exitSystem>
”سلام”	<UserInput exitSystem>
”مع السلامه”	<UserInput exitSystem>

	<p>Details:</p> <p>ArabicDirections_errorAndHelp إذا “ كُنتم تودون سماع طريق الوصول مرةً أخرى فالرجاء قول: “أعد مرةً أخرى”. أما إذا كُنتم تودون العودة الى القائمه قول “ القائمه اللى ليسيه فالرجاء اللى ليسيه”، أما إذا انتهيتم من مكالمتكم فالرجاء قول “مع السلامه” أو اغلاق الخط.”</p>	
--	---	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
repeat		#ArabicDirections
help	<p>إذا كُنتم تودون سماع طريق الوصول مرةً أخرى فالرجاء قول: “أعد مرةً أخرى”. أما إذا كُنتم تودون العودة الى القائمه اللى ليسيه فالرجاء قول “ القائمه اللى ليسيه”، أما إذا انتهيتم من مكالمتكم فالرجاء قول “مع السلامه” أو اغلاق الخط.</p> <p>Details:</p> <p>ArabicDirections_errorAndHelp إذا “ كُنتم تودون سماع طريق الوصول مرةً أخرى فالرجاء قول: “أعد مرةً أخرى”. أما إذا كُنتم تودون العودة الى القائمه اللى ليسيه فالرجاء قول “ القائمه اللى ليسيه”، أما إذا انتهيتم من مكالمتكم فالرجاء قول “مع السلامه” أو اغلاق الخط.”</p>	Continue with rec in this state.

4. ArabicMainMenu#ArabicVisitInformation

a. Description

Get visitor information for Baghdad Central Correctional Facility. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicMainMenu#ArabicMainMenu	ArabicMainMenu#ArabicMainMenu CleanUpAndexit_sayGoodbyeArabic#sayGoodbye

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>ساعات زياره المساجين في مركز بغداد للأصلح تبدأ من يوم الأثنين الى يوم السبت من الساعة الثامنة صباحاً لغاية الساعة الرابعة بعد الظهر. هل تودون الأستماع الى هذه المعلومات مرةً أخرى أم تودون العوده الى خدمةٍ أخرى فالرجاء قول القائمه الرئيسيه؟ اذا لم تكونوا بحاجة الى أي “مع السلامه” أو اغلاق الخط.</p> <p>Details: “ساعات زياره المساجين في مركز بغداد ArabicVisitInformation_init للأصلح تبدأ من يوم الأثنين الى يوم السبت من الساعة الثامنة الى يوم السبت من الساعة الثامنة صباحاً لغاية الساعة الرابعة بعد الظهر. هل تودون الأستماع الى هذه المعلومات مرةً أخرى أم تودون العوده الى القائمه الرئيسيه؟ اذا لم تكونوا بحاجة الى أي خدمةٍ أخرى فالرجاء قول “مع السلامه” أو اغلاق الخط.”</p>

e. Grammar:

ArabicMainMenu_ArabicVisitInformation.gsl#Arabic_Rule

NL Slots	Values
<UserInput>	repeatMessage, returnMainMenu, exitSystem
Sample Phrases	Slots Filled
”أريد سماع المعلومات مرةً اخرى”	<UserInput repeatMessage>
”سماع المعلومات”	<UserInput repeatMessage>

”معلومات“	<UserInput repeatMessage>
”أريد سماع معلومات“	<UserInput repeatMessage>
”معلومات حول الزياره“	<UserInput repeatMessage>
”معلومات الزياره“	<UserInput exitSystem>
”أريد العودة الى القائمه الرئيسيه“	<UserInput returnMainMenu>
”أريد القائمه الرئيسيه“	<UserInput returnMainMenu>
”العودة الى القائمه الرئيسيه“	<UserInput returnMainMenu>
”القائمه الرئيسيه“	<UserInput returnMainMenu>
”خروج“	<UserInput exitSystem>
”سلام“	<UserInput exitSystem>
”مع السلامه“	<UserInput exitSystem>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.UserInput == ”repeatMessage”		Continue with rec in this state.
lastresult\$.interpretation.UserInput == ”returnMainMenu”		ArabicMainMenu#Arabic MainMenu
lastresult\$.interpretation.UserInput == ”exitSystem”		CleanUpAndexit_sayGoodbyeArabic#sayGoodbye

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	هل تودون الأستماع الى هذه المعلومات مرة أخرى أم تودون العودة الى القائمه الرئيسيه؟ اذا كنتم تودون الحصول على معلومات تتعلق بالزياره فالرجاء قول: ”أعد مره أخرى”. أما اذا كنتم تودون العودة	Continue with rec in this state.

	<p>الى القائمه الربيسيه، فالرجاء قول: يتم من "لقائمه الربيسيه". أما اذا انته مكالمتكم فالرجاء قول "مع السلامه" أو اغلق الخط.</p> <p>Details: ArabicVisitInformation_errorAndHelp "هل تودون الأستماع الى هذه المعلومات مرة أخرى أم تودون العودة الى القائمه الربيسيه؟ اذا كنتم تودون الحصول على بالزياره فالرجاء قول: معلومات تتعلق "أعد مره أخرى". أما اذا كنتم تودون العودة الى القائمه الربيسيه، فالرجاء قول: "لقائمه الربيسيه". أما اذا انته يتم من مكالمتكم فالرجاء قول "مع السلامه" أو اغلق الخط."</p>	
<p>WHEN (COUNT = 2) nomatch noinput maxspeechtimeout</p>	<p>هل تودون الأستماع الى هذه المعلومات مرة أخرى أم تودون العودة الى القائمه الربيسيه؟ اذا كنتم تودون الحصول على معلومات تتعلق بالزياره فالرجاء قول: "أعد مره أخرى". أما اذا كنتم تودون العودة الى القائمه الربيسيه، فالرجاء قول: ربيسيه". أما اذا انته يتم من "لقائمه ال مكالمتكم فالرجاء قول "مع السلامه" أو اغلق الخط.</p> <p>Details: ArabicVisitInformation_errorAndHelp "هل تودون الأستماع الى هذه المعلومات مرة أخرى أم تودون العودة الى القائمه صول على الربيسيه؟ اذا كنتم تودون الح معلومات تتعلق بالزياره فالرجاء قول: "أعد مره أخرى". أما اذا كنتم تودون العودة الى القائمه الربيسيه، فالرجاء قول: "لقائمه الربيسيه". أما اذا انته يتم من</p>	<p>Continue with rec in this state.</p>

	مكالمتكم فالرجاء قول "مع السلامه" أو اغلاق الخط.	
--	--	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
repeat		#ArabicVisitInformation
help	<p>هل تتودون الأستماع الى هذه المعلومات مرة أخرى أم تتودون العودة الى القائمه الريفيسيه؟ اذا كنتم تتودون الحصول على فالرجاء قول: معلومات تتعلق بالزياره "أعد مره أخرى". أما اذا كنتم تتودون العودة الى القائمه الريفيسيه، فالرجاء قول: "لقائمه الريفيسيه". أما اذا انتهيت من مكالمتكم فالرجاء قول "مع السلامه" أو اغلاق الخط.</p> <p>Details: ArabicVisitInformation_errorAndHelp تودون الأستماع الى هذه المعلومات مرة أخرى أم تتودون العودة الى القائمه الريفيسيه؟ اذا كنتم تتودون الحصول على معلومات تتعلق بالزياره فالرجاء قول: "أعد مره أخرى". أما اذا كنتم تتودون العودة الى القائمه الريفيسيه، فالرجاء قول: م من "لقائمه الريفيسيه". أما اذا انتهيت مكالمتكم فالرجاء قول "مع السلامه" أو اغلاق الخط.</p>	Continue with rec in this state.

5. ArabicScheduling Page Information

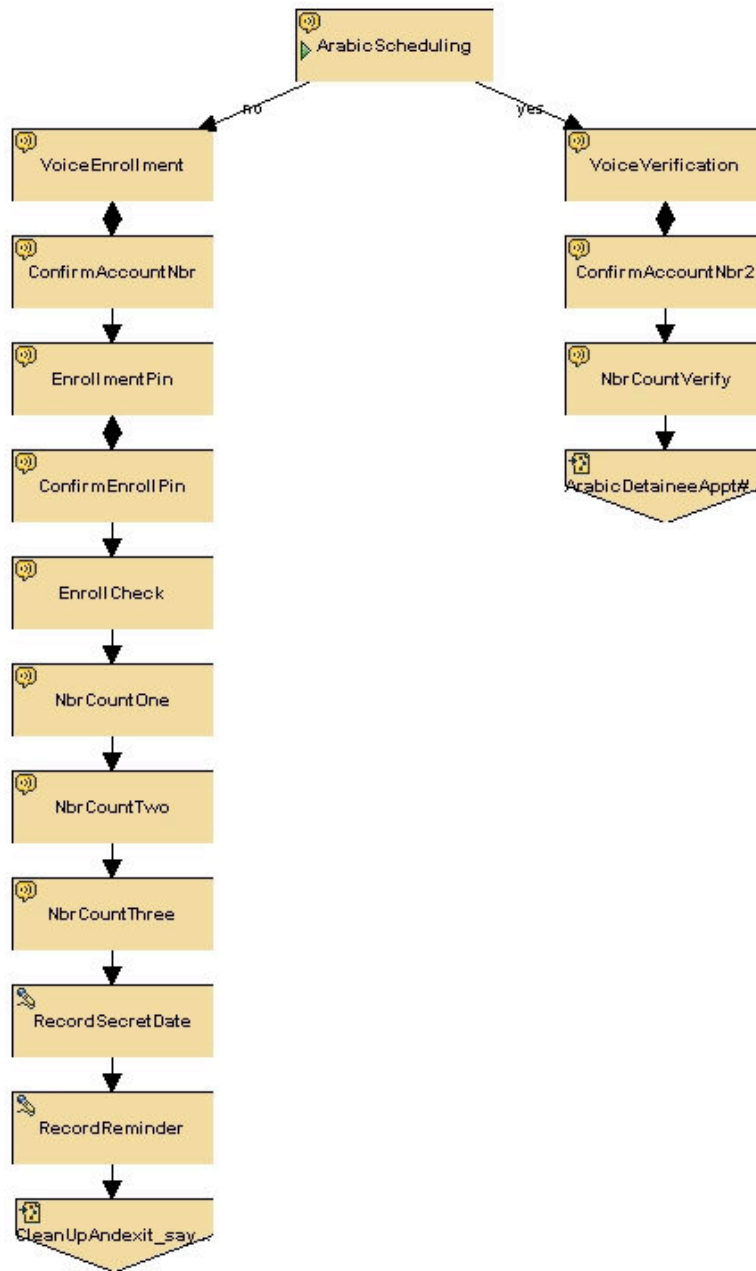
a. Description

This page simulates the Nuance Caller Authentication (NCA) Process.

b. Page Variables

Page Variables Table		
Name	Initial Value	Description
AcctNbr_a		
AcctNbr_b		
AcctNbr_c		
AcctNbr_d		
AcctNbr_e		
AcctNbr_f		
AcctNbr_g		
AcctNbr_h		
AcctNbr_i		
AcctNbr_j		
EnrollPin_a		
EnrollPin_b		
EnrollPin_c		
EnrollPin_d		

c. Call Flow



6. ArabicScheduling#ArabicScheduling

a. Description

Ask callers if they are enrolled in the automated scheduling system.

(This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicMainMenu#ArabicMainMenu	ArabicScheduling#VoiceVerification ArabicScheduling#VoiceEnrollment

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>ا مسجلين من أجل استخدام نظام التسجيل الآلي، يجب عليكم أن تكونوا مسبقاً في هذا النظام. هل سجلتم مسبقاً في هذا النظام؟ اذا كنتم قد سجلتم مسبقاً في نظام التسجيل الآلي فالرجاء قول "نعم". اذا لم تكونوا قد سجلتم مسبقاً في نظام التسجيل الآلي فالرجاء قول "لا"، ونحن بدورنا سنساعدكم في التسجيل في هذا النظام.</p> <p>Details: "من أجل استخدام نظام التسجيل الآلي، يجب ArabicScheduling_init عليكم أن تكونوا مسجلين مسبقاً في هذا النظام. هل سجلتم مسبقاً في هذا النظام؟ اذا كنتم قد سجلتم مسبقاً في نظام التسجيل الآلي فالرجاء لتُم مسبقاً في نظام التسجيل الآلي قول "نعم". اذا لم تكونوا قد سجلتم مسبقاً فالرجاء قول "لا"، ونحن بدورنا سنساعدكم في التسجيل في هذا النظام."</p>

e. Grammar:

ArabicScheduling_ArabicScheduling.gsl#Arabic_Rule

NL Slots	Values
<userInput>	yes, no

Sample Phrases	Slots Filled
”لا”	<userInput no>
”نعم”	<userInput yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == “yes”	شكراً Details: Generic_thanks”شكراً”	ArabicScheduling#Voice Verification
lastresult\$.interpretation.userInput == “no”	شكراً Details: Generic_thanks”شكراً”	ArabicScheduling#VoiceE nrollment

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	لكنتم مٌسجلين معنا فالرجاء قول اذا ”نعم”. وفي حالة لم تكونوا مٌسجلين معنا فالرجاء قول ”لا” ونحن بدورنا سنساعدكم في التسجيل في هذا النظام. Details: ArabicScheduling_error اذا كنتم مٌسجلين معنا فالرجاء قول ”نعم”. وفي مٌسجلين معنا فالرجاء حالة لم تكونوا قول ”لا” ونحن بدورنا سنساعدكم في التسجيل في هذا النظام.”	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	اذا كنتم مٌسجلين معنا فالرجاء قول ”نعم”. وفي حالة لم تكونوا مٌسجلين ونحن بدورنا معنا فالرجاء قول ”لا”	Continue with rec in this state.

	<p>سنساعدكم في التسجيل في هذا النظام.</p> <p>Details:</p> <p>ArabicScheduling_error اذا كنتم مُسجلين معنا فالرجاء قول "نعم". وفي حالة لم تكونوا مُسجلين معنا فالرجاء قول "لا" ونحن بدورنا سنساعدكم في التسجيل في هذا النظام."</p>	
--	---	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>من أجل استخدام نظام التسجيل الآلي، يجب عليكم أن تكونوا مسجلين مسبقاً في هذا النظام. اذا كنتم قد سجلتم أذا مسبقاً في نظام التسجيل الآلي فالرجاء قول "نعم". أما لم تكونوا قد سجلتم مسبقاً في نظام التسجيل الآلي فالرجاء قول "لا"، ونحن بدورنا سنساعدكم في التسجيل في هذا النظام.</p> <p>Details:</p> <p>ArabicScheduling_help "من أجل استخدام نظام التسجيل الآلي، يجب عليكم أن تكونوا مسجلين مسبقاً في هذا النظام. اذا كنتم قد سجلتم مسبقاً في نظام التسجيل الآلي فالرجاء قول "نعم". أما اذا لم تكونوا قد سجلتم مُسبقاً في نظام التسجيل الآلي فالرجاء قول "لا"، ونحن بدورنا سنساعدكم في التسجيل في هذا النظام."</p>	Continue with rec in this state.

7. ArabicScheduling#ConfirmAccountNbr

a. Description

This process asks callers to confirm their 10-digit account number.

(This is a recognition state.)

b. Special Features

NL Slots	Values
<userInput>	yes, no
Sample Phrases	Slots Filled
”لا”	<userInput no>
”نعم”	<userInput yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == “no”	<p>أن آسف!</p> <p>Details: Generic_imSorry”أن آسف!”</p>	ArabicScheduling#VoiceEnrollment
lastresult\$.interpretation.userInput == “yes”	<p>جيد</p> <p>Details: Generic_great”جيد”</p>	ArabicScheduling#EnrollmentPin

g. Error Behaviors

Error Type	Action	Goto
<p>WHEN (COUNT = 1)</p> <p>nomatch noinput</p> <p>maxspeechtimeout</p>	<p>إذا كان رقم حسابكم لدينا [URL Expression] فالرجاء قول “نعم”. إذا لم يكن هذا صحيحاً، فالرجاء قول “لا”.</p> <p>Details: لأن رقم “أذا AccountNbr_error” حسابكم لدينا” URL Expression: genPhoneNumber(accountNbr) GenericPromptConfirm_yesNo “إذا كان هذا صحيحاً، فالرجاء قول “نعم”. إذا لم</p>	Continue with rec in this state.

	يكن هذا صحيحاً، فالرجاء قول "لا".	
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	<p>إذا كان رقم حسابكم لدينا URL[Expression] فالرجاء قول "نعم". إذا لم يكن هذا صحيحاً، فالرجاء قول "لا".</p> <p>Details: إذا كان رقم ConfirmAccountNbr_error حسابكم لدينا URL Expression: genPhoneNumber(accountNbr) GenericPromptConfirm_yesNo إذا كان هذا صحيحاً، فالرجاء قول "نعم". إذا لم يكن هذا صحيحاً، فالرجاء قول "لا".</p>	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>أريد أن أتأكد من أنني سمعتكم بوضوح، إذا كان رقم حسابكم لدينا URL[Expression] فالرجاء قول "نعم". إذا لم يكن هذا صحيحاً، فالرجاء قول "لا".</p> <p>Details: "أريد أن أتأكد من أنني سمعتكم بوضوح، إذا كان رقم حسابكم لدينا" URL Expression: genPhoneNumber(accountNbr) GenericPromptConfirm_yesNo إذا كان هذا صحيحاً، فالرجاء قول "نعم". إذا لم يكن هذا صحيحاً، فالرجاء قول "لا".</p>	Continue with rec in this state.

	إذا لم يكن هذا صحيحاً، فالرجاء قول "لا".
--	--

e. Grammar:

ArabicScheduling_ConfirmAccountNbr2.gsl#Arabic_Rule

NL Slots	Values
<userInput>	yes, no
Sample Phrases	Slots Filled
"لا"	<userInput no>
"نعم"	<userInput yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == "no"	أنا آسف! Details: Generic_imSorry"أنا آسف!"	ArabicScheduling#Voice Verification
lastresult\$.interpretation.userInput == "yes"	جيد Details: Generic_great"جيد"	ArabicScheduling#NbrCountVerify

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspechtimeout	إذا كان رقم حسابكم لدينا [URL[Expression] إذا كان هذا صحيحاً، فالرجاء قول "نعم". إذا لم يكن هذا صحيحاً، فالرجاء قول "لا". Details:	Continue with rec in this state.

	<p>“أذا كان رقم ConfirmAccountNbr_error لدين” حسابكم URL Expression: genPhoneNumber(accountNbr) GenericPromptConfirm_yesNo إذا كان هذا صحيحاً، فالرجاء قول “نعم”. إذا لم يكن هذا صحيحاً، فالرجاء قول “لا”.”</p>	
<p>WHEN (COUNT = 2) nomatch noinput maxspeecheout</p>	<p>أذا كان رقم حسابكم لدين [URL Expression] إذا كان هذا صحيحاً، فالرجاء قول “نعم”. إذا لم يكن هذا صحيحاً، فالرجاء قول “لا”.</p> <p>Details: “أذا كان رقم ConfirmAccountNbr_error حسابكم لدين” URL Expression: genPhoneNumber(accountNbr) GenericPromptConfirm_yesNo إذا كان هذا صحيحاً، فالرجاء قول “نعم”. إذا لم يكن هذا صحيحاً، فالرجاء قول “لا”.”</p>	<p>Continue with rec in this state.</p>

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>أريد أن أتأكد من أنني سمعتكم بوضوح، إذا كان رقم حسابكم لدين [URL Expression] إذا كان هذا صحيحاً، فالرجاء قول “نعم”. إذا لم يكن هذا صحيحاً، فالرجاء قول “لا”.</p> <p>Details: “أريد أن أتأكد من أنني سمعتكم بوضوح، إذا كان رقم حسابكم لدين” URL Expression: genPhoneNumber(accountNbr) GenericPromptConfirm_yesNo إذا كان هذا صحيحاً، فالرجاء قول “نعم”. إذا لم يكن هذا صحيحاً، فالرجاء قول “لا”.</p>	<p>Continue with rec in this state.</p>

e. Grammar:

ArabicScheduling_ConfirmEnrollPin.gsl#Arabic_Rule

NL Slots	Values
<userInput>	yes, no
Sample Phrases	Slots Filled
”لا”	<userInput no>
”نعم”	<userInput yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == “no”	<p>أنا آسف!</p> <p>Details: Generic_imSorry”أنا آسف!”</p>	ArabicScheduling#EnrollmentPin
lastresult\$.interpretation.userInput == “yes”	<p>جيد</p> <p>Details: Generic_great”جيد”</p>	ArabicScheduling#EnrollCheck

g. Error Behaviors

Error Type	Action	Goto
<p>WHEN (COUNT = 1)</p> <p>nomatch noinput</p> <p>maxspeecchtimeout</p>	<p>إذا كان رقم التمسجيل لديكم [URL Expression] فالرجاء، قول “نعم”. إذا لم يكن هذا صحيحاً، فالرجاء قول “لا”.</p> <p>Details: ”إذا كان ConfirmEnrollmentPin_error رقم التمسجيل لديكم” URL Expression:</p>	Continue with rec in this state.

	<p>genEnrollNumber(enrollmentPin) GenericPromptConfirm_yesNo اذا كان هذا صحيحاً، فالرجاء قول "نعم". اذا لم يكن هذا صحيحاً، فالرجاء قول "لا".</p>	
<p>WHEN (COUNT = 2) nomatch noinput maxspeechtimeout</p>	<p>URL[اذا كان رقم التسجيل لديكم Expression] اذا كان هذا صحيحاً، فالرجاء قول "نعم". اذا لم يكن هذا صحيحاً، فالرجاء قول "لا".</p> <p>Details: ConfirmEnrollmentPin_error اذا كان رقم التسجيل لديكم" URL Expression: genEnrollNumber(enrollmentPin) GenericPromptConfirm_yesNo اذا كان هذا صحيحاً، فالرجاء قول "نعم". اذا لم يكن هذا صحيحاً، فالرجاء قول "لا".</p>	<p>Continue with rec in this state.</p>

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>دعني أتأكد من أن أنني سمعت رقم التسجيل لديكم بوضوح، اذا كان رقم التسجيل لديكم [URL Expression] اذا كان هذا صحيحاً، فالرجاء قول "نعم". اذا لم يكن هذا صحيحاً، فالرجاء قول "لا".</p> <p>Details: ConfirmEnrollmentPin_help "دعني أتأكد من أن أنني سمعت رقم التسجيل لديكم بوضوح، اذا كان رقم التسجيل لديكم" URL Expression: genEnrollNumber(enrollmentPin) GenericPromptConfirm_yesNo اذا كان</p>	<p>Continue with rec in this state.</p>

	حاً، فالرجاء قول “نعم”. اذا لم هذا صحي يكن هذا صحي حاً، فالرجاء قول “لا”.	
--	--	--

10. ArabicScheduling#EnrollCheck

a. Description

This process asks callers if they would like to “enroll me now.” For demonstration purposes, link to additional verification information is not included in this application. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicScheduling#ConfirmEnrollPin	ArabicScheduling#NbrCountOne

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>الآن، يبدوا أننا لم نسجلكم بعد بنظام التعرف على الصوت. هذا النظام سيمكننا من التعرف على صاحب الضوت عن طريق الصوت. هذه الطريقة أسرع وأكثر فعالية من طريقة ادخال الرقم السري أو كلمة السر. بهذه الطريقة سوف يكون عليكم الطريقة ستأخذ وقتاً قليلاً منكم. لكي نبدأ التسجيل معاً لمرّة واحدة فقط. هذه بعملية التسجيل فوراً، الرجاء قول: “سجلني”.</p> <p>Details: “الآن، يبدوا أننا لم نسجلكم بعد بنظام التعرف على الصوت. EnrollCheck_init الصوت. هذه الطريقة هذا النظام سيمكننا من التعرف على صاحب الضوت عن طريق أسرع وأكثر فعالية من طريقة ادخال الرقم السري أو كلمة السر. بهذه الطريقة سوف يكون عليكم التسجيل معاً لمرّة واحدة فقط. هذه الطريقة ستأخذ وقتاً قليلاً منكم. لكي نبدأ بعملية التسجيل فوراً، الرجاء قول: “سجلني”.</p>

e. *Grammar: ArabicScheduling_EnrollCheck.gsl#Arabic_Rule*

NL Slots	Values
<userInput>	enrollMeNow
Sample Phrases	Slots Filled
”سجلني”	<userInput enrollMeNow>

f. *Actions*

Condition	Action	Goto
lastresult\$.interpretation.userInput == “enrollMeNow”	شكراً Details: Generic_thanks”شكراً”	
--		ArabicScheduling#NbrCountOne

g. *Error Behaviors*

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeectimeout	لكي نبدأ بعملية التسجيل، الرجاء قول: ”سجلني” Details: ”لكي نبدأ EnrollCheck_errorAndHelp بعملية التسجيل، الرجاء قول: ”سجلني”	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeectimeout	لكي نبدأ بعملية التسجيل، الرجاء قول: ”سجلني” Details: ”لكي نبدأ EnrollCheck_errorAndHelp بعملية التسجيل، الرجاء قول:	Continue with rec in this state.

	”سجلني”	
--	---------	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	لكي نبدأ بعملية التسجيل، الرجاء قول: ”سجلني” Details: ”لكي نبدأ EnrollCheck_errorAndHelp بعملية التسجيل، الرجاء قول: ”سجلني”	Continue with rec in this state.

11. ArabicScheduling#EnrollmentPin

a. Description

This process asks caller for his or her 4-digit enrollment PIN. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicScheduling#ConfirmAccountNbr ArabicScheduling#ConfirmEnrollPin	ArabicScheduling#ConfirmEnrollPin

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	نحن بحاجة لأن نعرف الأربعة أرقام لرمز تسجيليكم والتي يمكن ايجادها على الوثيقة التي تم ارسالها لكم. لذلك الرجاء ايجادها ومن ثم الرجاء قول أو ض غط الأربعة أرقام لرمز تسجيليكم. Details:

	لأربعة أرقام لرمز تسجيلكلم "نحنُ بحاجةٌ لأن نعرف EnrollmentPin_init وال التي يمكن اي جادها على الوثيقه التي تم ارسالها لكم. لذلك الرجاء اي جادها ومن ثم الرجاء قول أو ض غط الاربعة أرقام لرمز تسجيلكلم."
Entry Type = reentry	الرجاء قول أو ض غط الاربعة أرقام لرمز تسجيلكلم مرة أخرى. Details: الرجاء قول أو ض غط الاربعة أرقام لرمز EnrollmentPin_reentry تسجيلكلم مرة أخرى."

e. Grammar: ArabicScheduling_EnrollmentPin.gsl#GetPinNumber

NL Slots	Values
<enrollPin>	أربع-ثلاثه-اثنان-واحد, "[four-digit-string]"
<digit_one>	حد, اثنان, ثلاثه, أربعه, خمسه, سته, سبعه, ثمانيه, تسعهصفر, وا
<digit_two>	صفر, واحد, اثنان, ثلاثه, أربعه, خمسه, سته, سبعه, ثمانيه, تسعه
<digit_three>	صفر, واحد, اثنان, ثلاثه, أربعه, خمسه, سته, سبعه, ثمانيه, تسعه
<digit_four>	خمسه, سته, سبعه, ثمانيه, تسعهصفر, واحد, اثنان, ثلاثه, أربعه.
Sample Phrases	Slots Filled
أربعه-ثلاثه-اثنان-واحد	<digit_one واحد> <digit_two اثنان> <digit_three ثلاثه> <digit_four أربعه> <enrollPin أربعه-ثلاثه-اثنان-واحد>
"dtmf-1 dtmf-2 dtmf-3 dtmf-4"	<digit_one واحد> <digit_two اثنان> <digit_three ثلاثه> <digit_four أربعه> <enrollPin أربعه-ثلاثه-اثنان-واحد>

f. Actions

Condition	Action	Goto
--	شكراً Details: Generic_thanks”شكراً“	
--	Assign: EnrollPin_a = lastresult\$.interpretation.digit_one Assign: EnrollPin_b = lastresult\$.interpretation.digit_two Assign: EnrollPin_c = lastresult\$.interpretation.digit_three Assign: EnrollPin_d = lastresult\$.interpretation.digit_four Assign: enrollmentPin = lastresult\$.interpretation.digit_enrollPin	ArabicScheduling#ConfirmEnrollPin

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	الرجاء قول أو ض غط الأربعة أرقام لرمز تسجيلكم. Details: ”الرجاء EnrollmentPin_errorAndHelp قول أو ض غط الأربعة أرقام لرمز تسجيلكم.“	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	ول أو ض غط الأربعة أرقام لرمز الرجاء ق تسجيلكم.	Continue with rec in this state.

	Details: EnrollmentPin_errorAndHelp الرجاء قول أو ض غط الأربعة أرقام لرمز تسجيلكم.	
--	---	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	الرجاء قول أو ض غط الأربعة أرقام لرمز تسجيلكم. Details: EnrollmentPin_errorAndHelp الرجاء قول أو ض غط الأربعة أرقام لرمز تسجيلكم.	Continue with rec in this state.

12. ArabicScheduling#NbrCountOne

a. Description

This process asks callers to count from 1 to 9. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicScheduling#EnrollCheck	ArabicScheduling#NbrCountTwo

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	من أجل عمل حساب صوتي لكم، أرجوا منكم العد من 1 إلى 9، ثلاث مرات متتاليه حتى يتمكن النظام الألي من التعرف على صوتكم . بعدده سوف نسألكم عن بعض المعلومات السريه التي نتطلبها منكم كالمعتاد وذلك لغوسيله للتأكد من

	<p>واحدةً من 1 الى 9، هكذا: واحد، اثنان، ش خصيبتكم. الآن، الرجاء الاعد بصوت عالٍ، مرةً ثلاثه، الى رقم تسعه.</p> <p>Details:</p> <p>“من أجل عمل حساب صوتي لكم، أرجوا منكم الاعد من 1 الى 9، ثلاث NbrCountOne_init مراتٍ متتاليه حتى يتمكن النظام الألي من التعرف على صوتكم . بعده سوف ض المعلومات السريه التي نتطلبها منكم كالمعتاد وذلك كوسيلةٍ نسألكم عن بع للأكيد من ش خصيبتكم. الآن، الرجاء الاعد بصوت عالٍ، مرةً واحدةً من 1 الى 9، هكذا: واحد، اثنان، ثلاثه، الى رقم تسعه.”</p>
--	--

e. Grammar: ArabicScheduling_NbrCountOne.gsl#Arabic_Rule

NL Slots	Values
<useInput>	nbrCount
Sample Phrases	Slots Filled
تسعه-ثمانيه-سبعه-سبعه-خمسه-أربعه-ثلاثه-اثنان-”واحد	<useInput nbrCount>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.usesInput == “nbrCount”		ArabicScheduling#NbrCountTwo

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	<p>الرجاء الاعد بصوت عالٍ، مرةً واحدةً من 1 الى 9، هكذا: واحد، اثنان، ثلاثه، الى رقم تسعه.</p> <p>Details:</p> <p>الرجاء الاعد بصوت عالٍ، مرةً واحدةً من 1 الى 9، هكذا: NbrCount_error</p>	Continue with rec in this state.

	واحد، اثنان، ثلاثه، الى رقم تسع.	
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	الرجاء الاعد بصوت عالٍ، مرة واحدة من 1 الى 9، مكذا: واحد، اثنان، ثلاثه، الى رقم تسع. Details: "الرجاء الاعد بصوت NbrCount_error عالٍ، مرة واحدة من 1 الى 9، مكذا: واحد، اثنان، ثلاثه، الى رقم تسع."	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	من أجل عمل حساب صوتي لكم، الرجاء الاعد بصوت عالٍ، مرة واحدة من 1 الى 9، مكذا: واحد، اثنان، ثلاثه، الى رقم تسع. Details: "من أجل عمل حساب NbrCount_help صوتي لكم، الرجاء الاعد بصوت عالٍ، ثنان، مرة واحدة من 1 الى 9، مكذا: واحد، ثلاثه، الى رقم تسع."	Continue with rec in this state.

13. ArabicScheduling#NbrCountThree

a. Description

Number count three for voice model collection. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicScheduling#NbrCountTwo	ArabicScheduling#RecordSecretDate

WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	الرجاء الاعد بصوتٍ عالٍ، مرةً واحدةً من 1 الى 9، ملكذا: واحد، اثنان، ثلثه، الى رقم تسعه. Details: “الرجاء الاعد بصوتٍ NbrCount_error عالٍ، مرةً واحدةً من 1 الى 9، ملكذا: واحد، اثنان، ثلثه، الى رقم تسعه.”	Continue with rec in this state.
---	---	----------------------------------

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	من أجل عمل حساب صوتي لكم، الرجاء احدةً من 1 الى 9، الاعد بصوتٍ عالٍ، مرةً و ملكذا: واحد، اثنان، ثلثه، الى رقم تسعه. Details: “من أجل عمل حساب NbrCount_help صوتي لكم، الرجاء الاعد بصوتٍ عالٍ، مرةً واحدةً من 1 الى 9، ملكذا: واحد، اثنان، ثلثه، الى رقم تسعه.”	Continue with rec in this state.

14. ArabicScheduling#NbrCountTwo

a. Description

Number count two for voiceprint collection. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicScheduling#NbrCountOne	ArabicScheduling#NbrCountThree

nomatch noinput maxspeechtimeout	الى 9، مكذا: واحد، اثنان، ثلثه، الى رقم تسعه. Details: العد بصوتٍ "الرجاء NbrCount_error من 1 الى 9، مكذا: واحد، اثنان، ثلثه، الى رقم تسعه."	state.
-------------------------------------	--	--------

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	من أجل عمل حساب صوتي لكم، الرجاء 1 الى 9، العد بصوتٍ عالٍ، مرةً واحدةً من مكذا: واحد، اثنان، ثلثه، الى رقم تسعه. Details: "من أجل عمل حساب NbrCount_help صوتي لكم، الرجاء العد بصوتٍ عالٍ، مرةً واحدةً من 1 الى 9، مكذا: واحد، اثنان، ثلثه، الى رقم تسعه."	Continue with rec in this state.

15. ArabicScheduling#NbrCountVerify

a. Description

Number count for voice verification. This process asks callers to count from 1 to 9. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicScheduling#ConfirmAccountNbr2	ArabicDetaineeAppt#ArabicDetaineeAppt

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>للتأكد من صوتكم، الرجاء العد بصوت عالٍ، مرة واحدة من 1 الى 9، هكذا: واحد، اثنان، ثلاثه، الى رقم تسعه.</p> <p>Details:</p> <p>للتأكد من صوتكم، الرجاء العد بصوت عالٍ، مرة NbrCountVerify_init الى رقم تسعه. "واحدة من 1 الى 9، هكذا: واحد، اثنان، ثلاثه،</p>

e. Grammar: ArabicScheduling_NbrCountVerify.gsl#Arabic_Rule

NL Slots	Values
<useInput>	nbrCount
Sample Phrases	Slots Filled
تسعه "ثمان يه س بع س ته - خم سه - أربعه - ثلاثه - اثنان -" واحد	<useInput nbrCount>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.u seInput == "nbrCount"	<p>لقد تم التأكد من المعلومات.</p> <p>Details:</p> <p>"لقد تم التأكد من NbrCountVerify_post المعلومات."</p>	ArabicDetaineeAppt#Ara bicDetaineeAppt

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	<p>الرجاء العد بصوت عالٍ، مرة واحدة من 1 الى 9، هكذا: واحد، اثنان، ثلاثه، الى رقم تسعه.</p> <p>Details:</p>	Continue with rec in this state.

	<p>“الرجاء الاعد بصوتٍ NbrCount_error حدةً من 1 الى 9، مكدًا: عالٍ، مرةً وا واحد، اثنان، ثلاثه، الى رقم تسعه.”</p>	
<p>WHEN (COUNT = 2) nomatch noinput maxspeechtimeout</p>	<p>الرجاء الاعد بصوتٍ عالٍ، مرةً واحدةً من 1 الى 9، مكدًا: واحد، اثنان، ثلاثه، الى رقم تسعه.</p> <p>Details: “الرجاء الاعد بصوتٍ NbrCount_error عالٍ، مرةً واحدةً من 1 الى 9، مكدًا: واحد، اثنان، ثلاثه، الى رقم تسعه.”</p>	<p>Continue with rec in this state.</p>

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>الاعد للتحقق من شخصيتك، الرجاء بصوتٍ عالٍ، مرةً واحدةً من 1 الى 9، مكدًا: واحد، اثنان، ثلاثه، الى رقم تسعه.</p> <p>Details: “للتأكد من NbrCountVerify_help شخصيتك، الرجاء الاعد بصوتٍ عالٍ، مرةً واحدةً من 1 الى 9، مكدًا: واحد، اثنان، ثلاثه، الى رقم تسعه.”</p>	<p>Continue with rec in this state.</p>

16. ArabicScheduling#RecordReminder

a. Description

This process simulates the NCA process of recording a callers' hint to their secret date. For demonstration purposes, this recording is not saved to any backend database. (This is a record state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicScheduling#RecordSecretDate	CleanUpAndexit_sayGoodbyeArabic#sayGoodbye

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>الآن، رجاءاً، هل يمكنكم أن تتذكروا الكلمة السريه التي ستساعدكم في تذكر الموعد السري. بعد سماع الصوت، الرجاء قول الكلمة السريه ونحن بدورنا سنسجلها لكم وأنتم ستعودون سماعها لاحقاً.</p> <p>Details: “الآن، رجاءاً، هل يمكنكم أن تتذكروا الكلمة السريه RemindDate_init التي ستساعدكم في تذكر الموعد السري. بعد سماع الصوت، الرجاء قول الكلمة السريه ونحن بدورنا سنسجلها لكم وأنتم ستعودون سماعها لاحقاً.”</p>

e. Actions

Condition	Action	Goto
--	<p>تم تسجيل لكم بنجاح في بنظام حسناً، لقد التعرف على الصوت.</p> <p>Details: “حسناً، لقد تم تسجيل لكم RemindDate_post بنجاح في بنظام التعرف على الصوت.”</p>	CleanUpAndexit_sayGoodbyeArabic#sayGoodbye

f. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	<p>رجاءاً، هل يمكنكم أن تقولوا لي الكلمة السريه التي ستساعدكم في تذكر الموعد السري الخاص بـحسابكم؟</p> <p>Details: “رجاءاً، هل يمكنكم أن RemindDate_error</p>	Continue with rec in this state.

	الكلمة السريه التي تقولوا لي ستساعديكم في تذكر الموعد السري الخاص بحسابكم؟	
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	رجاءاً، هل يمكنكم أن تقولوا لي الكلمة السريه التي ستساعديكم في تذكر الموعد السري الخاص بحسابكم؟ Details: “رجاءاً، هل يمكنكم أن RemindDate_error تقولوا لي الكلمة السريه التي ستساعديكم في تذكر الموعد السري الخاص بحسابكم؟”	Continue with rec in this state.

17. ArabicScheduling#RecordSecretDate

a. Description

This state is an Arabic substitution process for the English GetSecretDate and ConfirmSecretDate processes. (This is a record state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicScheduling#NbrCountThree	ArabicScheduling#RecordReminder

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	في هذه الخطوة، سوف ننتقل الى المعلومات السريه وسوف نسألكم السؤال المعتاد، وهو يتعلق بتاريخ يسهّل عليكم حفظه، ويصعبُ على الآخرين معرفته. عندما تكونوا جاهزين، الرجاء قولهُ بالكامل مع ذكر السنه، هكذا مثلاً: الأول من أبريل عام 1998. Details:

	<p>“في هذه الخطوة، سوف ننتقل الى المخطومات RecordSecretDate_init السريه وسوف نسألكم السؤال المعتاد، وهو يتعلق بتاريخ يسهّل عليكم حفظه، ويصعبُ على الآخرين معرفته. عندما تكونوا جاهزين، الرجاء ن أبريل عام 1998.” قولهُ بالكامل مع ذكر السنه، هكذا مثلاً: الأول م</p>
--	--

e. Actions

Condition	Action	Goto
--	<p>شكراً، لقد تم تسجيل الموعد السري</p> <p>Details: RecordSecretDate_post شكراً، لقد تم تسجيل الموعد السري”</p>	ArabicScheduling#RecordReminder

f. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	<p>الرجاء قول الموعد السري</p> <p>Details: RecordSecretDate_error الرجاء قول الموعد السري”</p>	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	<p>الرجاء قول الموعد السري</p> <p>Details: RecordSecretDate_error الرجاء قول الموعد السري”</p>	Continue with rec in this state.

18. ArabicScheduling#VoiceEnrollment

a. Description

Simulates the NCA voice enrollment process. This process asks callers for their 10-digit account number. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicScheduling#ArabicScheduling ArabicScheduling#ConfirmAccountNbr	ArabicScheduling#ConfirmAccountNbr

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>ن أجل البدء في عملية تسجيلكم بنظام التعرف على الصوت الرجاء ادخال أو قول العشرة أرقام الخاصة بحسابكم. اذا لم يكن بحوزتكم العشرة أرقام الخاصة بحسابكم أو في حالة فقدانها، الرجاء مراجعة أقرب مركز للشرطه من أجل التسجيل لحساب جديدي .</p> <p>Details: “ن أجل البدء في عملية تسجيلكم بنظام التعرف على الصوت الرجاء ادخال أو قول العشرة أرقام الخاصة بحسابكم. اذا لم يكن بحوزتكم العشرة أرقام الخاصة بحسابكم أو في حالة فقدانها، الرجاء اب جديدي .”مراجعة أقرب مركز للشرطه من أجل التسجيل لحساب</p>
Entry Type = reentry	<p>الرجاء إعادة ادخال العشرة أرقام الخاصة بحسابكم.</p> <p>Details: “الرجاء إعادة ادخال العشرة أرقام الخاصة بحسابكم.”</p>

e. Grammar:

ArabicScheduling_VoiceEnrollment.gsl#GetAccountNumber

NL Slots	Values
<AccountNumber>	”[ten-digit-string]” واحد-اثنان-واحد-خمسة-خمسة-خمسة-ثمانان-ثمانان-ثمانان-ثمانان-اثنان
<digit_one>	صفر, واحد, اثنان, ثلاثه, أربعه, خمسه, سته, سبعه, ثمانان, تسعه
<digit_two>	, سبعه, ثمانان, تسعهصفر, واحد, اثنان, ثلاثه, أربعه, خمسه, سته

<digit_three>	صفر, واحد, اثنان, ثلاثه, اربعه, خمسه, سته, سبعه, ثمانيه, تسعه
<digit_four>	صفر, واحد, اثنان, ثلاثه, اربعه, خمسه, سته, سبعه, ثمانيه, تسعه
<digit_five>	صفر, واحد, اثنان, ثلاثه, اربعه, خمسه, سته, سبعه, ثمانيه, تسعه
<digit_six>	صفر, واحد, اثنان, ثلاثه, اربعه, خمسه, سته, سبعه, ثمانيه, تسعه
<digit_seven>	صفر, واحد, اثنان, ثلاثه, اربعه, خمسه, سته, سبعه, ثمانيه, تسعه
<digit_eight>	صفر, واحد, اثنان, ثلاثه, اربعه, خمسه, سته, سبعه, ثمانيه, تسعه
<digit_nine>	اثنان, ثلاثه, اربعه, خمسه, سته, سبعه, ثمانيه, تسعه, صفر, واحد, ا
<digit_ten>	صفر, واحد, اثنان, ثلاثه, اربعه, خمسه, سته, سبعه, ثمانيه, تسعه
Sample Phrases	Slots Filled
-خمسه-خمسه-خمسه-ثمانيه-ثمانيه-ثمانيه-ثمانيه-ثمانيه اثنان-واحد-اثنان-واحد	<digit_one ثمانيه <digit_two ثمانيه <digit_three ثمانيه <digit_four خمسه <digit_five خمسه <digit_six خمسه <digit_seven واحد <digit_eight اثنان <digit_nine واحد <digit_ten اثنان <AccountNumber خمسه-خمسه-خمسه-ثمانيه-ثمانيه-ثمانيه-ثمانيه-ثمانيه اثنان->واحد-اثنان-واحد
”dtmf-8 dtmf-8 dtmf-8 dtmf-5 dtmf-5 dtmf-5 dtmf-1 dtmf-2 dtmf-1 dtmf-2”	<digit_one ثمانيه <digit_two ثمانيه <digit_three ثمانيه <digit_four خمسه <digit_five خمسه <digit_six خمسه <digit_seven واحد <digit_eight اثنان <digit_nine واحد <digit_ten اثنان <AccountNumber “[ten-digit-string]”>

f. Actions

Condition	Action	Goto
--	شكراً Details: Generic_thanks”شكراً“	
--	Assign: AcctNbr_a = lastresult\$.interpretation.digit_one Assign: AcctNbr_b = lastresult\$.interpretation.digit_two Assign: AcctNbr_c = lastresult\$.interpretation.digit_three Assign: AcctNbr_d = lastresult\$.interpretation.digit_four Assign: AcctNbr_e = lastresult\$.interpretation.digit_five Assign: AcctNbr_f = lastresult\$.interpretation.digit_six Assign: AcctNbr_g = lastresult\$.interpretation.digit_seven Assign: AcctNbr_h = lastresult\$.interpretation.digit_eight Assign: AcctNbr_i = lastresult\$.interpretation.digit_nine Assign: AcctNbr_j = lastresult\$.interpretation.digit_ten Assign: accountNbr = lastresult\$.interpretation.accountnumber	ArabicScheduling#ConfirmAccountNbr

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1)	من أجل البدء في عملية تسجيلكم بينظام	Continue with rec in this

nomatch noinput maxspeechtimeout	التعرّف على الصوت الرجاء ادخال أو قول الخاصه بحسابكم. العشرة أرقام Details: “من أجل البدء في عملية تسجيلكم بنظام التعرّف على الصوت الرجاء ادخال أو قول العشرة أرقام الخاصه بحسابكم.”	state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	من أجل البدء في عملية تسجيلكم بنظام التعرّف على الصوت الرجاء ادخال أو قول العشرة أرقام الخاصه بحسابكم. Details: “من أجل البدء في عملية تسجيلكم بنظام التعرّف العشرة على الصوت الرجاء ادخال أو قول أرقام الخاصه بحسابكم.”	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	من أجل البدء في عملية تسجيلكم بنظام تسجيل المواعيد الآلي يجب أن يكون بحوزتكم العشرة أرقام ال أو قول العشرة أرقام الخاصه بحسابكم. الرجاء ادخ الخاصه بحسابكم. اذا لم يكن بحوزتكم العشرة أرقام الخاصه بحسابكم أو في حالة أنكم فقدتوها فالرجاء مراجعة أقرب مركز للشرطه من أجل التسجيل لحساب جديد. Details: “من أجل البدء في عملية لكم بنظام تسجيل المواعيد الآلي يجب أن يكون تسجيل بحوزتكم العشرة أرقام الخاصه بحسابكم. الرجاء ادخال أو قول العشرة أرقام الخاصه بحسابكم. اذا لم يكن بحوزتكم العشرة أرقام الخاصه بحسابكم أو في حالة أنكم فقدتوها	Continue with rec in this state.

<AccountNumber>	”[ten-digit-string]” واحد-اثنان-واحد-خمسة-خمسة-ثمانية-ثمانية-ثمانية اثنان
<digit_one>	صفر, واحد, اثنان, ثلاثة, أربعة, خمسة, ستة, سبعة, ثمانية, تسعة
<digit_two>	صفر, واحد, اثنان, ثلاثة, أربعة, خمسة, ستة, سبعة, ثمانية, تسعة
<digit_three>	هـ, ستة, سبعة, ثمانية, تسعة, صفر, واحد, اثنان, ثلاثة, أربعة, خمسة
<digit_four>	صفر, واحد, اثنان, ثلاثة, أربعة, خمسة, ستة, سبعة, ثمانية, تسعة
<digit_five>	صفر, واحد, اثنان, ثلاثة, أربعة, خمسة, ستة, سبعة, ثمانية, تسعة
<digit_six>	صفر, واحد, اثنان, ثلاثة, أربعة, خمسة, ستة, سبعة, ثمانية, تسعة
<digit_seven>	صفر, واحد, اثنان, ثلاثة, أربعة, خمسة, ستة, سبعة, ثمانية, تسعة
<digit_eight>	صفر, واحد, اثنان, ثلاثة, أربعة, خمسة, ستة, سبعة, ثمانية, تسعة
<digit_nine>	صفر, واحد, اثنان, ثلاثة, أربعة, خمسة, ستة, سبعة, ثمانية, تسعة
<digit_ten>	د, اثنان, ثلاثة, أربعة, خمسة, ستة, سبعة, ثمانية, تسعة, صفر, واح
Sample Phrases	Slots Filled
ثمانية-ثمانية-ثمانية-واحد-خمسة-خمسة اثنان-واحد-اثنان	<digit_one ثمانية> <digit_two ثمانية> <digit_three ثمانية> <digit_four خمسة> <digit_five خمسة> <digit_six خمسة> <digit_seven واحد> <digit_eight اثنان> <digit_nine واحد> <digit_ten اثنان> <AccountNumber واحد-اثنان-واحد-خمسة-خمسة-ثمانية-ثمانية-ثمانية >اثنان
”dtmf-8 dtmf-8 dtmf-8 dtmf-5 dtmf-5 dtmf-5 dtmf-1 dtmf-2 dtmf-1 dtmf-2”	<digit_one ثمانية> <digit_two انية> <digit_three ثمانية> <digit_four خمسة> <digit_five خمسة> <digit_six خمسة>

	<digit_seven واحد> <digit_eight اثنان> <digit_nine واحد> <digit_ten اثنان> <AccountNumber 831-869-9638>
--	---

f. Actions

Condition	Action	Goto
--	شكراً Details: Generic_thanks”شكراً“	
--	Assign: AcctNbr_a = lastresult\$.interpretation.digit_one Assign: AcctNbr_b = lastresult\$.interpretation.digit_two Assign: AcctNbr_c = lastresult\$.interpretation.digit_three Assign: AcctNbr_d = lastresult\$.interpretation.digit_four Assign: AcctNbr_e = lastresult\$.interpretation.digit_five Assign: AcctNbr_f = lastresult\$.interpretation.digit_six Assign: AcctNbr_g = lastresult\$.interpretation.digit_seven Assign: AcctNbr_h = lastresult\$.interpretation.digit_eight Assign: AcctNbr_i = lastresult\$.interpretation.digit_nine Assign: AcctNbr_j = lastresult\$.interpretation.digit_ten Assign: accountNbr = lastresult\$.interpretation.accountnumber	ArabicScheduling#ConfirmAccountNbr2

g. Error Behaviors

Error Type	Action	Goto
<p>WHEN (COUNT = 1)</p> <p>nomatch noinput maxspeechtimeout</p>	<p>الرجاء ادخال أو قول العشرة أرقام الخاصة بحسابكم. اذا لم يكن بحوزتكم العشرة أرقام الخاصة بحسابكم أو في في حالة فقدانها، الرجاء مراجعة أقرب مركز لحساب جديد. للشروط من أجل التسجيل</p> <p>Details: “الرجاء ادخال أو VoiceVerification_error قول العشرة أرقام الخاصة بحسابكم. اذا لم يكن بحوزتكم العشرة أرقام الخاصة بحسابكم أو في في حالة فقدانها، الرجاء مراجعة أقرب مركز للشروط من أجل التسجيل لحساب جديد.”</p>	<p>Continue with rec in this state.</p>
<p>WHEN (COUNT = 2)</p> <p>nomatch noinput maxspeechtimeout</p>	<p>الرجاء ادخال أو قول العشرة أرقام الخاصة بحسابكم. اذا لم يكن بحوزتكم العشرة أرقام الخاصة بحسابكم أو في في حالة فقدانها، الرجاء مراجعة أقرب مركز لحساب جديد. للشروط من أجل التسجيل</p> <p>Details: “الرجاء ادخال أو VoiceVerification_error قول العشرة أرقام الخاصة بحسابكم. اذا لم يكن بحوزتكم العشرة أرقام الخاصة بحسابكم أو في في حالة فقدانها، الرجاء مراجعة أقرب مركز للشروط من أجل التسجيل لحساب جديد.”</p>	<p>Continue with rec in this state.</p>

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
<p>help</p>	<p>من أجل البدء في عملية تسجيلكم بنظام التعرف على الصوت، الرجاء ادخال أو قول العشرة أرقام الخاصة</p>	<p>Continue with rec in this state.</p>

	<p>بحسابكم. اذا لم يكن بحوزتكم ال عشرة أرقام ال خاصه بكم أو في حالة فقدانها، الرجاء مراجعة أقرب مركز بحسابك لشرطه من أجل التسجيل لحساب جدي. .</p> <p>Details: “من أجل البدء في عملية VoiceVerification_help تسجيلكم بنظام التعرف على الصوت، الرجاء ادخال أو لم يكن بحوزتكم قول ال عشرة أرقام ال خاصه بحسابكم. اذا ال عشرة أرقام ال خاصه بحسابكم أو في حالة فقدانها، الرجاء مراجعة أقرب مركز لشرطه من أجل التسجيل لحساب جدي. ”</p>	
--	--	--

20. ArabicDetaineeAppt Page Information

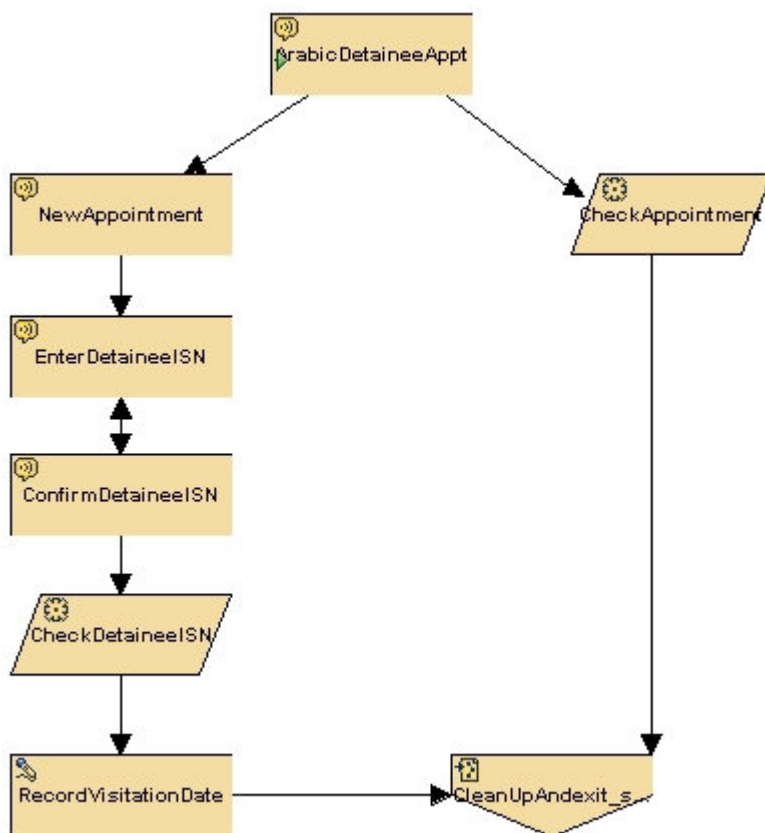
a. Description

This page demonstrates the call flow for a detainee appointment scheduling application, no interaction with backend database.

b. Page Variables

Page Variables Table		
Name	Initial Value	Description
DetaineeISN		
DetainNbr_a		
DetainNbr_b		
DetainNbr_c		
DetainNbr_d		
DetainNbr_e		
DetainNbr_f		
DetainNbr_g		
DetainNbr_h		
DetainNbr_i		

c. *Call Flow*



21. **ArabicDetaineeAppt#ArabicDetaineeAppt**

a. *Description*

Ask callers if they would like to schedule a new appointment to visit a detainee or check to see if a pending appointment is scheduled. (This is a recognition state.)

b. *Special Features*

c. *Entry and Exit States*

Entry States	Exit States
ArabicScheduling#NbrCountVerify	ArabicDetaineeAppt#CheckAppointment

ArabicDetaineeAppt#NewAppointment

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>الرجاء الأختياري من أحد الخيارات التاليتين: إذا كنتم تتودون عمل موعد جديد، فالرجاء قول: "موعد جديد". أما إذا كنتم تتودون التأكد من موعد مسبق للزيارة فالرجاء قول: "موعد مسبق للزيارة".</p> <p>Details:</p> <p>ار من أحد الخيارات التاليتين: "الرجاء الأختياري ArabicDetaineeAppt_init إذا كنتم تتودون عمل موعد جديد، فالرجاء قول: "موعد جديد". أما إذا كنتم تتودون التأكد من موعد مسبق للزيارة فالرجاء قول: "موعد مسبق للزيارة".</p>

e. Grammar:

ArabicDetaineeAppt_ArabicDetaineeAppt.gsl#Arabic_Rule

NL Slots	Values
<userInput>	newAppointment, checkAppointment
Sample Phrases	Slots Filled
"التأكد من موعد"	<userInput checkAppointment>
"موعد مسبق للزيارة"	<userInput checkAppointment>
"موعد جديد"	<userInput newAppointment>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == "checkAppointment"	<p>هل أنتم متأكدون؟</p> <p>Details:</p> <p>"هل أنتم متأكدون؟" Generic_sure</p>	ArabicDetaineeAppt#CheckAppointment

lastresult\$.interpretation.u serInput == "newAppoinment"	هل أنتم متأكدون؟ Details: Generic_sure"؟"متأكدون؟	ArabicDetaineeAppt#New Appointment
---	---	---------------------------------------

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	تم تودون عمل موعد جديدي، فالرجاء اذا كن قول : "موعد جديدي". أما اذا كنتم تودون التأكد من موعد مسبق للزياره فقولوا "موعد مسبق للزياره". Details: "اذا كنتم ArabicDetaineeAppt_error تودون عمل موعد جديدي، فالرجاء قول : كنتم تودون التأكد من "موعد جديدي". أما اذا موعد مسبق للزياره فقولوا "موعد مسبق للزياره".	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	اذا كنتم تودون عمل موعد جديدي، فالرجاء قول : "موعد جديدي". أما اذا كنتم تودون اره فقولوا التأكد من موعد مسبق للزي "موعد مسبق للزياره". Details: "اذا كنتم ArabicDetaineeAppt_error تودون عمل موعد جديدي، فالرجاء قول : "موعد جديدي". أما اذا كنتم تودون التأكد من موعد مسبق للزياره فقولوا "موعد مسبق للزياره".	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>إذا كنتم تودون عمل موعد جدي، فالرجاء قول : “موعد جدي”. أما إذا كنتم تودون التأكد من موعد مسبق للزيارة فالرجاء قول “موعد مسبق للزيارة”.</p> <p>Details: إذا كنتم ArabicDetaineeAppt_help تودون عمل موعد جدي، فالرجاء قول : “موعد جدي”. أما إذا كنتم تودون التأكد من موعد مسبق للزيارة فالرجاء قول “موعد مسبق للزيارة”.</p>	Continue with rec in this state.

22. ArabicDetaineeAppt#CheckAppointment

a. Description

(This is a non-recognition processing state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicDetaineeAppt#ArabicDetaineeAppt	CleanUpAndexit_sayGoodbyeArabic#sayGoodbye

d. Actions

0	Action	Goto
--	<p>حسب سجلاتنا فإنه لا يوجد لديكم موعد مسبق. الرجاء معاودة الاتصال فيمابعد.</p> <p>Details: “حسب سجلاتنا فإنه لا CheckAppointment_init يوجد لديكم موعد مسبق. الرجاء معاودة الاتصال فيمابعد”</p>	CleanUpAndexit_sayGoodbyeArabic#sayGoodbye

	<p>GenericPromptConfirm_part1”هل سمعت“</p> <p>File Expression: ”numbers/” + DetainNbr_a + “_high.wav”</p> <p>File Expression: ”numbers/” + DetainNbr_b + “_high.wav”</p> <p>File Expression: ”numbers/” + DetainNbr_c + “_high.wav”</p> <p>File Expression: ”numbers/” + DetainNbr_d + “_high.wav”</p> <p>File Expression: ”numbers/” + DetainNbr_e + “_high.wav”</p> <p>File Expression: ”numbers/” + DetainNbr_f + “_high.wav”</p> <p>File Expression: ”numbers/” + DetainNbr_g + “_high.wav”</p> <p>File Expression: ”numbers/” + DetainNbr_h + “_high.wav”</p> <p>File Expression: ”numbers/” + DetainNbr_i + “_high.wav”</p> <p>GenericPromptConfirm_part2 “هل هذا صحيح؟”</p> <p>GenericPromptConfirm_yesNo .”نعم“ فالرجاء قول “نعم” .”</p> <p>إذا لم يكن هذا صحيحاً، فالرجاء قول “لا”.</p>
--	--

e. Grammar:

ArabicDetaineeAppt_ConfirmDetaineeISN.gsl#Arabic_Rule

NL Slots	Values
<userInput>	yes, no
Sample Phrases	Slots Filled
”لا”	<userInput no>
”نعم”	<userInput yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == “no”	<p>أنا آسف!</p> <p>Details:</p> <p>Generic_imSorry”أنا آسف!”</p>	ArabicDetaineeAppt#EnterDetaineeISN
lastresult\$.interpretation.userInput == “yes”		ArabicDetaineeAppt#CheckDetaineeISN

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspechtimeout	<p>لكان رقم الهويه الخاص بالسجين URL [اذا Expression] اذا كان هذا صحيحاً، فالرجاء قول "نعم". اذا لم يكن هذا صحيحاً، فالرجاء قول "لا".</p> <p>Details: ConfirmDetaineeISN_error رقم الهويه الخاص بالسجين</p> <p>URL Expression: genISNumber(DetaineeISN)</p> <p>GenericPromptConfirm_yesNo "اذا كان هذا صحيحاً، فالرجاء قول "نعم". اذا لم يكن هذا صحيحاً، فالرجاء قول "لا"."</p>	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspechtimeout	<p>لخاص بالسجين URL [اذا كان رقم الهويه ا Expression] اذا كان هذا صحيحاً، فالرجاء قول "نعم". اذا لم يكن هذا صحيحاً، فالرجاء قول "لا".</p> <p>Details: ConfirmDetaineeISN_error رقم الهويه الخاص بالسجين</p> <p>URL Expression: genISNumber(DetaineeISN)</p> <p>GenericPromptConfirm_yesNo "اذا كان هذا صحيحاً، فالرجاء قول "نعم". اذا لم يكن هذا صحيحاً، فالرجاء قول "لا"."</p>	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>ح رقم الهويه الخاص دعني أتأكد من ص بالسجين. اذا كان الرقم URL [</p>	Continue with rec in this state.

	<p>اذا كان هذا صحيحاً، فالرجاء [Expression] قول "نعم". اذا لم يكن هذا صحيحاً، فالرجاء قول "لا".</p> <p>Details:</p> <p>“دعني أتأكد ConfirmDetaineeISN_help من صحة رقم الهويه الخاص بالسجين. اذا الرقم كان URL Expression: genISNumber(DetaineeISN) “اذا كان GenericPromptConfirm_yesNo هذا صحيحاً، فالرجاء قول “نعم”. اذا لم يكن هذا صحيحاً، فالرجاء قول “لا”.”</p>	
--	---	--

25. ArabicDetaineeAppt#EnterDetaineeISN

a. Description

This process asks callers to enter a detainee’s ISN to schedule a visit. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicDetaineeAppt#NewAppointment ArabicDetaineeAppt#ConfirmDetaineeISN	ArabicDetaineeAppt#ConfirmDetaineeISN

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>الرجاء قول أو ض غط الأرقام المتسعه الخاصه بالسجين الم عن ي.</p> <p>Details:</p> <p>“الرجاء قول أو ض غط الأرقام المتسعه الخاصه EnterDetaineeISN_init بالسجين الم عن ي.”</p>

Entry Type = reentry	<p>المعني. الرجاء اعادة قول أو اعادة ض غط الأرقام التسعة بالاسجيني</p> <p>Details:</p> <p>“الرجاء اعادة قول أو اعادة ض غط الأرقام التسعة EnterDetaineeISN_reentry الخاصه بالاسجيني المعني.”</p>
----------------------	---

e. **Grammar:**

ArabicDetaineeAppt_EnterDetaineeISN.gsl#GetDetaineeNumber

NL Slots	Values
<DetainNumber>	تسع-ثمانية-سبع-ستة-خمس-أربع-ثلاثة-اثنان-واحد, "[nine-digit-string]"
<digit_one>	صفر, واحد, اثنان, ثلاثة, أربع, خمس, ستة, سبع, ثمانية, تسعة
<digit_two>	صفر, واحد, اثنان, ثلاثة, أربع, خمس, ستة, سبع, ثمانية, تسعة
<digit_three>	هـ, أربع, خمس, ستة, سبع, ثمانية, تسعة, صفر, واحد, اثنان, ثلاث
<digit_four>	صفر, واحد, اثنان, ثلاثة, أربع, خمس, ستة, سبع, ثمانية, تسعة
<digit_five>	صفر, واحد, اثنان, ثلاثة, أربع, خمس, ستة, سبع, ثمانية, تسعة
<digit_six>	ثمانية, تسعة, صفر, واحد, اثنان, ثلاثة, أربع, خمس, ستة, سبع, ثمانية
<digit_seven>	صفر, واحد, اثنان, ثلاثة, أربع, خمس, ستة, سبع, ثمانية, تسعة
<digit_eight>	صفر, واحد, اثنان, ثلاثة, أربع, خمس, ستة, سبع, ثمانية, تسعة
<digit_nine>	صفر, واحد, اثنان, ثلاثة, أربع, خمس, ستة, سبع, ثمانية, تسعة
Sample Phrases	Slots Filled
<p>ستة-خمس-أربع-ثلاثة-اثنان-واحد</p> <p>تسع-ثمانية-سبع</p>	<p><digit_one واحد></p> <p><digit_two اثنان></p> <p><digit_three ثلاثة></p> <p><digit_four أربع></p> <p><digit_five خمس></p> <p><digit_six ستة></p> <p><digit_seven سبع></p> <p><digit_eight ثمانية></p> <p><digit_nine تسعة></p> <p><DetainNumber ثمانية-سبع-ستة-خمس-أربع-ثلاثة-اثنان-حدا></p>

	تس عه>
”dtmf-1 dtmf-2 dtmf-3 dtmf-4 dtmf-5 dtmf-6 dtmf-7 dtmf-8 dtmf-9”	<digit_one واحد> <digit_two اثنان> <digit_three ثلثه> <digit_four اربعه> <digit_five خمسه> <digit_six سته> <digit_seven سبعه> <digit_eight اني هـ> ثم <digit_nine تس عه> -ثم اني هـ س ب ع هـ س ت هـ -خمسه ارب عه -ثلثه اثنان -واحد <DetainNumber تس عه>

f. Actions

Condition	Action	Goto
--	شكرا" Details: Generic_thanks”شكرا”	
--	Assign: DetainNbr_a = lastresult\$.interpretation.digit_one Assign: DetainNbr_b = lastresult\$.interpretation.digit_two Assign: DetainNbr_c = lastresult\$.interpretation.digit_three Assign: DetainNbr_d = lastresult\$.interpretation.digit_four Assign: DetainNbr_e = lastresult\$.interpretation.digit_five	ArabicDetaineeAppt#Con firmDetaineeISN

	Assign: DetainNbr_f = lastresult\$.interpretation.digit_six Assign: DetainNbr_g = lastresult\$.interpretation.digit_seven Assign: DetainNbr_h = lastresult\$.interpretation.digit_eight Assign: DetainNbr_i = lastresult\$.interpretation.digit_nine Assign: DetaineeISN = lastresult\$.interpretation.DetainNumber	
--	--	--

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	الرجاء قول أو ضغظ التسعة أرقام الخاصة بالسجين. Details: “الرجاء قول أو EnterDetaineeISN_error ضغظ التسعة أرقام الخاصة بالسجين.”	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	الرجاء قول أو ضغظ التسعة أرقام الخاصة بالسجين. Details: “الرجاء قول أو EnterDetaineeISN_error ضغظ التسعة أرقام الخاصة بالسجين.”	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	الرجاء قول أو ضغط التسعة أرقام الخاصة ن. بالسجيني Details: “الرجاء قول أو EnterDetaineeISN_error ضغط التسعة أرقام الخاصة بالسجيني.”	Continue with rec in this state.

26. ArabicDetaineeAppt#NewAppointment

a. Description

This process asks callers if they have the detainee’s Interment Serial Number (ISN). (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicDetaineeAppt#ArabicDetaineeAppt	ArabicDetaineeAppt#EnterDetaineeISN

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	من أجل الحصول على موعد جديد يجب أن يكون بحوزتكم رقم الهويه الخاص بالسجيني. اذا كان بحوزتكم رقم الهويه الخاص بالسجيني فالرجاء قول: “نعم” واذا لم يكن بحوزتكم فالرجاء قول: “لا” Details: موعد جديد يجب أن يكون بحوزتكم “من أجل الحصول على NewAppointment_init رقم الهويه الخاص بالسجيني. اذا كان بحوزتكم رقم الهويه الخاص بالسجيني فالرجاء قول: “نعم” واذا لم يكن بحوزتكم فالرجاء قول: “لا”

e. Grammar:

ArabicDetaineeAppt_NewAppointment.gsl#Arabic_Rule

NL Slots	Values
<userInput>	yes, no
Sample Phrases	Slots Filled
”لا”	<userInput no>
”نعم”	<userInput yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == “no”	<p>من أجل عمل موعد جديد لزيارة أحد السجناء، يجب أن جةً يكون معكم رقم الهويه الخاص بالسجين . وننتي للاجراءات الامنيه فانه لا يمكننا اعطائكم هذا الرقم عبر التلـفون. الرجاء مراجعة أقرب مركز للشرطه لأجل هذا الرقم.</p> <p>Details: “من أجل عمل موعد جديد لزيارة أحد AccessDenial_init السجناء، يجب أن يكون معكم رقم الهويه الخاص . وننتي جةً للاجراءات الامنيه فانه لا بالسجين يمكننا اعطائكم هذا الرقم عبر التـلـفون. الرجاء مراجعة أقرب مركز للشرطه لأجل هذا الرقم.”</p>	Return to the calling dialog
lastresult\$.interpretation.userInput == “yes”		ArabicDetaineeAppt#EnterDetaineeISN

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	<p>إذا كان بحوزتكم رقم الهويه الخاص بالسجين فالرجاء قول: “نعم” وإذا لم يكن بحوزتكم فالرجاء قول: “لا” ونحن بدورنا سنساعدكم في الحصول على هذه الامـعـلـومـات.</p>	Continue with rec in this state.

	<p>Details:</p> <p>إذا كان NewAppointment_error بحوزتكم رقم الهويه الخاص بالسجين فالرجاء قول: "نعم" وإذا لم يكن بحوزتكم فالرجاء قول: "لا" ونحن بدورنا سنساعدكم في الحصول على هذه المعلومات.</p>	
<p>WHEN (COUNT = 2) nomatch noinput maxspeechtimeout</p>	<p>إذا كان بحوزتكم رقم الهويه الخاص بالسجين فالرجاء قول: "نعم" وإذا لم يكن بحوزتكم فالرجاء قول: "لا" ونحن بدورنا سنساعدكم في الحصول على هذه المعلومات.</p> <p>Details:</p> <p>إذا كان NewAppointment_error بحوزتكم رقم الهويه الخاص بالسجين فالرجاء قول: "نعم" وإذا لم يكن بحوزتكم فالرجاء قول: "لا" ونحن بدورنا سنساعدكم في الحصول على هذه المعلومات.</p>	<p>Continue with rec in this state.</p>

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>من أجل الحصول على موعدٍ جديدٍ يجب أن يكون بحوزتكم رقم الهويه الخاص بالسجين. إذا كان بحوزتكم رقم الهويه الخاص بالسجين فالرجاء قول: "نعم" وإذا لم يكن بحوزتكم فالرجاء قول: "لا" ونحن بدورنا سنساعدكم في الحصول على هذه المعلومات.</p> <p>Details:</p> <p>“من أجل الحصول على موعدٍ جديدٍ NewAppointment_help يجب أن يكون بحوزتكم رقم الهويه الخاص بالسجين. إذا كان بحوزتكم رقم الهويه الخاص بالسجين فالرجاء قول: "نعم" وإذا لم يكن بحوزتكم فالرجاء قول: "لا" ونحن</p>	<p>Continue with rec in this state.</p>

المعاملومات. "ب دورنا سن ساع دكم في الحصول على هذه	
--	--

27. ArabicDetaineeAppt#RecordVisitationDate

a. Description

This state is an Arabic substitution process for the English GetDetaineeVisitation Date and Time functions. (This is a record state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
ArabicDetaineeAppt#CheckDetaineeISN	CleanUpAndexit_sayGoodbyeArabic#sayGoodbye

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>بعد سماع الصوت، الرجاء قول تاريخ وزمن الزيارة التي تودون تحديدها. "أبو مصعب الزرقاوي"</p> <p>Details: "بعد سماع الصوت، الرجاء قول تاريخ وزمن RecordVisitationDate_init الزيارة التي تودون تحديدها." "أبو مصعب الزرقاوي" DetaineeName_Arabic</p>

e. Actions

Condition	Action	Goto
--	<p>شكراً، لقد سجلنا طلب الزيارة. نرجوا منكم أن تتصلوا بنا بعد 24 ساعة لمعرفة فيما إذا تم تحديده موعداً للزيارة.</p> <p>Details: لقد سجلنا طلب الزيارة. "شكراً"، RecordVisitationDate_post نرجوا منكم أن تتصلوا بنا بعد 24 ساعة لمعرفة فيما إذا تم</p>	CleanUpAndexit_sayGoodbyeArabic#sayGoodbye

	تحديد موعد للزياره.	
--	---------------------	--

f. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	بعد سماع الصوت، الرجاء قول تاريخ وزمن الزيارة التي تودون تحديدها. "أبو مصعب الزرقاوي" Details: "بعد سماع RecordVisitationDate_init الصوت، الرجاء قول تاريخ وزمن الزيارة التي تودون تحديدها." "أبو مصعب DetaineeName_Arabic الزرقاوي"	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	بعد سماع الصوت، الرجاء قول تاريخ وزمن الزيارة التي تودون تحديدها. "أبو مصعب الزرقاوي" Details: "بعد سماع RecordVisitationDate_init الصوت، الرجاء قول تاريخ وزمن الزيارة التي تودون تحديدها." "أبو مصعب DetaineeName_Arabic الزرقاوي"	Continue with rec in this state.

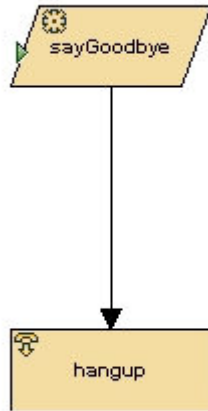
28. CleanUpAndexit_sayGoodbyeArabic Page Information

a. Description

b. Page Variables

There are no variables defined for this page.

c. *Call Flow*



29. **CleanUpAndexit_sayGoodbyeArabic#sayGoodbye**

a. *Description*

(This is a non-recognition processing state.)

b. *Special Features*

c. *Entry and Exit States*

Entry States	Exit States
ArabicMainMenu#ArabicVisitInformation ArabicMainMenu#ArabicDirections ArabicScheduling#RecordReminder ArabicDetaineeAppt#CheckAppointment ArabicDetaineeAppt#RecordVisitationDate	CleanUpAndexit_sayGoodbyeArabic#hangup

d. *Actions*

Condition	Action	Goto
--	شكراً! لاتصل الكم بمركز بغداد للاصلح. مع السلامه!	CleanUpAndexit_sayGoo dbyeArabic#hangup

	Details: CleanUpAndExit_sayGoodbyeArabic "شكرا" لأتصل لكم بمركز بغداد للأصلح. مع السلامه!"	
--	--	--

30. CleanUpAndexit_sayGoodbyeArabic#hangup

a. Description

(This is a terminate state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
CleanUpAndexit_sayGoodbyeArabic#sayGoodbye	--

H. ARABICMAINMENU APPENDICES

1. Grammar and Slot Definitions

Dialog State	Grammar	Slots	Slot Values
ArabicMainMenu #ArabicMainMenu	ArabicMainMenu_ArabicMainMenu.gsl#Sample_Rule	userInput	information, directions, scheduling,
ArabicMainMenu #ArabicVisitInformation	ArabicMainMenu_ArabicVisitInformation.gsl#Arabic_Rule	UserInput	repeatMessage, returnMainMenu, exitSystem,
ArabicMainMenu #ArabicDirections	ArabicMainMenu_ArabicDirections.gsl#Arabic_Rule	UserInput	repeatDirections, returnMainMenu, exitSystem,
ArabicScheduling #ArabicScheduling	ArabicScheduling_ArabicScheduling.gsl#Arabic_Rule	userInput	yes, no,
ArabicScheduling #VoiceEnrollment	ArabicScheduling_VoiceEnrollment.gsl#GetAccountNumber	AccountNumber digit_one	"[ten-digit-string]", -شمان يه-شمان يه, -واحد-اشنان-واحد-خمسه-خمسه-شمان يه اشنان,

			ستہ, سبعہ, ثمانیہ, تسعہ, صفر, واحد, اثنان, ثلاثہ, أربعہ, خمسہ, ستہ, سبعہ, ثمانیہ, تسعہ, ثنان, ثلاثہ, أربعہ, خمسہ, صفر, واحد, ا ستہ, سبعہ, ثمانیہ, تسعہ,
ArabicScheduling #ConfirmEnrollPin	ArabicScheduling_Confirm EnrollPin.gsl#Arabic_Rule	userInput	yes, no,
ArabicScheduling #EnrollCheck	ArabicScheduling_EnrollCh eck.gsl#Arabic_Rule	userInput	enrollMeNow,
ArabicScheduling #ConfirmAccount Nbr2	ArabicScheduling_Confirm AccountNbr2.gsl#Arabic_R ule	userInput	yes, no,
ArabicScheduling #NbrCountVerify	ArabicScheduling_NbrCoun tVerify.gsl#Arabic_Rule	useInput	nbrCount,
ArabicScheduling #VoiceVerification	ArabicScheduling_VoiceVe rification.gsl#GetAccountN umber	AccountNum ber digit_one digit_two digit_three digit_four digit_five digit_six digit_seven digit_eight digit_nine digit_ten	ثمانیہ-ثمانیہ, "[ten-digit-string]" -واحد-اثنان-واحد-خمسہ-خمسہ-خمسہ-ثمانیہ اثنان, صفر, واحد, اثنان, ثلاثہ, أربعہ, خمسہ, ستہ, سبعہ, ثمانیہ, تسعہ, ربعہ, خمسہ, صفر, واحد, اثنان, ثلاثہ, أ ستہ, سبعہ, ثمانیہ, تسعہ, صفر, واحد, اثنان, ثلاثہ, أربعہ, خمسہ, ستہ, سبعہ, ثمانیہ, تسعہ, صفر, واحد, اثنان, ثلاثہ, أربعہ, خمسہ, ستہ, سبعہ, ثمانیہ, تسعہ, صفر, واحد, اثنان, ثلاثہ, أربعہ, خمسہ, ستہ, سبعہ, ثمانیہ, تسعہ, ربعہ, خمسہ, صفر, واحد, اثنان, ثلاثہ, أ ستہ, سبعہ, ثمانیہ, تسعہ, صفر, واحد, اثنان, ثلاثہ, أربعہ, خمسہ, ستہ, سبعہ, ثمانیہ, تسعہ, صفر, واحد, اثنان, ثلاثہ, أربعہ, خمسہ, ستہ, سبعہ, ثمانیہ, تسعہ,

			صفر, واحد, اثنان, ثلاثه, أربعه, خمسه, سته, سابعه, ثمانيه, تسعه, ربعه, خمسه, صفر, واحد, اثنان, ثلاثه, أ سته, سابعه, ثمانيه, تسعه,
ArabicDetaineeAppt#ArabicDetaineeAppt	ArabicDetaineeAppt_ArabicDetaineeAppt.gsl#Arabic_Rule	userInput	newAppointment, checkAppointment,
ArabicDetaineeAppt#NewAppointment	ArabicDetaineeAppt_NewAppointment.gsl#Arabic_Rule	userInput	yes, no,
ArabicDetaineeAppt#EnterDetaineeISN	ArabicDetaineeAppt_EnterDetaineeISN.gsl#GetDetaineeNumber	DetainNumber digit_one digit_two digit_three digit_four digit_five digit_six digit_seven digit_eight digit_nine	”[nine-digit-string]”, ثلاثه-اثنان-واحد, تسعه, ثمانيه-سابعه-سته-خمسه-أربعه صفر, واحد, اثنان, ثلاثه, أربعه, خمسه, سته, سابعه, ثمانيه, تسعه, صفر, واحد, اثنان, ثلاثه, أربعه, خمسه, سته, سابعه, ثمانيه, تسعه, صفر, واحد, اثنان, ثلاثه, أربعه, خمسه, سته, سابعه, ثمانيه, تسعه, ان, ثلاثه, أربعه, خمسه, صفر, واحد, اثنان, سته, سابعه, ثمانيه, تسعه, صفر, واحد, اثنان, ثلاثه, أربعه, خمسه, سته, سابعه, ثمانيه, تسعه, صفر, واحد, اثنان, ثلاثه, أربعه, خمسه, سته, سابعه, ثمانيه, تسعه, ان, ثلاثه, أربعه, خمسه, صفر, واحد, اثنان, سته, سابعه, ثمانيه, تسعه, صفر, واحد, اثنان, ثلاثه, أربعه, خمسه, سته, سابعه, ثمانيه, تسعه,
ArabicDetaineeAppt#ConfirmDetaineeISN	ArabicDetaineeAppt_ConfirmDetaineeISN.gsl#Arabic_Rule	userInput	yes, no,

2. Prompt List

Prompt File	Transcription
help_universal	”حسنًا، الذيكُم بـعض يد المساعده.“
operator_universal	”الرجاء قبول اعتذارنا لعدم وجود ممثلين حاضرين لمساعدتكم.“
global_error1	”أنا آسف!“
global_error2	”أنا آسف! لم أفهم ذلك.“
global_error3	”أنا آسف! يبدو أن نواجه بعض الصعوبات الفنية. نرجوا منكم أن تحاولوا معنا في وقت لاحق.“
ArabicMainMenu_init	”الرجاء الاختيار من الخيارات التالية: للحصول على معلومات تتعلق بالزياره، فالرجاء قول “معلومات”. أما اذا كنتم تتودون معرفة عنا فالرجاء قول “طريق الوصول”. بالنسبة لطريق الوصول الى موق لاستعمال نظام التسجيل الالى، فالرجاء قول “تسجيل موعده“.
Generic_sure	”هل أنتم متأكدون؟“
ArabicMainMenu_help	”عبر نظام التسجيل الالى سيكون بإمكانكم الاختيار من الخيارات بالزياره، التاليه: اذا كنتم تتودون الحصول على معلومات تتعلق بالرجاء قول: “معلومات”. أما اذا كنتم تتودون معرفة طريق الوصول الى مركز بغداد للأصلاح، فالرجاء قول: “طريق الوصول”. أما بالنسبة لاستعمال نظام التسجيل الالى، فالرجاء قول: “تسجيل موعده“.
ArabicMainMenu_error	”الى هذا الموق أم “هل تتودون الحصول على معلومات، طريق الوصول استعمل نظام التسجيل الالى؟ للحصول على معلومات، الرجاء قول: “معلومات”. بالنسبة للحصول على معلومات عن طريق الوصول الى هذا الموق فالرجاء قول: “طريق الوصول”. أما بالنسبة لاستعمال نظام التسجيل الالى، فالرجاء قول: “تسجيل موعده“.
ArabicVisitInformation_init	”ساعات زياره المساجين في مركز بغداد للأصلاح تبدأ من يوم الاثنين الى يوم السبت من الساعه الثامنه صباحاً لغاية الساعه الرابعه بعد الظهر. هل تتودون الاستماع الى هذه المعلومات مرةً أخرى أم جةً الى أي تتودون العودة الى القائمه الرئيسيه؟ اذا لم تكونوا بحا خدمةً أخرى فالرجاء قول “مع السلامه” أو اغلق الخ.“
ArabicVisitInformation_errorAndHelp	”هل تتودون الاستماع الى هذه المعلومات مرةً أخرى أم تتودون العودة الى القائمه الرئيسيه؟ اذا كنتم تتودون الحصول على معلومات تتعلق

	ه أخرى". أما إذا كنتم تتودون العودة الى بالزياره فالرجاء قول: "أعد مر اللقاءم الرىيسيه، فالرجاء قول: "لقاءم الرىيسيه". أما اذا انتهيتم من مكالمتكم فالرجاء قول "مع السلامه" أو اغلق الخط."
ArabicDirections_init	"يقع مركز بغداد للأصلح على بُعد 20 ميلاً غرب مدينة بغداد في ب. من مدينة بغداد اتجهوا غرباً على الطريق السريع مدينة أبو غري رقم 6 لمسافة 18 ميلاً ثم خذوا المخرج رقم 9 الى أبو غري. يقع مركز بغداد للأصلح على بعد ميلين جنوب غرب لمخرج رقم 9. والأن، هل تتودون سماع طريق الوصول الى هذا الموقع مرة أخرى أم تتودون العودة يسيه؟ اذا انتهيتم من مكالمتكم فالرجاء اغلق الى اللقاءم الرى الخط."
ArabicDirections_errorAndHelp	"اذا كنتم تتودون سماع طريق الوصول مرة أخرى فالرجاء قول: "أعد مرة أخرى". أما اذا كنتم تتودون العودة الى اللقاءم الرىيسيه فالرجاء قول لمتكم فالرجاء قول "مع" اللقاءم الرىيسيه"، أما اذا انتهيتم من مكالمه السلامه" أو اغلق الخط."
ArabicScheduling_init	"من أجل استخدام نظام التسجيل الألي، يجب عليكم أن تكونوا مسجلين مسبقاً في هذا النظام. هل سجلتم مسبقاً في هذا النظام؟ اذا كنتم قد سجلتم مسبقاً في نظام التسجيل الألي فالرجاء قول لم تكونوا قد سجلتم مسبقاً في نظام التسجيل الألي "نعم". اذا فالرجاء قول "لا"، ونحن بدورنا سنساعدكم في التسجيل في هذا النظام."
Generic_thanks	"شكراً"
ArabicScheduling_help	"من أجل استخدام نظام التسجيل الألي، يجب عليكم أن تكونوا مسجلين مسبقاً في نظام مسجلين مسبقاً في هذا النظام. اذا كنت التسجيل الألي فالرجاء قول "نعم". أما اذا لم تكونوا قد سجلتم مسبقاً في نظام التسجيل الألي فالرجاء قول "لا"، ونحن بدورنا سنساعدكم في التسجيل في هذا النظام."
ArabicScheduling_error	ة لم تكونوا "اذا كنتم مسجلين معنا فالرجاء قول "نعم". وفي حال مسجلين معنا فالرجاء قول "لا" ونحن بدورنا سنساعدكم في التسجيل في هذا النظام."
VoiceEnrollment_init	"ن أجل البدء في عملية تسجيلكم بنظام التعرف على الصوت الرجاء ادخال أو قول العشرة أرقام الخاصة بحسابكم. اذا لم يكن حسابكم أو في حالة فقدانها، الرجاء بحوزتكم العشرة أرقام الخاصة ب مراجعة أقرب مركز للشرطه من أجل التسجيل لحساب جديدي."

VoiceEnrollment_reentry	”الرجاء إعادة ادخال الة عشرة أرقام الخاصه بحسابك.”
VoiceEnrollment_help	”من أجل البدء في عملية تسجيلكم بنظام تسجيل المواعيد الة يكون بحوزتكم الة عشرة أرقام الخاصه بحسابك. الرجاء ادخال يجب أن يكون أو قول الة عشرة أرقام الخاصه بحسابك. إذا لم يكن بحوزتكم الة عشرة أرقام الخاصه بحسابك أو في حالة أنكم فقدتوها فالرجاء مراجعة أقرب مركز للشرطه من أجل التسجيل لحساب جدي.”
VoiceEnrollment_error	في عملية تسجيلكم بنظام التعرف على الصوت ”من أجل البدء الرجاء ادخال أو قول الة عشرة أرقام الخاصه بحسابك.”
Generic_imSorry	”أنا آسف!”
Generic_great	”جيد”
NbrCountOne_init	”من أجل عمل حساب صوتي لكم، أرجوا منكم الة من 1 الى 9، ثلاث من التعرف على صوتكم. مرات متتاليه حتى يتمكن النظام الة بعدها سوف نسألكم عن بعض المعلومات السريه التي نطلبها منكم كالمعاد وذلك كوسيلة للتأكد من شخصيتكم. الآن، الرجاء الة بصوت عالٍ، مرة واحدة من 1 الى 9، هكذا: واحد، اثنان، ثلاثه، الة رقم تسعه.”
NbrCount_help	”الرجاء الة بصوت عالٍ، مرة واحدة من 1 الى 9، هكذا: واحد، اثنان، ثلاثه، الة رقم تسعه.”
NbrCount_error	”الرجاء الة بصوت عالٍ، مرة واحدة من 1 الى 9، هكذا: واحد، اثنان، ثلاثه، الة رقم تسعه.”
NbrCountTwo_init	”ولآخر. أخرى من فضلكم؟”
NbrCountThree_init	”مرة أخرى من فضلكم؟”
EnrollmentPin_init	”نحن بحاجة لأن نعرف الة أربعة أرقام لرمز تسجيلكم والتي يمكن ايجاده على الوثيقه التي تم ارسالها لكم. لذلك الرجاء ايجاده ومن ثم الرجاء قول أو ضغط الة أربعة أرقام لرمز تسجيلكم.”
EnrollmentPin_reentry	قول أو ضغط الة أربعة أرقام لرمز تسجيلكم مرة أخرى.””الرجاء
EnrollmentPin_errorAndHelp	”الرجاء قول أو ضغط الة أربعة أرقام لرمز تسجيلكم.”
EnrollCheck_init	”الآن، يبدوا أننا لم نسجلكم بعد بنظام التعرف على الصوت. هذا ق الصوت. النظام سيمكننا من التعرف على صاحب الصوت عن طري هذه الطريقه أسرع وأكثر فعالية من طريقه ادخال الرقم السري أو كلمه السر. بهذه الطريقه سوف يكون عليكم التسجيل مننا لمره

	واحدة فقط. هذه الطريقة ستأخذ وقتاً قليلاً منكم. لكي نبدأ بعملية التسجيل فوراً، الرجاء قول: "سجلني".
EnrollCheck_errorAndHelp	"لكي نبدأ بعملية التسجيل، الرجاء قول: "سجلني"
NbrCountVerify_init	"للتأكد من صوتكم، الرجاء العد بصوت عالٍ، مرة واحدة من 1 إلى 9، هكذا: واحد، اثنان، ثلاثه، إلى رقم تسعة."
NbrCountVerify_post	"لقد تم التأكد من المعلومات."
NbrCountVerify_help	د من شخصيتكم، الرجاء العد بصوت عالٍ، مرة واحدة من 1 "للتأكد إلى 9، هكذا: واحد، اثنان، ثلاثه، إلى رقم تسعة."
RemindDate_init	"الآن، رجاءاً، هل يمكنكم أن تتذكروا الـكلمة السريّة التي ستستخدمونها في تذكر الموعد السريّ. بعد سماع الصوت، الرجاء قول الـكلمة ورنّا سنسجلها لكم وأنتم ستعاودون سماعها لاحقاً." السريّة ونحن نبدأ
RemindDate_post	"حسنًا، لقد تم تسجيلكم بنجاح في نظام التعرف على الصوت."
RemindDate_error	"رجاءاً، هل يمكنكم أن تقولوا لي الـكلمة السريّة التي ستستخدمونها في تذكر الموعد السريّ الخاص بحسابكم؟"
RecordSecretDate_init	"في هذه الخطوة، سوف ننتقل إلى المعلومات السريّة وسوف نسألكم السؤال المعتاد، وهو يتعلّق بتاريخ يسهّل عليكم حفظه، ويصعبُ على الآخرين معرفته. عندما تكونوا جاهزين، الرجاء قوله بالكامل مع ذكر السنه، هكذا مثلاً: الأول من أبريل عام 1998."
RecordSecretDate_post	"شكراً، لقد تم تسجيل الموعد السري"
RecordSecretDate_error	"الرجاء قول الموعد السري"
VoiceVerification_init	"من أجل البدء، الرجاء ادخال العشرة أرقام الخاصه بحسابكم."
VoiceVerification_reentry	م. "الرجاء إعادة ادخال أو قول العشرة أرقام الخاصه بحسابكم"
VoiceVerification_help	"من أجل البدء في عملية تسجيلكم بنظام التعرف على الصوت، الرجاء ادخال أو قول العشرة أرقام الخاصه بحسابكم. إذا لم يكن بحوزتكم العشرة أرقام الخاصه بحسابكم أو في حالة فقدانها، الرجاء يد. "مراجعة أقرب مركز للشرطه من أجل التسجيل لحساب جديد."
VoiceVerification_error	"الرجاء ادخال أو قول العشرة أرقام الخاصه بحسابكم. إذا لم يكن بحوزتكم العشرة أرقام الخاصه بحسابكم أو في حالة فقدانها، الرجاء مراجعة أقرب مركز للشرطه من أجل التسجيل لحساب جديد."

ArabicDetaineeAppt_init	ن أحد الخيارات المتاليين: اذا كنتم تودون عمل "الرجاء الاختيار م موعد جديد، فالرجاء قول: "موعد جدي". أما اذا كنتم تودون التأكد من موعد مسبق للزيارة فالرجاء قول: "موعد مسبق للزيارة".
ArabicDetaineeAppt_help	"اذا كنتم تودون عمل موعد جديد، فالرجاء قول: "موعد جدي". أما اذا م تودون التأكد من موعد مسبق للزيارة فالرجاء قول "موعد مسبق كنت للزيارة".
ArabicDetaineeAppt_error	"اذا كنتم تودون عمل موعد جديد، فالرجاء قول: "موعد جدي". أما اذا كنتم تودون التأكد من موعد مسبق للزيارة فقولوا "موعد مسبق للزيارة".
AccessDenial_init	عمل موعد جديد لزيارة أحد السجناء، يجب أن يكون معكم رقم "من أجل الهويه الخاص بالسجين . ونتيجةً للإجراءات الأمنية فإنه لا يمكننا اعطائكم هذا الرقم عبر التليفون. الرجاء مراجعة أقرب مركز للشرطة لأجل هذا الرقم."
NewAppointment_help	يكون بحوزتكم رقم الهويه "من أجل الحصول على موعد جديد يجب أن الخاص بالسجين. اذا كان بحوزتكم رقم الهويه الخاص بالسجين فالرجاء قول: "نعم" واذا لم يكن بحوزتكم فالرجاء قول: "لا" ونحن بدورنا سنساعدكم في الحصول على هذه المعلومات."
NewAppointment_error	فالرجاء قول: "نعم" "اذا كان بحوزتكم رقم الهويه الخاص بالسجين واذا لم يكن بحوزتكم فالرجاء قول: "لا" ونحن بدورنا سنساعدكم في الحصول على هذه المعلومات."
EnterDetaineeISN_init	"الرجاء قول أو ضغط الأرقام التسعة الخاصة بالسجين المعني."
EnterDetaineeISN_reentry	التسعة الخاصة بالسجين "الرجاء اعادة قول أو اعادة ضغط الأرقام المعني."
EnterDetaineeISN_error	"الرجاء قول أو ضغط التسعة أرقام الخاصة بالسجين."
CheckAppointment_init	"حسب سجلاتنا فإنه لا يوجد لديكم موعد مسبق. الرجاء معاودة الاتصال فيما بعد."
RecordVisitationDate_post	زياره. نرجوا منكم أن تتصلوا بنا بعد "شكراً"، لقد سجلنا طلب ال 24 ساعة لمعرفة فيما اذا تم تحديده موعد للزيارة."
CleanUpAndExit_sayGoodbyeArabic	"شكراً" لتصلوا لكم بمركز بغداد للأصلح. مع السلامه!"
GenericPromptConfirm_part1	"هل سمعت"
GenericPromptConfirm_part2	"هل هذا صحيح؟"

GenericPromptConfirm_yesNo	”إذا كان هذا صحيحاً، فالرجاء قول “نعم”. إذا لم يكن هذا صحيحاً، فالرجاء قول “لا”.”
ConfirmAccountNbr_help	”أريد أن أتأكد من أنني سمعتكم بوضوح، إذا كان رقم حسابكم لديناً”
ConfirmAccountNbr_error	”إذا كان رقم حسابكم لديناً”
ConfirmEnrollmentPin_help	”دعني أتأكد من أنني سمعت رقم التسجيل لديكم بوضوح، إذا كان رقم التسجيل لديكم”
ConfirmEnrollmentPin_error	”إذا كان رقم التسجيل لديكم”
NewAppointment_init	”من أجل الحصول على موعد جديد يجب أن يكون بحوزتكم رقم الهويه حوزتكم رقم الهويه الخاص بالسجين الخاص بالسجين. إذا كان ب فالرجاء قول: “نعم” وإذا لم يكن بحوزتكم فالرجاء قول: “لا””
ConfirmDetaineeISN_help	”دعني أتأكد من صحة رقم الهويه الخاص بالسجين. إذا كان الرقم”
ConfirmDetaineeISN_error	”إذا كان رقم الهويه الخاص بالسجين”
CheckDetaineeISN_initPart1	”حسناً، دعوني أرى إذا كنتم زائراً مسجلاً لسجين يحمل رقم هويه خاص.”
CheckDetaineeISN_initPart2	”شكراً. الآن تأكدنا أنكم زائراً مسجلاً لسجين يحمل رقم هويه خاص.”
DetaineeName_Arabic	”أبو مصعب الزرقاوي”
RecordVisitationDate_init	الرجاء قول تاريخ وزمن الزيارة التي تودون “بعد سماع الصوت، تحديداً.”

I. ENGMENMENU OVERVIEW

1. Application Summary

a. Variable Definitions

Application variable information is listed below.

Application Variables Table		
Name	Initial Value	Description
accountNbr		another sample variable for the subdialog
enrollmentPin		

DATE_OUT_day		
DATE_OUT_month		
DATE_OUT_year		
TIME_OUT_AM_PM		
TIME_OUT_time		

2. EngMainMenu Dialog Flow

a. *Universal Behaviors*

Certain capabilities and behaviors are available in all dialog states, unless otherwise specified. These are called ‘Universals.’

b. *Universal Actions*

The ‘Universal Actions’ grammar is active in all states that have recognition. This grammar is typically used to allow callers to ask for help, repeat prompts, or transfer to an operator. Examples of expressions and corresponding universal NL slot fill values are shown in the table below. The following table shows the universals available with the Nuance Voice Platform. These aren’t necessarily active in this application.

Universal Values	Sample Phrases
cancel	’cancel’ ’go back’
exit	’exit’ ’goodbye’
help	’help’ ’I need help’
mainmenu	’main menu’ ’start over’
operator	’Service Representative’ ’I want to talk with an operator’ ’agent’

repeat	'repeat'
--------	----------

The following table shows the universal behaviors specified in this application.

Universal Type	Action	Goto
help	Okay, here's some help. Details: help_universal "Okay, here's some help."	Continue with recognition in the state in which the universal was spoken.
repeat AND (_previousBehavior == undefined)		Continue with recognition in the state in which the universal was spoken.
repeat AND (_previousBehavior != undefined)		Throw the event: _previousBehavior
operator	I'm sorry, there are no representatives available. Details: operator_universal "I'm sorry, there are no representatives available."	Continue with recognition in the state in which the universal was spoken.
exit		Return to the calling dialog and throw the event: 'exit'
mainmenu		EngMainMenu#EngMainMenu

c. Universal Error Handling

Universal error handling is outlined below. This error behavior can be overridden in any given state.

Error Type	Action	Goto
------------	--------	------

WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	Sorry. Details: global_error1 “Sorry.”	Continue with state-specific behavior.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	Sorry. I still didn’t get that. Details: global_error2 “Sorry. I still didn’t get that.”	Continue with state-specific behavior.
WHEN (COUNT = 3) nomatch noinput maxspeechtimeout	Sorry, we’re experiencing some technical difficulty right now. Please try again at a later time. Details: global_error3 “Sorry, we’re experiencing some technical difficulty right now. Please try again at a later time.”	Return to the calling dialog

J. ENGMMAINMENU DIALOG STATES

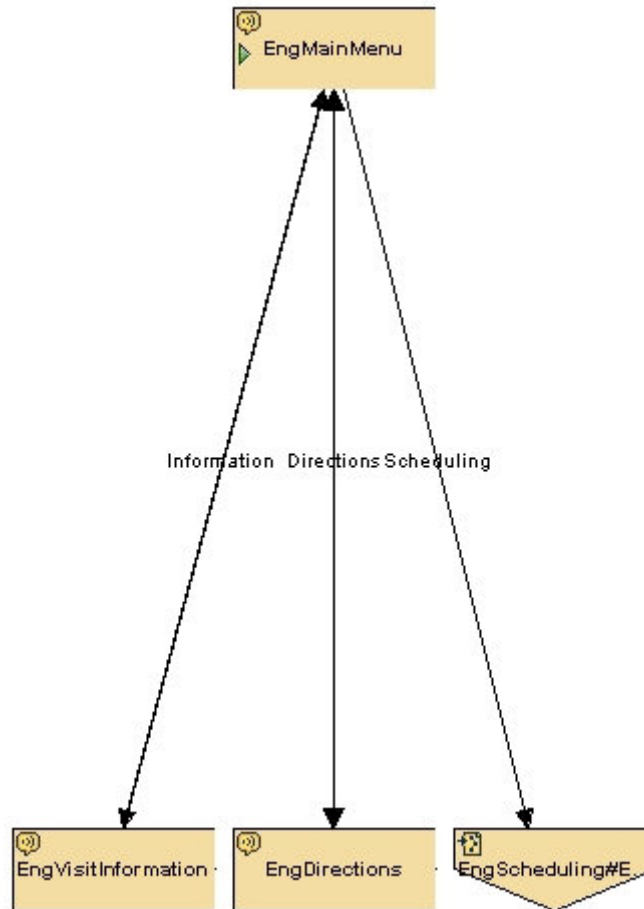
This section provides details of the system behavior in each dialog state.

1. EngMainMenu Page Information

- a. *Description*
- b. *Page Variables*

There are no variables defined for this page.

c. Call Flow



2. EngMainMenu#EngMainMenu

a. Description

EngMainMenu enables callers to obtain visitation information, get directions to BCCF, and use automated scheduling system. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngMainMenu#EngVisitInformation	EngMainMenu#EngVisitInformation
EngMainMenu#EngDirections	EngMainMenu#EngDirections
	EngScheduling#EngScheduling

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>Please select from the following options. To get general visitor information, including visiting hours, say ‘information’. To get directions to our facility, say ‘directions’. To set up a meeting using our automated scheduling system, say ‘scheduling’.</p> <p>Details: EngMainMenu_init “Please select from the following options. To get general visitor information, including visiting hours, say ‘information’. To get directions to our facility, say ‘directions’. To set up a meeting using our automated scheduling system, say ‘scheduling’.”</p>

e. Grammar: EngMainMenu_EngMainMenu.gsl#Sample_Rule

NL Slots	Values
<userInput>	information, directions, scheduling
Sample Phrases	Slots Filled
”info”	<userInput information>
”information”	<userInput information>
”uh information”	<userInput information>
”get information”	<userInput information>
”i’d like to get information”	<userInput information>
”directions”	<userInput directions>
”uh directions”	<userInput directions>
”get directions”	<userInput directions>
”i’d like to get directions”	<userInput directions>
”scheduling”	<userInput scheduling>
”uh scheduling”	<userInput scheduling>

"get scheduling"	<userInput scheduling>
"i'd like to use your automated scheduling system"	<userInput scheduling>
"appointment"	<userInput scheduling>
"make appointment"	<userInput scheduling>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == "information"	Sure. Details: Generic_sure "Sure."	EngMainMenu#EngVisitInformation
lastresult\$.interpretation.userInput == "directions"	Sure. Details: Generic_sure "Sure."	EngMainMenu#EngDirections
lastresult\$.interpretation.userInput == "scheduling"	Sure. Details: Generic_sure "Sure."	EngScheduling#EngScheduling

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	Which would you like to do? get information, get directions, or use our automated scheduling system. Details: EngMainMenu_error "Which would you like to do? get information, get directions, or use our automated scheduling system."	Continue with rec in this state.

WHEN (COUNT = 2) nomatch noinput maxspechtimeout	Which would you like to do? get information, get directions, or use our automated scheduling system. Details: EngMainMenu_error “Which would you like to do? get information, get directions, or use our automated scheduling system.”	Continue with rec in this state.
--	--	----------------------------------

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	With this system, you can choose from the following options. If you'd like to get general visitor information including visiting hours, say 'information'. If you'd like to get directions to Baghdad Central Correctional Facility, say 'directions'. If you'd like to set up a visit with a detainee using our automated scheduling system, say 'scheduling'. Details: EngMainMenu_help “With this system, you can choose from the following options. If you'd like to get general visitor information including visiting hours, say 'information'. If you'd like to get directions to Baghdad Central Correctional Facility, say 'directions'. If you'd like to set up a visit with a detainee using our automated scheduling system, say 'scheduling'.”	Continue with rec in this state.

3. EngMainMenu#EngDirections

a. Description

Get directions to Baghdad Central Correction Facility (BCCF). (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngMainMenu#EngMainMenu	EngMainMenu#EngMainMenu

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>Baghdad Central Correctional Facility is located 20 miles west of Baghdad, in the town of Abu Ghraib. From Baghdad, go west on highway six for 18 miles then take exit nine at Abu Ghraib. Our facility is located 2 miles southwest of exit nine. Would you like to hear the directions again or return to the main menu? If you're done for now, please feel free to hang up.</p> <p>Details: EngDirections_init "Baghdad Central Correctional Facility is located 20 miles west of Baghdad, in the town of Abu Ghraib. From Baghdad, go west on highway six for 18 miles then take exit nine at Abu Ghraib. Our facility is located 2 miles southwest of exit nine. Would you like to hear the directions again or return to the main menu? If you're done for now, please feel free to hang up."</p>

e. Grammar: EngMainMenu_EngDirections.gsl#Sample_Rule

NL Slots	Values
<UserInput>	repeatDirections, returnMainMenu
Sample Phrases	Slots Filled

"directions"	<UserInput repeatDirections>
"uh directions"	<UserInput repeatDirections>
"i'd like to hear the directions again"	<UserInput repeatDirections>
"i'd like to listen to the directions again"	<UserInput repeatDirections>
"i would like to hear the directions again"	<UserInput repeatDirections>
"info"	<UserInput repeatDirections>
"information"	<UserInput repeatDirections>
"uh information"	<UserInput repeatDirections>
"i'd like to hear the information again"	<UserInput repeatDirections>
"i'd like to listen to the information again"	<UserInput repeatDirections>
"i would like to listen to the information again"	<UserInput repeatDirections>
"uh main menu"	<UserInput returnMainMenu>
"return to the main menu"	<UserInput returnMainMenu>
"i'd like to return to the main menu"	<UserInput returnMainMenu>
"i would like to return to the main menu"	<UserInput returnMainMenu>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.UserInput == "repeatDirections"		Continue with rec in this state.
lastresult\$.interpretation.UserInput == "returnMainMenu"		EngMainMenu#EngMain Menu

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput	Which would you like to do: hear the directions again or return to the main	Continue with rec in this state.

maxspechtimeout	<p>menu? If you're done for now, please feel free to hang up.</p> <p>Details: EngDirections_error1 "Which would you like to do: hear the directions again or return to the main menu? If you're done for now, please feel free to hang up."</p>	
<p>WHEN (COUNT = 2)</p> <p>nomatch noinput maxspechtimeout</p>	<p>If you want to hear the directions again, say 'repeat'. If you want to return to the main menu, say 'main menu'. If you're done, say goodbye or just hang up.</p> <p>Details: EngDirections_error2 "If you want to hear the directions again, say 'repeat'. If you want to return to the main menu, say 'main menu'. If you're done, say goodbye or just hang up."</p>	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
repeat		#EngDirections
help	<p>To hear the directions to our facility, say 'repeat'. To return to the main menu, say 'main menu'. If you don't need anything else, say goodbye or just hang up.</p> <p>Details: EngDirections_help "To hear the directions to our facility, say 'repeat'. To return to the main menu, say 'main</p>	Continue with rec in this state.

	menu'. If you don't need anything else, say goodbye or just hang up."	
--	---	--

4. EngMainMenu#EngVisitInformation

a. Description

Get visitor information for Baghdad Central Correctional Facility (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngMainMenu#EngMainMenu	EngMainMenu#EngMainMenu

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>Baghdad Central Correctional Facility is open for detainee visitors from 8 AM to 4 PM, Monday through Saturday. Would you like to hear that information again or return to the main menu? If you're done for now, please feel free to hang up.</p> <p>Details: EngVisitInformation_init "Baghdad Central Correctional Facility is open for detainee visitors from 8 AM to 4 PM, Monday through Saturday. Would you like to hear that information again or return to the main menu? If you're done for now, please feel free to hang up."</p>

e. Grammar:

EngMainMenu_EngVisitInformation.gsl#Sample_Rule

NL Slots	Values
<UserInput>	repeatMessage, returnMainMenu

Sample Phrases	Slots Filled
"info"	<UserInput repeatMessage>
"uh information"	<UserInput repeatMessage>
"hear information"	<UserInput repeatMessage>
"visitor information"	<UserInput repeatMessage>
"i'd like to hear the information again"	<UserInput repeatMessage>
"i would like to hear the information again"	<UserInput repeatMessage>
"i'd like to listen to the information again"	<UserInput repeatMessage>
"uh main menu"	<UserInput returnMainMenu>
"return to main menu"	<UserInput returnMainMenu>
"go back to main menu"	<UserInput returnMainMenu>
"i'd like to return to the main menu"	<UserInput returnMainMenu>
"i would like to return to the main menu"	<UserInput returnMainMenu>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.U serInput == "repeatMessage"		Continue with rec in this state.
lastresult\$.interpretation.U serInput == "returnMainMenu"		EngMainMenu#EngMain Menu

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	Which do you want to do: hear the visitor information again or return to the main menu? If you're done, say	Continue with rec in this state.

	<p>goodbye or just hang up.</p> <p>Details: EngVisitInformation_error1 “Which do you want to do: hear the visitor information again or return to the main menu? If you’re done, say goodbye or just hang up.”</p>	
<p>WHEN (COUNT = 2) nomatch noinput maxspeechtimeout</p>	<p>If you want to hear the visitor information again, say ‘repeat’. If you want to return to the main menu, say ‘main menu’. If you’re done, say goodbye or just hang up.</p> <p>Details: EngVisitInformation_error2 “If you want to hear the visitor information again, say ‘repeat’. If you want to return to the main menu, say ‘main menu’. If you’re done, say goodbye or just hang up.”</p>	<p>Continue with rec in this state.</p>

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
repeat		#EngVisitInformation
help	<p>To hear the visitation information again, say ‘repeat’. To return to the main menu, say ‘main menu’. Or if you don’t need anything else, say goodbye or just hang up.</p> <p>Details: EngVisitInformation_help “To hear the visitation information again, say</p>	<p>Continue with rec in this state.</p>

	'repeat'. To return to the main menu, say 'main menu'. Or if you don't need anything else, say goodbye or just hang up."	
--	--	--

5. EngScheduling Page Information

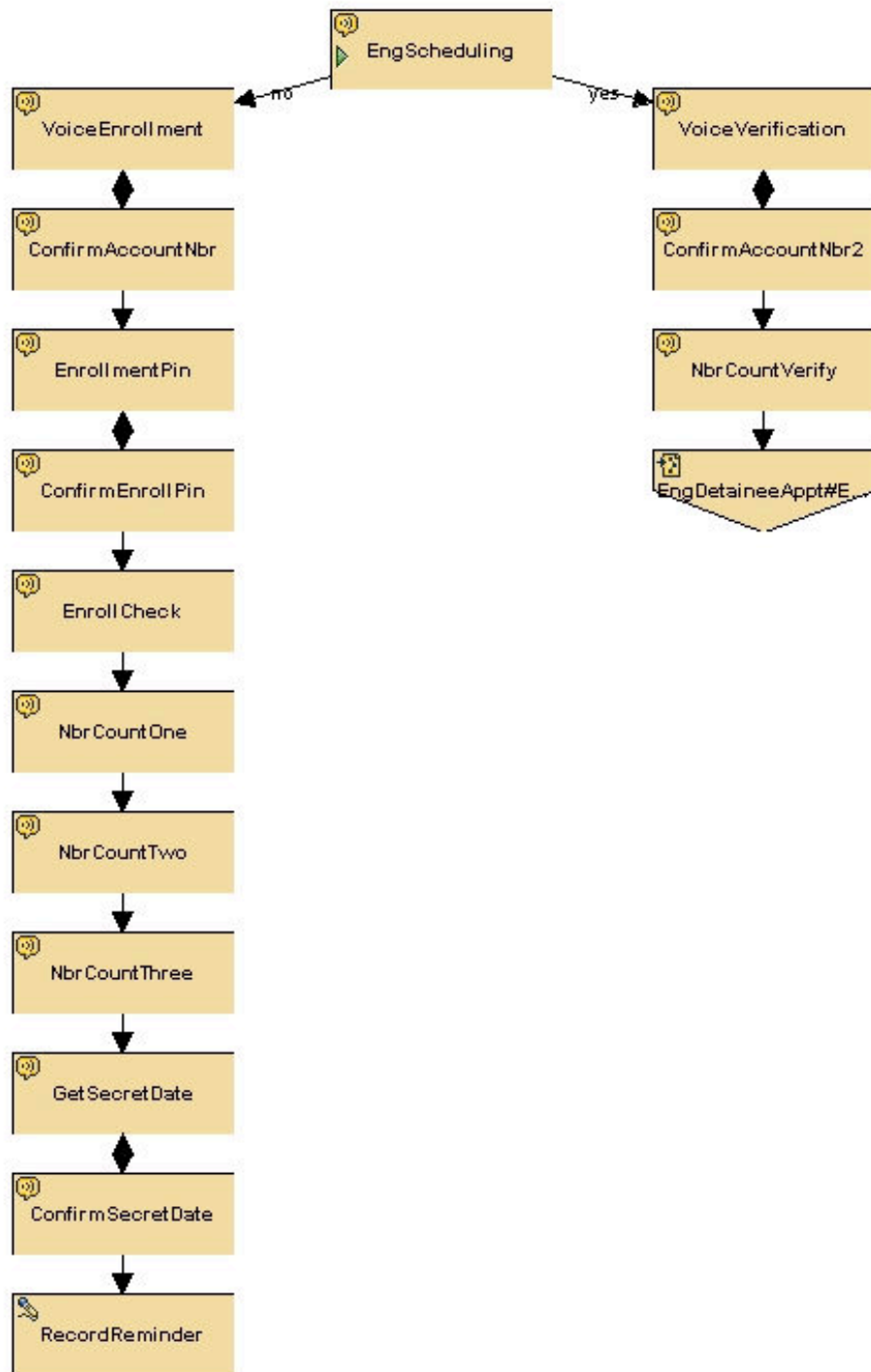
a. Description

This page simulates the Nuance Caller Authentication (NCA) Process.

b. Page Variables

There are no variables defined for this page.

c. Call Flow



6. EngScheduling#EngScheduling

a. Description

Ask callers if they are enrolled in the automated scheduling system. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngMainMenu#EngMainMenu	EngScheduling#VoiceVerification EngScheduling#VoiceEnrollment

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	In order to use our automated scheduling system, you must be an enrolled user. Are you an enrolled user? If you are, say 'yes'. If you're not, say 'no' and I'll help you to enroll in our system. Details: EngScheduling_init "In order to use our automated scheduling system, you must be an enrolled user. Are you an enrolled user? If you are, say 'yes'. If you're not, say 'no' and I'll help you to enroll in our system."

e. Grammar: EngScheduling_EngScheduling.gsl#Sample_Rule

NL Slots	Values
<userInput>	yes, no
Sample Phrases	Slots Filled
"yes"	<userInput yes>
"yup"	<userInput yes>
"yeah"	<userInput yes>
"i think so"	<userInput yes>

"no"	<userInput no>
"maybe"	<userInput no>
"i don't think so"	<userInput no>
"i don't know"	<userInput no>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == "yes"	Thanks. Details: Generic_thanks "Thanks."	EngScheduling#VoiceVerification
lastresult\$.interpretation.userInput == "no"	Thanks. Details: Generic_thanks "Thanks."	EngScheduling#VoiceEnrollment

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	If you're enrolled, say 'yes'. If you're not, say 'no' and I'll help you to enroll in our system. Details: EngScheduling_error1 "If you're enrolled, say 'yes'. If you're not, say 'no' and I'll help you to enroll in our system."	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	If you're already enrolled in our system, say 'yes'. If you're not or if you're not sure, say 'no', and I'll help you to enroll in our system.	Continue with rec in this state.

	<p>Details:</p> <p>EngScheduling_error2 “If you’re already enrolled in our system, say ‘yes’. If you’re not or if you’re not sure, say ‘no’, and I’ll help you to enroll in our system.”</p>	
--	--	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>In order to use our automated scheduling system, you must be an enrolled user. If you are already enrolled in our automated scheduling system, say ‘yes’. If you’re not, say ‘no’ and I’ll help you to enroll in our system.</p> <p>Details:</p> <p>EngScheduling_help “In order to use our automated scheduling system, you must be an enrolled user. If you are already enrolled in our automated scheduling system, say ‘yes’. If you’re not, say ‘no’ and I’ll help you to enroll in our system.”</p>	Continue with rec in this state.

7. EngScheduling#ConfirmAccountNbr

a. Description

This process asks callers to confirm their 10-digit account number. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#VoiceEnrollment	EngScheduling#VoiceEnrollment EngScheduling#EnrollmentPin

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	I heard [URL Expression] Is that right? Details: GenericPromptConfirm_part1 “I heard” URL Expression: genPhoneNumber(accountNbr) GenericPromptConfirm_part2 “Is that right?”

e. Grammar:

EngScheduling_ConfirmAccountNbr.gsl#Basic_Yes_No

NL Slots	Values
<confirm>	yes, no
Sample Phrases	Slots Filled
”no”	<confirm no>
”yes”	<confirm yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.confirm == “no”	I’m sorry. Details: Generic_imSorry “I’m sorry.”	EngScheduling#VoiceEnrollment
lastresult\$.interpretation.confirm == “yes”	Great! Details:	EngScheduling#EnrollmentPin

	Generic_great “Great!”	
--	------------------------	--

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	I got your account number as [URL Expression] If that’s right, say ‘yes’. If it’s not, say ‘no’. Details: ConfirmAccountNbr_error “I got your account number as” URL Expression: genPhoneNumber(accountNbr) GenericPromptConfirm_yesNo “If that’s right, say ‘yes’. If it’s not, say ‘no’.”	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	I got your account number as [URL Expression] If that’s right, say ‘yes’. If it’s not, say ‘no’. Details: ConfirmAccountNbr_error “I got your account number as” URL Expression: genPhoneNumber(accountNbr) GenericPromptConfirm_yesNo “If that’s right, say ‘yes’. If it’s not, say ‘no’.”	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	I’d like to make sure that I heard your account number correctly. That was	Continue with rec in this state.

	<p>[URL Expression] If that's right, say 'yes'. If it's not, say 'no'.</p> <p>Details: ConfirmAccountNbr_help "I'd like to make sure that I heard your account number correctly. That was"</p> <p>URL Expression: genPhoneNumber(accountNbr)</p> <p>GenericPromptConfirm_yesNo "If that's right, say 'yes'. If it's not, say 'no'."</p>	
--	---	--

8. EngScheduling#ConfirmAccountNbr2

a. Description

This process asks callers to confirm their 10-digit account number. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#VoiceVerification	EngScheduling#VoiceVerification EngScheduling#NbrCountVerify

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>I heard [URL Expression] Is that right?</p> <p>Details: GenericPromptConfirm_part1 "I heard" URL Expression: genPhoneNumber(accountNbr) GenericPromptConfirm_part2 "Is that right?"</p>

e. Grammar:

EngScheduling_ConfirmAccountNbr2.gsl#Basic_Yes_No

NL Slots	Values
<confirm>	yes, no
Sample Phrases	Slots Filled
"no"	<confirm no>
"yes"	<confirm yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.confirm == "no"	I'm sorry. Details: Generic_imSorry "I'm sorry."	EngScheduling#VoiceVerification
lastresult\$.interpretation.confirm == "yes"	Great! Details: Generic_great "Great!"	EngScheduling#NbrCountVerify

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	I got your account number as [URL Expression] If that's right, say 'yes'. If it's not, say 'no'. Details: ConfirmAccountNbr_error "I got your account number as" URL Expression: genPhoneNumber(accountNbr)	Continue with rec in this state.

	GenericPromptConfirm_yesNo “If that’s right, say ‘yes’. If it’s not, say ‘no’.”	
WHEN (COUNT = 2) nomatch noinput maxspeechevent	I got your account number as [URL Expression] If that’s right, say ‘yes’. If it’s not, say ‘no’. Details: ConfirmAccountNbr_error “I got your account number as” URL Expression: genPhoneNumber(accountNbr) GenericPromptConfirm_yesNo “If that’s right, say ‘yes’. If it’s not, say ‘no’.”	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	I’d like to make sure that I heard your account number correctly. That was [URL Expression] If that’s right, say ‘yes’. If it’s not, say ‘no’. Details: ConfirmAccountNbr_help “I’d like to make sure that I heard your account number correctly. That was” URL Expression: genPhoneNumber(accountNbr) GenericPromptConfirm_yesNo “If that’s right, say ‘yes’. If it’s not, say ‘no’.”	Continue with rec in this state.

9. EngScheduling#ConfirmEnrollPin

a. Description

This process asks callers to confirm their 4-digit enrollment PIN. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#EnrollmentPin	EngScheduling#EnrollmentPin EngScheduling#EnrollCheck

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	I heard [URL Expression] Is that right? Details: GenericPromptConfirm_part1 “I heard” URL Expression: genEnrollNumber(enrollmentPin) GenericPromptConfirm_part2 “Is that right?”

e. Grammar:

EngScheduling_ConfirmEnrollPin.gsl#Basic_Yes_No

NL Slots	Values
<confirm>	yes, no
Sample Phrases	Slots Filled
”no”	<confirm no>
”yes”	<confirm yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.confirm == "no"	I'm sorry. Details: Generic_imSorry "I'm sorry."	EngScheduling#EnrollmentPin
lastresult\$.interpretation.confirm == "yes"	Great! Details: Generic_great "Great!"	EngScheduling#EnrollCheck

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechevent	I got your secret date as [URL Expression] If that's right, say 'yes'. If it's not, say 'no'. Details: ConfirmEnrollmentPin_error "I got your secret date as" URL Expression: genEnrollNumber(enrollmentPin) GenericPromptConfirm_yesNo "If that's right, say 'yes'. If it's not, say 'no'."	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechevent	I got your secret date as [URL Expression] If that's right, say 'yes'. If it's not, say 'no'. Details: ConfirmEnrollmentPin_error "I got your secret date as" URL Expression: genEnrollNumber(enrollmentPin) GenericPromptConfirm_yesNo "If	Continue with rec in this state.

	that's right, say 'yes'. If it's not, say 'no'."	
--	--	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>I'd like to make sure that I heard your enrollment code correctly. That code was [URL Expression] If that's right, say 'yes'. If it's not, say 'no'.</p> <p>Details:</p> <p>ConfirmEnrollmentPin_help "I'd like to make sure that I heard your enrollment code correctly. That code was"</p> <p>URL Expression: genEnrollNumber(enrollmentPin) GenericPromptConfirm_yesNo "If that's right, say 'yes'. If it's not, say 'no'."</p>	Continue with rec in this state.

10. EngScheduling#ConfirmSecretDate

a. Description

This process asks callers to confirm their secret date. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#GetSecretDate	EngScheduling#GetSecretDate EngScheduling#RecordReminder

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>I heard [100msecs] [date:m] [50msecs] [date:d] [50msecs] [date:y] [100msecs] Is that right?</p> <p>Details: GenericPromptConfirm_part1 “I heard” Silence: 100 msecs TTS Expression [date:m]: DATE_OUT_month Silence: 50 msecs TTS Expression [date:d]: DATE_OUT_day Silence: 50 msecs TTS Expression [date:y]: DATE_OUT_year Silence: 100 msecs GenericPromptConfirm_part2 “Is that right?”</p>

e. Grammar:

EngScheduling_ConfirmSecretDate.gsl#Basic_Yes_No

NL Slots	Values
<confirm>	no, yes
Sample Phrases	Slots Filled
”no”	<confirm no>
”yes”	<confirm yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.confirm == “no”	<p>I’m sorry.</p> <p>Details: Generic_imSorry “I’m sorry.”</p>	EngScheduling#GetSecretDate
lastresult\$.interpretation.c	Sure.	EngScheduling#RecordRe

confirm == "yes"	Details: Generic_sure "Sure."	minder
------------------	----------------------------------	--------

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechovertimeout	<p>I'd like to make sure I got your secret date correctly. I heard the date as [100msecs] [date:m] [50msecs] [date:d] [50msecs] [date:y] [100msecs] If that's right, say 'yes'. If it's not, say 'no'.</p> <p>Details: ConfirmSecretDate_error "I'd like to make sure I got your secret date correctly. I heard the date as" Silence: 100 msecs TTS Expression [date:m]: DATE_OUT_month Silence: 50 msecs TTS Expression [date:d]: DATE_OUT_day Silence: 50 msecs TTS Expression [date:y]: DATE_OUT_year Silence: 100 msecs GenericPromptConfirm_yesNo "If that's right, say 'yes'. If it's not, say 'no'."</p>	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechovertimeout	<p>I'd like to make sure I got your secret date correctly. I heard the date as [100msecs] [date:m] [50msecs] [date:d] [50msecs] [date:y] [100msecs] If that's right, say 'yes'. If it's not, say 'no'.</p>	Continue with rec in this state.

	<p>Details:</p> <p>ConfirmSecretDate_error “I’d like to make sure I got your secret date correctly. I heard the date as”</p> <p>Silence: 100 msecs</p> <p>TTS Expression [date:m]:</p> <p>DATE_OUT_month</p> <p>Silence: 50 msecs</p> <p>TTS Expression [date:d]:</p> <p>DATE_OUT_day</p> <p>Silence: 50 msecs</p> <p>TTS Expression [date:y]:</p> <p>DATE_OUT_year</p> <p>Silence: 100 msecs</p> <p>GenericPromptConfirm_yesNo “If that’s right, say ‘yes’. If it’s not, say ‘no’.”</p>	
--	--	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>I’d like to make sure I got your secret date correctly. If your secret date is [100msec] [date:m] [50msec] [date:d] [50msec] [date:y] [100msec] If that’s right, say ‘yes’. If it’s not, say ‘no’.</p> <p>Details:</p> <p>ConfirmSecretDate_help “I’d like to make sure I got your secret date correctly. If your secret date is”</p> <p>Silence: 100 msecs</p> <p>TTS Expression [date:m]:</p> <p>DATE_OUT_month</p>	Continue with rec in this state.

	Silence: 50 msecs TTS Expression [date:d]: DATE_OUT_day Silence: 50 msecs TTS Expression [date:y]: DATE_OUT_year Silence: 100 msecs GenericPromptConfirm_yesNo “If that’s right, say ‘yes’. If it’s not, say ‘no’.”	
--	--	--

11. EngScheduling#EnrollCheck

a. Description

This process asks callers if they would like to “enroll me now.” For demonstration purposes, links to additional verification information is not included in this application. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#ConfirmEnrollPin	EngScheduling#NbrCountOne

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	Now it looks like we haven’t yet enrolled you in our Voiceprint Verification System. This’ll let us identify you using your unique voiceprint, which is faster and more convenient than a PIN or password. We only need to enroll you once, and it’ll just take a minute. To go ahead with the enrollment process right now, say ‘enroll me now’. Details: EnrollCheck_init “Now it looks like we haven’t yet enrolled you in our

	<p>Voiceprint Verification System. This'll let us identify you using your unique voiceprint, which is faster and more convenient than a PIN or password. We only need to enroll you once, and it'll just take a minute.</p> <p>To go ahead with the enrollment process right now, say 'enroll me now'."</p>
--	---

e. Grammar: EngScheduling_EnrollCheck.gsl#Sample_Rule

NL Slots	Values
<userInput>	enrollMeNow
Sample Phrases	Slots Filled
"enroll"	<userInput enrollMeNow>
"enroll me"	<userInput enrollMeNow>
"enroll me now"	<userInput enrollMeNow>
"uh enroll me now"	<userInput enrollMeNow>
"i want to enroll now"	<userInput enrollMeNow>
"sure enroll me now"	<userInput enrollMeNow>
"please enroll me now"	<userInput enrollMeNow>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == "enrollMeNow"	<p>Thanks.</p> <p>Details: Generic_thanks "Thanks."</p>	
--		EngScheduling#NbrCount One

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	To get started on the enrollment process, say 'enroll me now'. Details: EnrollCheck_error "To get started on the enrollment process, say 'enroll me now'."	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	To get started on the enrollment process, say 'enroll me now'. Details: EnrollCheck_error "To get started on the enrollment process, say 'enroll me now'."	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	To go ahead with the enrollment process right now, say 'enroll me now'. Details: EnrollCheck_help "To go ahead with the enrollment process right now, say 'enroll me now'."	Continue with rec in this state.

12. EngScheduling#EnrollmentPin

a. Description

This process asks caller for their 4-digit enrollment PIN. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#ConfirmAccountNbr EngScheduling#ConfirmEnrollPin	EngScheduling#ConfirmEnrollPin

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	Next, I need to get the 4-digit enrollment code from the enrollment notice that we sent you. So take a moment to find that code now, and when you're ready, go ahead and say it, or just key it in. Details: EnrollmentPin_init "Next, I need to get the 4-digit enrollment code from the enrollment notice that we sent you. So take a moment to find that code now, and when you're ready, go ahead and say it, or just key it in."
Entry Type = reentry	Please say or key in your 4-digit enrollment code again. Details: EnrollmentPin_reentry "Please say or key in your 4-digit enrollment code again."

e. Grammar: builtin:digits?length=4;minlength=4;maxlength=4

NL Slots	Values
<enrollmentPin>	pinNbr
Sample Phrases	Slots Filled
"one two three four"	<built-in true>

f. Actions

Condition	Action	Goto
-----------	--------	------

lastresult == true	Thanks. Details: Generic_thanks “Thanks.”	
--	Assign: enrollmentPin = lastresult	EngScheduling#ConfirmEnrollmentPin

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	Please say or key in your 4-digit enrollment code. Details: EnrollmentPin_error “Please say or key in your 4-digit enrollment code.”	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	Please say or key in your 4-digit enrollment code. Details: EnrollmentPin_error “Please say or key in your 4-digit enrollment code.”	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	Please say or key in your 4-digit enrollment code from the enrollment notice that we sent you. Details: EnrollmentPin_help “Please say or key in your 4-digit enrollment code from the enrollment notice that we sent you.”	Continue with rec in this state.

13. EngScheduling#GetSecretDate

a. Description

This process asks callers for a secret date, callers can specify the day, month and the year. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#NbrCountThree EngScheduling#ConfirmSecretDate	EngScheduling#ConfirmSecretDate

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>Next I'll get the secret information that we'll ask you for occasionally. This'll be a date that's easy for you to remember, but hard for others to guess, like a special anniversary or a friend's birthday. So, think of the secret date you'd like to use, and when you're ready, just tell me that date, including the year, like this April 1st 1998.</p> <p>Details: GetSecretDate_init "Next I'll get the secret information that we'll ask you for occasionally. This'll be a date that's easy for you to remember, but hard for others to guess, like a special anniversary or a friend's birthday. So, think of the secret date you'd like to use, and when you're ready, just tell me that date, including the year, like this April 1st 1998."</p>
Entry Type = reentry	<p>Please reenter your secret date, like this, April 1st 1998.</p> <p>Details: GetSecretDate_reentry "Please reenter your secret date, like this, April 1st 1998."</p>

e. Grammar:

EngScheduling_GetSecretDate.gsl#DATE_VOICE_OR_DTMF

NL Slots	Values
<day>	day
<month>	month
<year>	year
Sample Phrases	Slots Filled
"may thirteenth nineteen ninety-nine"	<day day> <month month> <year year>
"the thirteenth of may nineteen ninety nine"	<day day> <month month> <year year>
"five thirteen nineteen ninety nine"	<day day> <month month> <year year>

f. Actions

Condition	Action	Goto
--	Thanks. Details: Generic_thanks "Thanks." Assign: DATE_OUT_day = lastresult\$.interpretation.date.day Assign: DATE_OUT_month = lastresult\$.interpretation.date.month Assign: DATE_OUT_year =	

	<p>lastresult\$.interpretation.date.year</p> <p>Log: 'DATE_OUT_day is ' + DATE_OUT_day</p> <p>Log: 'DATE_OUT_month is ' + DATE_OUT_month</p> <p>Log: 'DATE_OUT_year is ' +DATE_OUT_year</p>	
--		EngScheduling#ConfirmSecretDate

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspechtimeout	<p>Please say or key in your secret date, like this, April 1st 1998.</p> <p>Details: GetSecretDate_error1 "Please say or key in your secret date, like this, April 1st 1998."</p>	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspechtimeout	<p>Please enter a date that's easy for you to remember, but hard for others to guess, like a special anniversary or a friend's birthday. So, think of the secret date you'd like to use, and when you're ready, just tell me that date, including the year, like this April 1st 1998.</p> <p>Details: GetSecretDate_error2 "Please enter a date that's easy for you to remember, but hard for others to guess, like a special anniversary or a friend's birthday. So, think of the secret date</p>	Continue with rec in this state.

	you'd like to use, and when you're ready, just tell me that date, including the year, like this April 1st 1998.”	
--	--	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>Please enter a secret date that's easy for you to remember, but hard for others to guess. When you're ready, just tell me that date, including the year, like this April 1st 1998.</p> <p>Details: GetSecretDate_help “Please enter a secret date that's easy for you to remember, but hard for others to guess. When you're ready, just tell me that date, including the year, like this April 1st 1998.”</p>	Continue with rec in this state.

14. EngScheduling#NbrCountOne

a. Description

Number count one for voice model collection. This process asks callers to count from 1 to 9. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#EnrollCheck	EngScheduling#NbrCountTwo

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>Now, to create your voiceprint, first I'll ask you to count from 1 to 9, three separate times, so that the system can analyze your voice. Then I'll ask you for some secret information that we might need to get from you occasionally, just for extra security. So to get started, please count out loud, once from 1 to 9 like this, one, two, three, and so on.</p> <p>Details: NbrCountOne_init "Now, to create your voiceprint, first I'll ask you to count from 1 to 9, three separate times, so that the system can analyze your voice. Then I'll ask you for some secret information that we might need to get from you occasionally, just for extra security. So to get started, please count out loud, once from 1 to 9 like this, one, two, three, and so on."</p>

e. Grammar: EngScheduling_NbrCountOne.gsl#Sample_Rule

NL Slots	Values
<useInput>	nbrCount
Sample Phrases	Slots Filled
"one two three four five six seven eight nine"	<useInput nbrCount>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.uselInput == "nbrCount"		EngScheduling#NbrCountTwo

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	Please count out loud, once, from 1 to 9 like this one, two, three, and so on.	Continue with rec in this state.

	Details: NbrCount_error “Please count out loud, once, from 1 to 9 like this one, two, three, and so on.”	
WHEN (COUNT = 2) nomatch noinput maxspeecheout	Please count out loud, once, from 1 to 9 like this one, two, three, and so on. Details: NbrCount_error “Please count out loud, once, from 1 to 9 like this one, two, three, and so on.”	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	In order to create your voiceprint, please count out loud, once from 1 to 9 like this, one, two, three, and so on. Details: NbrCount_help “In order to create your voiceprint, please count out loud, once from 1 to 9 like this, one, two, three, and so on.”	Continue with rec in this state.

15. EngScheduling#NbrCountThree

a. Description

Number count three for voice model collection. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
--------------	-------------

EngScheduling#NbrCountTwo	EngScheduling#GetSecretDate
---------------------------	-----------------------------

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	And one last time. Details: NbrCountThree_init “And one last time.”

e. Grammar: EngScheduling_NbrCountThree.gsl#Sample_Rule

NL Slots	Values
<userInput>	nbrCount
Sample Phrases	Slots Filled
”one two three four five six seven eight nine”	<userInput nbrCount>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == “nbrCount”	Great! Details: Generic_great “Great!”	EngScheduling#GetSecretDate

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	Please count out loud, once, from 1 to 9 like this one, two, three, and so on. Details: NbrCount_error “Please count out loud, once, from 1 to 9 like this one, two,	Continue with rec in this state.

	three, and so on.”	
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	Please count out loud, once, from 1 to 9 like this one, two, three, and so on. Details: NbrCount_error “Please count out loud, once, from 1 to 9 like this one, two, three, and so on.”	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	In order to create your voiceprint, please count out loud, once from 1 to 9 like this, one, two, three, and so on. Details: NbrCount_help “In order to create your voiceprint, please count out loud, once from 1 to 9 like this, one, two, three, and so on.”	Continue with rec in this state.

16. EngScheduling#NbrCountTwo

a. Description

Number count two for voice model collection. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#NbrCountOne	EngScheduling#NbrCountThree

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	And, once more, please? Details: NbrCountTwo_init “And, once more, please?”

e. Grammar: EngScheduling_NbrCountTwo.gsl#Sample_Rule

NL Slots	Values
<userInput>	nbrCount
Sample Phrases	Slots Filled
”one two three four five six seven eight nine”	<userInput nbrCount>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.userInput == “nbrCount”		EngScheduling#NbrCount Three

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	Please count out loud, once, from 1 to 9 like this one, two, three, and so on. Details: NbrCount_error “Please count out loud, once, from 1 to 9 like this one, two, three, and so on.”	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	Please count out loud, once, from 1 to 9 like this one, two, three, and so on. Details: NbrCount_error “Please count out loud,	Continue with rec in this state.

	once, from 1 to 9 like this one, two, three, and so on.”	
--	--	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	In order to create your voiceprint, please count out loud, once from 1 to 9 like this, one, two, three, and so on. Details: NbrCount_help “In order to create your voiceprint, please count out loud, once from 1 to 9 like this, one, two, three, and so on.”	Continue with rec in this state.

17. EngScheduling#NbrCountVerify

a. Description

Number count for voice verification. This process asks callers to count from 1 to 9. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#ConfirmAccountNbr2	EngDetaineeAppt#EngDetaineeAppt

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	Now to verify your voice, please count out loud from one up to nine. Details: NbrCountVerify_init “Now to verify your voice, please count out loud

	from one up to nine.”
--	-----------------------

e. Grammar: EngScheduling_NbrCountVerify.gsl#Sample_Rule

NL Slots	Values
<useInput>	nbrCount
Sample Phrases	Slots Filled
”one two three four five six seven eight nine”	<useInput nbrCount>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.usesInput == “nbrCount”	You’re been verified. Details: NbrCountVerify_post “You’re been verified.”	EngDetaineeAppt#EngDetaineeAppt

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	Please count out loud, once, from 1 to 9 like this one, two, three, and so on. Details: NbrCount_error “Please count out loud, once, from 1 to 9 like this one, two, three, and so on.”	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	Please count out loud, once, from 1 to 9 like this one, two, three, and so on. Details: NbrCount_error “Please count out loud, once, from 1 to 9 like this one, two, three, and so on.”	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	In order to verify your account, please count out loud once from 1 to 9 like this, one, two, three and so on. Details: NbrCountVerify_help “In order to verify your account, please count out loud once from 1 to 9 like this, one, two, three and so on.”	Continue with rec in this state.

18. EngScheduling#RecordReminder

a. Description

This process simulates the NCA process of recording a callers’ hint to their secret date. For demonstration purposes, this recording is not saved to any backend database. (This is a record state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#ConfirmSecretDate	--

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	Now think of a hint that’ll remind you of that date. After you hear the beep, tell me that hint and we’ll record it so that we can play it back to you later. So, for example, you might say my mother’s birthday or my graduation date.

	<p>Details:</p> <p>RemindDate_init “Now think of a hint that’ll remind you of that date. After you hear the beep, tell me that hint and we’ll record it so that we can play it back to you later. So, for example, you might say my mother’s birthday or my graduation date.”</p>
--	---

e. Actions

Condition	Action	Goto
--	<p>OK! we’ve successfully enrolled your voiceprint.</p> <p>Details:</p> <p>RemindDate_post “OK! we’ve successfully enrolled your voiceprint.”</p>	Return to the calling dialog

f. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	<p>Please tell me a hint that will remind you of your secret date.</p> <p>Details:</p> <p>RemindDate_error “Please tell me a hint that will remind you of your secret date.”</p>	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	<p>Please tell me a hint that will remind you of your secret date.</p> <p>Details:</p> <p>RemindDate_error “Please tell me a hint that will remind you of your secret date.”</p>	Continue with rec in this state.

19. EngScheduling#VoiceEnrollment

a. Description

Simulates the NCA voice enrollment process. This process asks callers for their 10-digit account number. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#EngScheduling EngScheduling#ConfirmAccountNbr	EngScheduling#ConfirmAccountNbr

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>To get started on the voice enrollment process, I need your 10-digit account number. If you don't have an account number, or if you've lost it, please go to your nearest police station to register for a new account. If you have the account number, go ahead and say or key it in now.</p> <p>Details: VoiceEnrollment_init "To get started on the voice enrollment process, I need your 10-digit account number. If you don't have an account number, or if you've lost it, please go to your nearest police station to register for a new account. If you have the account number, go ahead and say or key it in now."</p>
Entry Type = reentry	<p>Please say or key-in your 10-digit account number one more time.</p> <p>Details: VoiceEnrollment_reentry "Please say or key-in your 10-digit account number one more time."</p>

e. Grammar:

builtin:digits?length=10;minlength=10;maxlength=10

NL Slots	Values
<userInput>	accountNbr
Sample Phrases	Slots Filled
"zero one two three four five six seven eight nine"	<built-in "yes">

f. Actions

Condition	Action	Goto
lastresult == true	Thanks. Details: Generic_thanks "Thanks."	
--	Assign: accountNbr = lastresult	EngScheduling#ConfirmAccountNbr

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	Please say or key-in your 10-digit account number. Details: VoiceEnrollment_error1 "Please say or key-in your 10-digit account number."	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	To get you started on the voice enrollment process, I need to have your 10-digit account number. Please key it in, or say 'help' for more information. Details:	Continue with rec in this state.

	VoiceEnrollment_error2 “To get you started on the voice enrollment process, I need to have your 10-digit account number. Please key it in, or say ‘help’ for more information.”	
--	---	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>In order to enroll in our automated scheduling system, you must have a 10-digit account number. If you don’t have your account number or if you’ve lost it, please hang up and go to your local police station to register for a new account. If you have your account number, please say or key-in the number now.</p> <p>Details: VoiceEnrollment_help “In order to enroll in our automated scheduling system, you must have a 10-digit account number. If you don’t have your account number or if you’ve lost it, please hang up and go to your local police station to register for a new account. If you have your account number, please say or key-in the number now.”</p>	Continue with rec in this state.

20. EngScheduling#VoiceVerification

a. Description

Simulates the NCA verification process. This process asks callers for their 10-digit account number. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngScheduling#EngScheduling EngScheduling#ConfirmAccountNbr2	EngScheduling#ConfirmAccountNbr2

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	To get started, go ahead and say or key-in your 10-digit account number. Details: VoiceVerification_init “To get started, go ahead and say or key-in your 10-digit account number.”
Entry Type = reentry	Please say or key-in your 10-digit account number one more time. Details: VoiceVerification_reentry “Please say or key-in your 10-digit account number one more time.”

e. Grammar:

builtin:digits?length=10;minlength=10;maxlength=10

NL Slots	Values
<userInput>	accountNbr
Sample Phrases	Slots Filled
”zero one two three four five six seven eight nine”	<built-in true>

f. Actions

Condition	Action	Goto
lastresult == true	Thanks. Details: Generic_thanks “Thanks.”	
--	Assign: accountNbr = lastresult	EngScheduling#ConfirmAccountNbr2

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspechtimeout	Please say or key-in your 10-digit account number. Details: VoiceVerification_error1 “Please say or key-in your 10-digit account number.”	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspechtimeout	Please key-in your 10-digit account number or say ‘help’ for more information. Details: VoiceVerification_error2 “Please key-in your 10-digit account number or say ‘help’ for more information.”	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	To get started on the voice verification process, please say or key-in your 10-digit account number. If you don’t have a 10-digit account number or if you’ve lost it, please go to your local police	Continue with rec in this state.

	<p>station to register for a new account. If you have the number, please go ahead and say or key it in now.</p> <p>Details: VoiceVerification_help “To get started on the voice verification process, please say or key-in your 10-digit account number. If you don’t have a 10-digit account number or if you’ve lost it, please go to your local police station to register for a new account. If you have the number, please go ahead and say or key it in now.”</p>	
--	---	--

21. EngDetaineeAppt Page Information

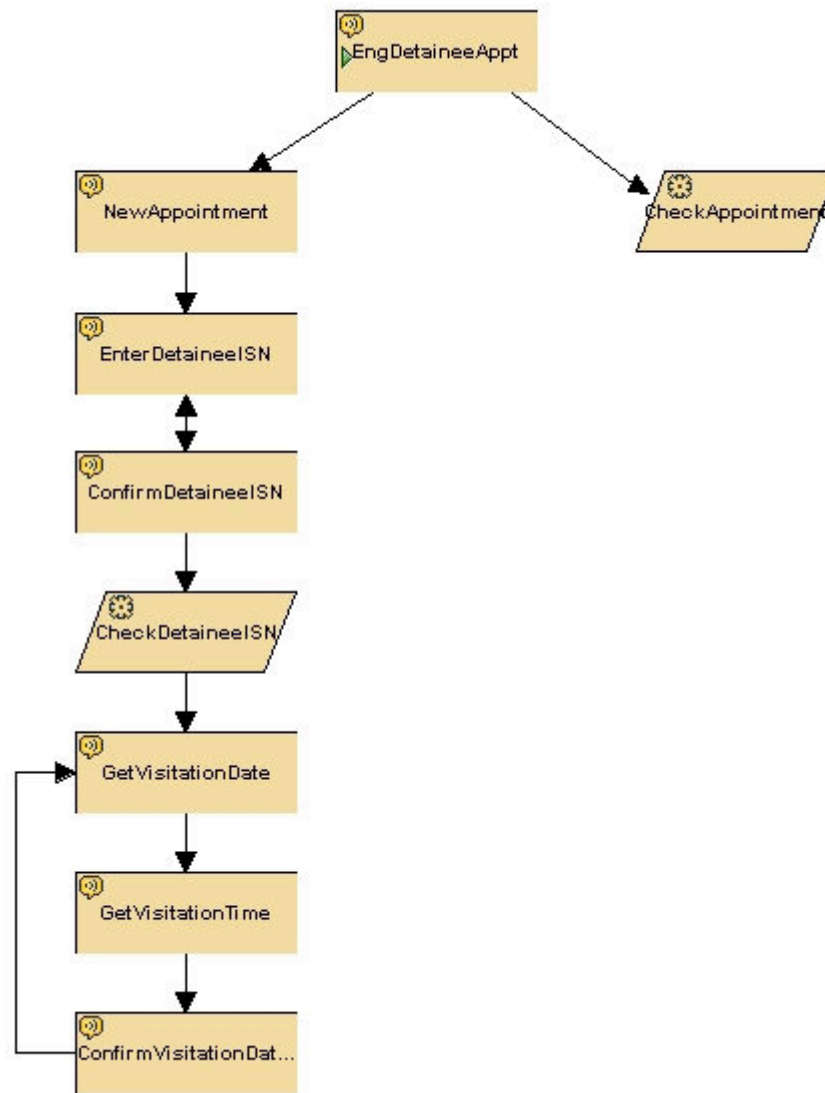
a. Description

This page demonstrates the call flow for a detainee appointment scheduling application, no interaction with backend database.

b. Page Variables

Page Variables Table		
Name	Initial Value	Description
DetaineeISN		

c. *Call Flow*



22. **EngDetaineeAppt#EngDetaineeAppt**

a. *Description*

Ask callers if they would like to schedule a new appointment to visit a detainee or check to see if a pending appointment is scheduled. (This is a recognition state.)

b. *Special Features*

c. *Entry and Exit States*

Entry States	Exit States
EngScheduling#NbrCountVerify	EngDetaineeAppt#CheckAppointment EngDetaineeAppt#NewAppointment

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>Next, please select from the following options. If you'd like to make a new appointment, say 'new appointment'. If you'd like to check the status of a pending appointment, say 'check appointment'.</p> <p>Details: EngDetaineeAppt_init "Next, please select from the following options. If you'd like to make a new appointment, say 'new appointment'. If you'd like to check the status of a pending appointment, say 'check appointment'."</p>

e. Grammar:

EngDetaineeAppt_EngDetaineeAppt.gsl#Sample_Rule

NL Slots	Values
<userInput>	newAppointment, checkAppointment
Sample Phrases	Slots Filled
"check appointment"	<userInput checkAppointment>
"uh check appointment"	<userInput checkAppointment>
"i'd like to check appointment"	<userInput checkAppointment>
"check existing appointment"	
"new appointment"	<userInput newAppointment>
"uh new appointment"	<userInput newAppointment>
"make new appointment"	<userInput newAppointment>
"i'd like to make a new appointment"	<userInput newAppointment>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.u serInput == “checkAppointment”	Sure. Details: Generic_sure “Sure.”	EngDetaineeAppt#Check Appointment
lastresult\$.interpretation.u serInput == “newAppointment”	Sure. Details: Generic_sure “Sure.”	EngDetaineeAppt#NewA ppointment

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspechtimeout	Which did you want to do: set up a new appointment or check a pending appointment? Details: EngDetaineeAppt_error1 “Which did you want to do: set up a new appointment or check a pending appointment?”	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspechtimeout	To set up a new appointment now, say ‘new appointment’. To check a pending appointment, say ‘check appointment’. Details: EngDetaineeAppt_error2 “To set up a new appointment now, say ‘new appointment’. To check a pending appointment, say ‘check appointment’.”	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>If you'd like to make a new appointment to meet with a detainee, say 'new appointment'. If you'd like to check a pending appointment to see if it has been scheduled, say 'check appointment'.</p> <p>Details: EngDetaineeAppt_help "If you'd like to make a new appointment to meet with a detainee, say 'new appointment'. If you'd like to check a pending appointment to see if it has been scheduled, say 'check appointment'."</p>	Continue with rec in this state.

23. EngDetaineeAppt#CheckAppointment

a. Description

(This is a non-recognition processing state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngDetaineeAppt#EngDetaineeAppt	--

d. Actions

Condition	Action	Goto
--	Based on our records, you have no scheduled appointments at this time. If you've called earlier	Return to the calling dialog

	<p>to set up an appointment, note that it takes 24 hours for the appointment to get scheduled. Please check back at a later time.</p> <p>Details: CheckAppointment_init “Based on our records, you have no scheduled appointments at this time. If you’ve called earlier to set up an appointment, note that it takes 24 hours for the appointment to get scheduled. Please check back at a later time.”</p>	
--	---	--

24. EngDetaineeAppt#CheckDetaineeISN

a. Description

This process simulates interaction with a back-end database. It is envisioned that the inputs to the database are the caller’s account number and detainee’s ISN. The database will then match the two numbers, if the database confirms that the caller is a registered visitor of the detainee, the database will generate a voice recording of the detainee’s name. If the two numbers do not match, the system will return a prompt stating that the caller is not a registered visitor of the detainee. (This is a non-recognition processing state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngDetaineeAppt#ConfirmDetaineeISN	EngDetaineeAppt#GetVisitationDate

d. Actions

Condition	Action	Goto
--	Next, please wait while I check to see if you’re a registered visitor of the detainee with ISN [URL Expression] [1000msecs] Thanks. I’ve confirmed	EngDetaineeAppt#GetVisitationDate

	<p>that you're a registered visitor of Abu Musab Al-Zarqawi</p> <p>Details:</p> <p>CheckDetaineeISN_initPart1 "Next, please wait while I check to see if you're a registered visitor of the detainee with ISN"</p> <p>URL Expression: genISNumber(DetaineeISN)</p> <p>Silence: 1000 msecs</p> <p>CheckDetaineeISN_initPart2 "Thanks. I've confirmed that you're a registered visitor of"</p> <p>DetaineeName "Abu Musab Al-Zarqawi"</p>	
--	---	--

25. EngDetaineeAppt#ConfirmDetaineeISN

a. Description

This process asks callers to confirm the detainee's 9-digit ISN. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngDetaineeAppt#EnterDetaineeISN	EngDetaineeAppt#EnterDetaineeISN EngDetaineeAppt#CheckDetaineeISN

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>I heard [URL Expression] Is that right?</p> <p>Details:</p> <p>GenericPromptConfirm_part1 "I heard"</p> <p>URL Expression: genISNumber(DetaineeISN)</p> <p>GenericPromptConfirm_part2 "Is that right?"</p>

e. Grammar:

EngDetaineeAppt_ConfirmDetaineeISN.gsl#Basic_Yes_No

NL Slots	Values
<confirm>	yes, no
Sample Phrases	Slots Filled
"no"	<confirm no>
"yes"	<confirm yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.confirm == "no"	I'm sorry. Details: Generic_imSorry "I'm sorry."	EngDetaineeAppt#EnterDetaineeISN
lastresult\$.interpretation.confirm == "yes"		EngDetaineeAppt#CheckDetaineeISN

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	I heard the detainee's ISN as [URL Expression] If that's right, say 'yes'. If it's not, say 'no'. Details: ConfirmDetaineeISN_error "I heard the detainee's ISN as" URL Expression: genISNumber(DetaineeISN) GenericPromptConfirm_yesNo "If	Continue with rec in this state.

	that's right, say 'yes'. If it's not, say 'no'."	
WHEN (COUNT = 2) nomatch noinput maxspechtimeout	I heard the detainee's ISN as [URL Expression] If that's right, say 'yes'. If it's not, say 'no'. Details: ConfirmDetaineeISN_error "I heard the detainee's ISN as" URL Expression: genISNumber(DetaineeISN) GenericPromptConfirm_yesNo "If that's right, say 'yes'. If it's not, say 'no'."	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	I'd like to make sure that I heard the detainee's ISN correctly. That was [URL Expression] If that's right, say 'yes'. If it's not, say 'no'. Details: ConfirmDetaineeISN_help "I'd like to make sure that I heard the detainee's ISN correctly. That was" URL Expression: genISNumber(DetaineeISN) GenericPromptConfirm_yesNo "If that's right, say 'yes'. If it's not, say 'no'."	Continue with rec in this state.

26. EngDetaineeAppt#ConfirmVisitationDateTime

a. Description

This process confirms the date and time of the requested visit was collected. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngDetaineeAppt#GetVisitationTime	EngDetaineeAppt#GetVisitationDate

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>I heard that you'd like to visit Abu Musab Al-Zarqawi on [date:m] [50msecs] [date:d] [50msecs] [date:y] [50msecs] [TTS Expression] [100msecs] Is that right?</p> <p>Details: ConfirmVisitationDateTime_confirm1 "I heard that you'd like to visit" DetaineeName "Abu Musab Al-Zarqawi" Generic_on "on" TTS Expression [date:m]: DATE_OUT_month Silence: 50 msecs TTS Expression [date:d]: DATE_OUT_day Silence: 50 msecs TTS Expression [date:y]: DATE_OUT_year Silence: 50 msecs TTS Expression: TIME_OUT_time + ' ' + TIME_OUT_AM_PM Silence: 100 msecs GenericPromptConfirm_part2 "Is that right?"</p>

e. Grammar:

EngDetaineeAppt_ConfirmVisitationDateTime.gsl#Basic_Yes_N

o

NL Slots	Values
<confirm>	no, yes
Sample Phrases	Slots Filled
"no"	<confirm no>
"yes"	<confirm yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.confirm == "no"	I'm sorry. Details: Generic_imSorry "I'm sorry."	EngDetaineeAppt#GetVisitationDate
lastresult\$.interpretation.confirm == "yes"	Thanks, I've submitted the details of your request for this visit. Please call us back in 24 hours to see if your requested visit has been scheduled. Details: ConfirmDateTime_post "Thanks, I've submitted the details of your request for this visit. Please call us back in 24 hours to see if your requested visit has been scheduled."	Return to the calling dialog

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput	I'd like to make sure that I got all the details for your request correctly. You'd	Continue with rec in this state.

<p>maxspeechovertimeout</p>	<p>like to visit Abu Musab Al-Zarqawi on [date:m] [50msecs] [date:d] [50msecs] [date:y] at [50msecs] [time:hm] Is that right?</p> <p>Details: ConfirmVisitationDateTime_help “I’d like to make sure that I got all the details for your request correctly. You’d like to visit” DetaineeName “Abu Musab Al- Zarqawi” Generic_on “on” TTS Expression [date:m]: DATE_OUT_month Silence: 50 msec TTS Expression [date:d]: DATE_OUT_day Silence: 50 msec TTS Expression [date:y]: DATE_OUT_year Generic_at “at” Silence: 50 msec TTS Expression [time:hm]: TIME_OUT_time + ‘ ‘ + TIME_OUT_AM_PM GenericPromptConfirm_part2 “Is that right?”</p>	
<p>WHEN (COUNT = 2) nomatch noinput maxspeechovertimeout</p>	<p>I’d like to make sure that I got all the details for your request correctly. You’d like to visit Abu Musab Al-Zarqawi on [date:m] [50msecs] [date:d] [50msecs] [date:y] at [50msecs] [time:hm] Is that right?</p>	<p>Continue with rec in this state.</p>

	<p>Details:</p> <p>ConfirmVisitationDateTime_help “I’d like to make sure that I got all the details for your request correctly. You’d like to visit”</p> <p>DetaineeName “Abu Musab Al-Zarqawi”</p> <p>Generic_on “on”</p> <p>TTS Expression [date:m]:</p> <p>DATE_OUT_month</p> <p>Silence: 50 msec</p> <p>TTS Expression [date:d]:</p> <p>DATE_OUT_day</p> <p>Silence: 50 msec</p> <p>TTS Expression [date:y]:</p> <p>DATE_OUT_year</p> <p>Generic_at “at”</p> <p>Silence: 50 msec</p> <p>TTS Expression [time:hm]:</p> <p>TIME_OUT_time + ‘ ‘ +</p> <p>TIME_OUT_AM_PM</p> <p>GenericPromptConfirm_part2 “Is that right?”</p>	
--	---	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>I’d like to make sure that I got all the details for your request correctly. You’d like to visit Abu Musab Al-Zarqawi on [date:m] [50msec] [date:d] [50msec] [date:y] at [50msec] [time:hm] Is that right?</p> <p>Details:</p>	<p>Continue with rec in this state.</p>

	<p>ConfirmVisitationDateTime_help “I’d like to make sure that I got all the details for your request correctly. You’d like to visit”</p> <p>DetaineeName “Abu Musab Al-Zarqawi”</p> <p>Generic_on “on”</p> <p>TTS Expression [date:m]:</p> <p>DATE_OUT_month</p> <p>Silence: 50 msec</p> <p>TTS Expression [date:d]:</p> <p>DATE_OUT_day</p> <p>Silence: 50 msec</p> <p>TTS Expression [date:y]:</p> <p>DATE_OUT_year</p> <p>Generic_at “at”</p> <p>Silence: 50 msec</p> <p>TTS Expression [time:hm]:</p> <p>TIME_OUT_time + ‘ ‘ +</p> <p>TIME_OUT_AM_PM</p> <p>GenericPromptConfirm_part2 “Is that right?”</p>	
--	---	--

27. EngDetaineeAppt#EnterDetaineeISN

a. Description

This process asks callers to enter a detainee’s ISN to schedule a visit. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngDetaineeAppt#NewAppointment EngDetaineeAppt#ConfirmDetaineeISN	EngDetaineeAppt#ConfirmDetaineeISN

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	Please say or key in all 9-digits of the detainee’s ISN. Details: EnterDetaineeISN_init “Please say or key in all 9-digits of the detainee’s ISN.”
Entry Type = reentry	Please give me the 9-digit ISN one more time. Details: EnterDetaineeISN_reentry “Please give me the 9-digit ISN one more time.”

e. Grammar: builtin:digits?length=9;minlength=9;maxlength=9

NL Slots	Values
<userInput>	detaineeISN
Sample Phrases	Slots Filled
”one two three four five six seven eight nine”	<built-in “yes”>

f. Actions

Condition	Action	Goto
lastresult == true	Thanks. Details: Generic_thanks “Thanks.”	
--	Assign: DetaineeISN = lastresult	EngDetaineeAppt#ConfirmDetaineeISN

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeecheimeout	Please say or key-in the detainee's 9-digit ISN. Details: EnterDetaineeISN_error "Please say or key-in the detainee's 9-digit ISN."	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeecheimeout	Please say or key-in the detainee's 9-digit ISN. Details: EnterDetaineeISN_error "Please say or key-in the detainee's 9-digit ISN."	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	Please say or key-in the detainee's 9-digit ISN. Details: EnterDetaineeISN_error "Please say or key-in the detainee's 9-digit ISN."	Continue with rec in this state.

28. EngDetaineeAppt#GetVisitationDate

a. Description

This process asks callers to specify a complete date (day, month, and year) of their requested visit. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
--------------	-------------

EngDetaineeAppt#CheckDetaineeISN EngDetaineeAppt#ConfirmVisitationDateTime	EngDetaineeAppt#GetVisitationTime
---	-----------------------------------

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>Please tell me the date for when you'd like to visit. Abu Musab Al-Zarqawi Please say a complete date, including the month, day and year. For example, you could say May 18, 2005.</p> <p>Details:</p> <p>GetVisitationDate_initPart1 "Please tell me the date for when you'd like to visit."</p> <p>DetaineeName "Abu Musab Al-Zarqawi"</p> <p>GetVisitationDate_initPart2 "Please say a complete date, including the month, day and year. For example, you could say May 18, 2005."</p>
Entry Type = reentry	<p>Please tell me the full date once again. For example, you could say May 18, 2005.</p> <p>Details:</p> <p>GetVisitationDate_reentryPart1 "Please tell me the full date once again."</p> <p>GetVisitationDate_reentryPart2 "For example, you could say May 18, 2005."</p>

e. Grammar:

***EngDetaineeAppt_GetVisitationDate.gs#DATE_VOICE_OR_D
TMF***

NL Slots	Values
<day>	day

<month>	month
<year>	year
Sample Phrases	Slots Filled
"may thirteenth nineteen ninety-nine"	<day day> <month month> <year year>
"the thirteenth of may nineteen ninety nine"	<day day> <month month> <year year>
"five thirteen nineteen ninety nine"	<day day> <month month> <year year>

f. Actions

Condition	Action	Goto
--	Assign: DATE_OUT_day = lastresult\$.interpretation.date.day Assign: DATE_OUT_month = lastresult\$.interpretation.date.month Assign: DATE_OUT_year = lastresult\$.interpretation.date.year Log: 'DATE_OUT_day is ' + DATE_OUT_day Log: 'DATE_OUT_month is ' + DATE_OUT_month Log: 'DATE_OUT_year is ' +DATE_OUT_year	
--	Thanks.	EngDetaineeAppt#GetVisitationTime

	Details: Generic_thanks “Thanks.”	
--	--------------------------------------	--

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeecheout	Tell me the date that you'd like to visit. Abu Musab Al-Zarqawi Please say a complete date, including the month, day and year. For example, you could say May 18, 2005. Details: GetVisitationDate_errorPart1 “Tell me the date that you'd like to visit.” DetaineeName “Abu Musab Al-Zarqawi” GetVisitationDate_errorPart2 “Please say a complete date, including the month, day and year. For example, you could say May 18, 2005.”	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeecheout	Tell me the date that you'd like to visit. Abu Musab Al-Zarqawi Please say a complete date, including the month, day and year. For example, you could say May 18, 2005. Details: GetVisitationDate_errorPart1 “Tell me the date that you'd like to visit.” DetaineeName “Abu Musab Al-Zarqawi” GetVisitationDate_errorPart2 “Please say a complete date, including the month, day and year. For example, you	Continue with rec in this state.

	could say May 18, 2005.”	
--	--------------------------	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	<p>To set up your appointment, I need to know the date that you’d like to visit.</p> <p>Abu Musab Al-Zarqawi Please tell me the complete date, including the month, day and year. For example, you could say May 18, 2005.</p> <p>Details:</p> <p>GetVisitationDate_helpPart1 “To set up your appointment, I need to know the date that you’d like to visit.”</p> <p>DetaineeName “Abu Musab Al-Zarqawi”</p> <p>GetVisitationDate_helpPart2 “Please tell me the complete date, including the month, day and year. For example, you could say May 18, 2005.”</p>	Continue with rec in this state.

29. EngDetaineeAppt#GetVisitationTime

a. Description

This process asks callers to specify the hour and minute and AM/PM of their requested visit. (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngDetaineeAppt#GetVisitationDate	EngDetaineeAppt#ConfirmVisitationDateTime

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>Next, tell me the time you'd like to visit. You can choose any time between the hours of 8 AM to 4 PM.</p> <p>Details: GetVisitationTime_init "Next, tell me the time you'd like to visit. You can choose any time between the hours of 8 AM to 4 PM."</p>

e. Grammar:

***EngDetaineeAppt_GetVisitationTime.gsl#TIME_VOICE_OR_D
TMF***

NL Slots	Values
<am_pm>	am, pm
<hr>	"[hour]"
<min>	"[min]"
Sample Phrases	Slots Filled
"a quarter to six in the morning"	<am_pm am>
"noon"	<am_pm pm> <time 0>
"two to two"	<time 158>
"four o'clock p m"	<am_pm pm> <time 400>

f. Actions

Condition	Action	Goto
--	<p>Thanks.</p> <p>Details:</p>	EngDetaineeAppt#ConfirmVisitationDateTime

	<p>Generic_thanks “Thanks.”</p> <p>Assign: TIME_OUT_time = lastresult\$.interpretation.hr + ‘:’ +lastresult\$.interpretation.min</p> <p>Assign: TIME_OUT_AM_PM = lastresult\$.interpretation.am_pm</p>	
--	--	--

g. Error Behaviors

Error Type	Action	Goto
<p>WHEN (COUNT = 1)</p> <p>nomatch noinput maxspeechtimeout</p>	<p>Just say the time that you’d like to visit Abu Musab Al-Zarqawi You can choose any time between the hours of 8 AM to 4 PM. For example, you can say, 2 PM.</p> <p>Details: GetVisitationTime_errorPart1 “Just say the time that you’d like to visit” DetaineeName “Abu Musab Al- Zarqawi” GetVisitationTime_errorPart2 “You can choose any time between the hours of 8 AM to 4 PM. For example, you can say, 2 PM.”</p>	<p>Continue with rec in this state.</p>
<p>WHEN (COUNT = 2)</p> <p>nomatch noinput maxspeechtimeout</p>	<p>Tell me the date that you’d like to visit. Abu Musab Al-Zarqawi You can choose any time between the hours of 8 AM to 4 PM. For example, you can say, 2 PM.</p> <p>Details: GetVisitationDate_errorPart1 “Tell me the date that you’d like to visit.” DetaineeName “Abu Musab Al-</p>	<p>Continue with rec in this state.</p>

	Zarqawi” GetVisitationTime_errorPart2 “You can choose any time between the hours of 8 AM to 4 PM. For example, you can say, 2 PM.”	
--	---	--

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	To complete the meeting request, I need to know the time that you’d like to visit. Abu Musab Al-Zarqawi You can choose any time between the hours of 8 AM and 4 PM. For example, you can say 2 PM. Details: GetVisitationTime_helpPart1 “To complete the meeting request, I need to know the time that you’d like to visit.” DetaineeName “Abu Musab Al-Zarqawi” GetVisitationTime_helpPart2 “You can choose any time between the hours of 8 AM and 4 PM. For example, you can say 2 PM.”	Continue with rec in this state.

30 EngDetaineeAppt#NewAppointment

a. Description

This process asks callers if they have the detainee’s Internment Serial Number (ISN). (This is a recognition state.)

b. Special Features

c. Entry and Exit States

Entry States	Exit States
EngDetaineeAppt#EngDetaineeAppt	EngDetaineeAppt#EnterDetaineeISN

d. Pre-rec Prompts

Type and Condition	Action
Entry Type = initial	<p>In order to make a new appointment, you must have the detainee's Internment Serial Number, or ISN. Do you have the ISN?</p> <p>Details: NewAppointment_init "In order to make a new appointment, you must have the detainee's Internment Serial Number, or ISN. Do you have the ISN?"</p>

e. Grammar:

EngDetaineeAppt_NewAppointment.gsl#Basic_Yes_No

NL Slots	Values
<confirm>	yes, no
Sample Phrases	Slots Filled
"no"	<confirm no>
"yes"	<confirm yes>

f. Actions

Condition	Action	Goto
lastresult\$.interpretation.confirm == "no"	In order to make a new appointment to visit a detainee, you must have the detainee's ISN. Due to security reasons, we cannot give you the ISN over the telephone. But you can get that number by going to your local police station. Please call back once you get it, and I'll help you set up your	Return to the calling dialog

	<p>appointment.</p> <p>Details: AccessDenial_init “In order to make a new appointment to visit a detainee, you must have the detainee’s ISN. Due to security reasons, we cannot give you the ISN over the telephone. But you can get that number by going to your local police station. Please call back once you get it, and I’ll help you set up your appointment.”</p>	
lastresult\$.interpretation.confirm == “yes”		EngDetaineeAppt#EnterDetaineeISN

g. Error Behaviors

Error Type	Action	Goto
WHEN (COUNT = 1) nomatch noinput maxspeechtimeout	<p>If you have the detainee’s ISN, say ‘yes’. If you don’t, say ‘no’.</p> <p>Details: NewAppointment_error “If you have the detainee’s ISN, say ‘yes’. If you don’t, say ‘no’.”</p>	Continue with rec in this state.
WHEN (COUNT = 2) nomatch noinput maxspeechtimeout	<p>If you have the detainee’s ISN, say ‘yes’. If you don’t, say ‘no’.</p> <p>Details: NewAppointment_error “If you have the detainee’s ISN, say ‘yes’. If you don’t, say ‘no’.”</p>	Continue with rec in this state.

h. State-Specific Universal Behaviors

Universal Type	Action	Goto
help	In order to make a new appointment, you must have the detainee’s Internment Serial Number or ISN. If	Continue with rec in this state.

	<p>you have the ISN, please say ‘yes’, if you don’t, just say ‘no’ and I’ll tell you how to get that information.</p> <p>Details: NewAppointment_help “In order to make a new appointment, you must have the detainee’s Internment Serial Number or ISN. If you have the ISN, please say ‘yes’, if you don’t, just say ‘no’ and I’ll tell you how to get that information.”</p>	
--	--	--

K. ENGMENMENU APPENDICES

1. Grammar and Slot Definitions

Dialog State	Grammar	Slots	Slot Values
EngMainMenu#EngMainMenu	EngMainMenu_EngMainMenu.gsl#Sample_Rule	userInput	information, directions, scheduling,
EngMainMenu#EngVisitInformation	EngMainMenu_EngVisitInformation.gsl#Sample_Rule	UserInput	repeatMessage, returnMainMenu,
EngMainMenu#EngDirections	EngMainMenu_EngDirections.gsl#Sample_Rule	UserInput	repeatDirections, returnMainMenu,
EngScheduling#EngScheduling	EngScheduling_EngScheduling.gsl#Sample_Rule	userInput	yes, no,
EngScheduling#VoiceEnrollment	builtin:digits?length=10;minlength=10;maxlength=10	userInput	accountNbr,
EngScheduling#ConfirmAccountNbr	EngScheduling_ConfirmAccountNbr.gsl#Basic_Yes_No	confirm	yes, no,
EngScheduling#NbrCountOne	EngScheduling_NbrCountOne.gsl#Sample_Rule	useInput	nbrCount,
EngScheduling#NbrCountTwo	EngScheduling_NbrCountTwo.gsl#Sample_Rule	userInput	nbrCount,
EngScheduling#NbrCountThr	EngScheduling_NbrCountThree.	userInput	nbrCount,

ee	gsl#Sample_Rule		
EngScheduling#EnrollmentPin	builtin:digits?length=4;minlength=4;maxlength=4	enrollmentPin	pinNbr,
EngScheduling#ConfirmEnrollmentPin	EngScheduling_ConfirmEnrollment.gsl#Basic_Yes_No	confirm	yes, no,
EngScheduling#EnrollCheck	EngScheduling_EnrollCheck.gsl#Sample_Rule	userInput	enrollMeNow,
EngScheduling#VoiceVerification	builtin:digits?length=10;minlength=10;maxlength=10	userInput	accountNbr,
EngScheduling#ConfirmAccountNbr2	EngScheduling_ConfirmAccountNbr2.gsl#Basic_Yes_No	confirm	yes, no,
EngScheduling#NbrCountVerify	EngScheduling_NbrCountVerify.gsl#Sample_Rule	useInput	nbrCount,
EngScheduling#ConfirmSecretDate	EngScheduling_ConfirmSecretDate.gsl#Basic_Yes_No	confirm	no, yes,
EngScheduling#GetSecretDate	EngScheduling_GetSecretDate.gsl#DATE_VOICE_OR_DTMF	day month year	day, month, year,
EngDetaineeAppt#EngDetaineeAppt	EngDetaineeAppt_EngDetaineeAppt.gsl#Sample_Rule	userInput	newAppointment, checkAppointment,
EngDetaineeAppt#NewAppointment	EngDetaineeAppt_NewAppointment.gsl#Basic_Yes_No	confirm	yes, no,
EngDetaineeAppt#EnterDetaineeISN	builtin:digits?length=9;minlength=9;maxlength=9	userInput	detaineeISN,
EngDetaineeAppt#ConfirmDetaineeISN	EngDetaineeAppt_ConfirmDetaineeISN.gsl#Basic_Yes_No	confirm	yes, no,
EngDetaineeAppt#GetVisitationDate	EngDetaineeAppt_GetVisitationDate.gsl#DATE_VOICE_OR_DTMF	day month year	day, month, year,
EngDetaineeAppt#GetVisitation	EngDetaineeAppt_GetVisitation	am_pm	am, pm,

onTime	Time.gsl#TIME_VOICE_OR_D TMF	hr min	”[hour]”, ”[min]”,
EngDetaineeAppt#ConfirmVisitationDateTime	EngDetaineeAppt_ConfirmVisitationDateTime.gsl#Basic_Yes_No	confirm	no, yes,

2. Prompt List

Prompt File	Transcription
help_universal	”Okay, here’s some help.”
operator_universal	”I’m sorry, there are no representatives available.”
global_error1	”Sorry.”
global_error2	”Sorry. I still didn’t get that.”
global_error3	”Sorry, we’re experiencing some technical difficulty right now. Please try again at a later time.”
EngMainMenu_init	”Please select from the following options. To get general visitor information, including visiting hours, say ‘information’. To get directions to our facility, say ‘directions’. To set up a meeting using our automated scheduling system, say ‘scheduling’.”
Generic_sure	”Sure.”
EngMainMenu_help	”With this system, you can choose from the following options. If you’d like to get general visitor information including visiting hours, say ‘information’. If you’d like to get directions to Baghdad Central Correctional Facility, say ‘directions’. If you’d like to set up a visit with a detainee using our automated scheduling system, say ‘scheduling’.”
EngMainMenu_error	”Which would you like to do? get information, get directions, or use our automated scheduling system.”
EngVisitInformation_init	”Baghdad Central Correctional Facility is open for detainee visitors from 8 AM to 4 PM, Monday through Saturday. Would you like to hear that information again or return to the main menu? If you’re done for now, please feel free to hang up.”

EngVisitInformation_help	”To hear the visitation information again, say ‘repeat’. To return to the main menu, say ‘main menu’. Or if you don’t need anything else, say goodbye or just hang up.”
EngVisitInformation_error1	”Which do you want to do: hear the visitor information again or return to the main menu? If you’re done, say goodbye or just hang up.”
EngVisitInformation_error2	”If you want to hear the visitor information again, say ‘repeat’. If you want to return to the main menu, say ‘main menu’. If you’re done, say goodbye or just hang up.”
EngDirections_init	”Baghdad Central Correctional Facility is located 20 miles west of Baghdad, in the town of Abu Ghraib. From Baghdad, go west on highway six for 18 miles then take exit nine at Abu Ghraib. Our facility is located 2 miles southwest of exit nine. Would you like to hear the directions again or return to the main menu? If you’re done for now, please feel free to hang up.”
EngDirections_help	”To hear the directions to our facility, say ‘repeat’. To return to the main menu, say ‘main menu’. If you don’t need anything else, say goodbye or just hang up.”
EngDirections_error1	”Which would you like to do: hear the directions again or return to the main menu? If you’re done for now, please feel free to hang up.”
EngDirections_error2	”If you want to hear the directions again, say ‘repeat’. If you want to return to the main menu, say ‘main menu’. If you’re done, say goodbye or just hang up.”
EngScheduling_init	”In order to use our automated scheduling system, you must be an enrolled user. Are you an enrolled user? If you are, say ‘yes’. If you’re not, say ‘no’ and I’ll help you to enroll in our system.”
Generic_thanks	”Thanks.”
EngScheduling_help	”In order to use our automated scheduling system, you must be an enrolled user. If you are already enrolled in our automated scheduling system, say ‘yes’. If you’re not, say ‘no’ and I’ll help you to enroll in our system.”

EngScheduling_error1	"If you're enrolled, say 'yes'. If you're not, say 'no' and I'll help you to enroll in our system."
EngScheduling_error2	"If you're already enrolled in our system, say 'yes'. If you're not or if you're not sure, say 'no', and I'll help you to enroll in our system."
VoiceEnrollment_init	"To get started on the voice enrollment process, I need your 10-digit account number. If you don't have an account number, or if you've lost it, please go to your nearest police station to register for a new account. If you have the account number, go ahead and say or key it in now."
VoiceEnrollment_reentry	"Please say or key-in your 10-digit account number one more time."
VoiceEnrollment_help	"In order to enroll in our automated scheduling system, you must have a 10-digit account number. If you don't have your account number or if you've lost it, please hang up and go to your local police station to register for a new account. If you have your account number, please say or key-in the number now."
VoiceEnrollment_error1	"Please say or key-in your 10-digit account number."
VoiceEnrollment_error2	"To get you started on the voice enrollment process, I need to have your 10-digit account number. Please key it in, or say 'help' for more information."
Generic_imSorry	"I'm sorry."
Generic_great	"Great!"
NbrCountOne_init	"Now, to create your voiceprint, first I'll ask you to count from 1 to 9, three separate times, so that the system can analyze your voice. Then I'll ask you for some secret information that we might need to get from you occasionally, just for extra security. So to get started, please count out loud, once from 1 to 9 like this, one, two, three, and so on."
NbrCount_help	"In order to create your voiceprint, please count out loud, once from 1 to 9 like this, one, two, three, and so on."
NbrCount_error	"Please count out loud, once, from 1 to 9 like this one, two, three,

	and so on.”
NbrCountTwo_init	”And, once more, please?”
NbrCountThree_init	”And one last time.”
EnrollmentPin_init	”Next, I need to get the 4-digit enrollment code from the enrollment notice that we sent you. So take a moment to find that code now, and when you’re ready, go ahead and say it, or just key it in.”
EnrollmentPin_reentry	”Please say or key in your 4-digit enrollment code again.”
EnrollmentPin_help	”Please say or key in your 4-digit enrollment code from the enrollment notice that we sent you.”
EnrollmentPin_error	”Please say or key in your 4-digit enrollment code.”
EnrollCheck_init	”Now it looks like we haven’t yet enrolled you in our Voiceprint Verification System. This’ll let us identify you using your unique voiceprint, which is faster and more convenient than a PIN or password. We only need to enroll you once, and it’ll just take a minute. To go ahead with the enrollment process right now, say ‘enroll me now’.”
EnrollCheck_help	”To go ahead with the enrollment process right now, say ‘enroll me now’.”
EnrollCheck_error	”To get started on the enrollment process, say ‘enroll me now’.”
VoiceVerification_init	”To get started, go ahead and say or key-in your 10-digit account number.”
VoiceVerification_reentry	”Please say or key-in your 10-digit account number one more time.”
VoiceVerification_help	”To get started on the voice verification process, please say or key-in your 10-digit account number. If you don’t have a 10-digit account number or if you’ve lost it, please go to your local police station to register for a new account. If you have the number, please go ahead and say or key it in now.”
VoiceVerification_error1	”Please say or key-in your 10-digit account number.”

VoiceVerification_error2	"Please key-in your 10-digit account number or say 'help' for more information."
NbrCountVerify_init	"Now to verify your voice, please count out loud from one up to nine."
NbrCountVerify_post	"You're been verified."
NbrCountVerify_help	"In order to verify your account, please count out loud once from 1 to 9 like this, one, two, three and so on."
RemindDate_init	"Now think of a hint that'll remind you of that date. After you hear the beep, tell me that hint and we'll record it so that we can play it back to you later. So, for example, you might say my mother's birthday or my graduation date."
RemindDate_post	"OK! we've successfully enrolled your voiceprint."
RemindDate_error	"Please tell me a hint that will remind you of your secret date."
GetSecretDate_init	"Next I'll get the secret information that we'll ask you for occasionally. This'll be a date that's easy for you to remember, but hard for others to guess, like a special anniversary or a friend's birthday. So, think of the secret date you'd like to use, and when you're ready, just tell me that date, including the year, like this April 1st 1998."
GetSecretDate_reentry	"Please reenter your secret date, like this, April 1st 1998."
GetSecretDate_help	"Please enter a secret date that's easy for you to remember, but hard for others to guess. When you're ready, just tell me that date, including the year, like this April 1st 1998."
GetSecretDate_error1	"Please say or key in your secret date, like this, April 1st 1998."
GetSecretDate_error2	"Please enter a date that's easy for you to remember, but hard for others to guess, like a special anniversary or a friend's birthday. So, think of the secret date you'd like to use, and when you're ready, just tell me that date, including the year, like this April 1st 1998."
EngDetaineeAppt_init	"Next, please select from the following options. If you'd like to make a new appointment, say 'new appointment'. If you'd like to

	check the status of a pending appointment, say 'check appointment'."
EngDetaineeAppt_help	"If you'd like to make a new appointment to meet with a detainee, say 'new appointment'. If you'd like to check a pending appointment to see if it has been scheduled, say 'check appointment'."
EngDetaineeAppt_error1	"Which did you want to do: set up a new appointment or check a pending appointment?"
EngDetaineeAppt_error2	"To set up a new appointment now, say 'new appointment'. To check a pending appointment, say 'check appointment'."
NewAppointment_init	"In order to make a new appointment, you must have the detainee's Internment Serial Number, or ISN. Do you have the ISN?"
AccessDenial_init	"In order to make a new appointment to visit a detainee, you must have the detainee's ISN. Due to security reasons, we cannot give you the ISN over the telephone. But you can get that number by going to your local police station. Please call back once you get it, and I'll help you set up your appointment."
NewAppointment_help	"In order to make a new appointment, you must have the detainee's Internment Serial Number or ISN. If you have the ISN, please say 'yes', if you don't, just say 'no' and I'll tell you how to get that information."
NewAppointment_error	"If you have the detainee's ISN, say 'yes'. If you don't, say 'no'."
EnterDetaineeISN_init	"Please say or key in all 9-digits of the detainee's ISN."
EnterDetaineeISN_reentry	"Please give me the 9-digit ISN one more time."
EnterDetaineeISN_error	"Please say or key-in the detainee's 9-digit ISN."
CheckAppointment_init	"Based on our records, you have no scheduled appointments at this time. If you've called earlier to set up an appointment, note that it takes 24 hours for the appointment to get scheduled. Please check back at a later time."
GetVisitationTime_init	"Next, tell me the time you'd like to visit. You can choose any

	time between the hours of 8 AM to 4 PM.”
ConfirmDateTime_post	”Thanks, I’ve submitted the details of your request for this visit. Please call us back in 24 hours to see if your requested visit has been scheduled.”
GenericPromptConfirm_part1	”I heard”
GenericPromptConfirm_part2	”Is that right?”
ConfirmAccountNbr_help	”I’d like to make sure that I heard your account number correctly. That was”
GenericPromptConfirm_yesNo	”If that’s right, say ‘yes’. If it’s not, say ‘no’.”
ConfirmAccountNbr_error	”I got your account number as”
ConfirmEnrollmentPin_help	”I’d like to make sure that I heard your enrollment code correctly. That code was”
ConfirmEnrollmentPin_error	”I got your secret date as”
ConfirmSecretDate_help	”I’d like to make sure I got your secret date correctly. If your secret date is”
ConfirmSecretDate_error	”I’d like to make sure I got your secret date correctly. I heard the date as”
ConfirmDetaineeISN_help	”I’d like to make sure that I heard the detainee’s ISN correctly. That was”
ConfirmDetaineeISN_error	”I heard the detainee’s ISN as”
CheckDetaineeISN_initPart1	”Next, please wait while I check to see if you’re a registered visitor of the detainee with ISN”
CheckDetaineeISN_initPart2	”Thanks. I’ve confirmed that you’re a registered visitor of”
DetaineeName	”Abu Musab Al-Zarqawi”
GetVisitationDate_initPart1	”Please tell me the date for when you’d like to visit.”
GetVisitationDate_initPart2	”Please say a complete date, including the month, day and year. For example, you could say May 18, 2005.”
GetVisitationDate_reentryPart1	”Please tell me the full date once again.”

GetVisitationDate_reentryPart2	"For example, you could say May 18, 2005."
GetVisitationDate_helpPart1	"To set up your appointment, I need to know the date that you'd like to visit."
GetVisitationDate_helpPart2	"Please tell me the complete date, including the month, day and year. For example, you could say May 18, 2005."
GetVisitationDate_errorPart1	"Tell me the date that you'd like to visit."
GetVisitationDate_errorPart2	"Please say a complete date, including the month, day and year. For example, you could say May 18, 2005."
GetVisitationTime_helpPart1	"To complete the meeting request, I need to know the time that you'd like to visit."
GetVisitationTime_helpPart2	"You can choose any time between the hours of 8 AM and 4 PM. For example, you can say 2 PM."
GetVisitationTime_errorPart1	"Just say the time that you'd like to visit"
GetVisitationTime_errorPart2	"You can choose any time between the hours of 8 AM to 4 PM. For example, you can say, 2 PM."
ConfirmVisitationDateTime_confirm1	"I heard that you'd like to visit"
Generic_on	"on"
ConfirmVisitationDateTime_help	"I'd like to make sure that I got all the details for your request correctly. You'd like to visit"
Generic_at	"at"

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B. NPS SPEAKER VERIFICATION TEST INVITATION LETTER

14 April 2005

From: Mr. James Ehlert, Naval Postgraduate School (NPS), Information Sciences Department
 To: Prospective Participants

Subj: INVITATION LETTER FOR NPS VOICE ENROLLMENT AND VERIFICATION TEST.

Encl: (1) Sample Voice Enrollment and Verification Call-flow
 (2) Participant Consent Form
 (3) Minimal Risk Consent Statement
 (4) Privacy Act Statement
 (5) User Feedback Questionnaire

Ladies and Gentlemen,

1. On behalf of the Naval Postgraduate School (NPS), I would like to respectfully request your participation in a voice verification test (dates provided below). The research program is conducted by NPS and is sponsored by the Office of Secretary of Defense (OSD). The test will attempt to study the feasibility of remote voice enrollment and voice verification in support of War on Terrorism (WoT) security requirements. During this test NPS will evaluate the voice verification accuracy of a commercially packaged voice verification application called Nuance Caller Authentication (NCA) 1.0 provided by Nuance Communications Inc.

2. Test Period. The voice verification test will be conducted in two phases, as described below:

Date	Event	Remark
20-24 Apr 05 (Wed-Sun)	<i>Initial Voice Enrollment & Voice Verification Testing</i>	<i>The voice verification system will be operational from Wednesday, April 20, 12:00 AM (PST) to Sunday, April 24, 11:59 PM (PST).</i>
2-8 May 05 (Mon-Sun)	<i>Voice Verification Testing</i>	<i>The voice verification system will be operational from Monday, May 2, 12:00 AM (PST) to Sunday, May 8, 2005 11:59 PM (PST).</i>

For the initial voice enrollment and verification testing (20-24 Apr 05) please call one of the following telephone numbers listed below, six separate times during the first test period: once to enroll your voice biometric and five times to verify your voice biometric. Please space out the frequency of your calls to the system with a minimum of 4-hours in between each call.

And for subsequent voice verification testing (2-8 May 05) please call the system again, four separate times to verify your voice biometric, for a total of ten calls for the entire voice verification test.

- (831) 656-1905
- (831) 656-1906
- (831) 656-1907

Note: Due to a large number of users, the system may be busy; in this case please call one of the other telephone numbers listed above or try again at a later time. Also, it is not necessary to enroll and verify your voice biometric on the same telephone number, you may enroll using one of the listed telephone number above and verify on another, all three telephone numbers are linked to the same database. Your participation is very important for the success of this project.

3. Test Instructions.

As a participant, please respond to system prompts. The voice enrollment process will take less than two minutes to complete and the verification process will take less than a minute. Enclosure (1) is provided to demonstrate the call flow dialog of the enrollment and verification process.

During the initial enrollment phase, the system will ask you for a 10-digit account number. NPS recommends using your telephone number but any 10-digit number will suffice. NPS also recommends participants write down their 10-digit number since it is the unique identifier that matches your voice sample to your stored voice biometric.

In addition to the 10-digit number, the system will also ask you for a 4-digit enrollment pin code, please use any 4-digit code for the enrollment pin code. It is not necessary to remember the 4-digit PIN once you have enrolled in the system.

4. Consent Forms. In order to participate in this test, please sign and complete the following enclosed forms (see below) and send it via email to sklee@nps.edu or via fax to (831) 656-3679, attention: Capt Samuel Lee. These forms are to ensure your privacy and to ensure you that the data collected in support of this test will be kept in strict confidentiality.

Note: The system will not ask you for any sensitive information like name, social security number, and etc.

- Participant Consent Form (see Enclosure 2)
- Minimal Risk Consent Statement (see Enclosure 3)
- Privacy Act Statement (see Enclosure 4)

5. Test Feedback. Lastly, upon completion of this test, please fill out the attached User Feedback Questionnaire (see Enclosure 5) and send it via email to sklee@nps.edu or via fax to (831) 656-3679, attention: Capt Samuel Lee. Your feedback is very important to us.

6. The NPS greatly appreciates your participation in this test. If there are any questions please contact my points-of-contact in this matter: Capt Samuel Lee at (831) 869-9638 or via email at sklee@nps.edu, or Dr. Pat Sankar at (714) 206-7685 or via email at pvsankar@nps.edu.

Very Respectfully,

James Ehlert
NSA Cryptologic Research Chair
Naval Postgraduate School

SAMPLE NCA SYSTEM ENROLLMENT CALL FLOW

System: Thanks for calling Nuance Caller Authentication, powered by Nuance Verifier! To get started, go ahead and say or key-in your 10-digit account number.

Caller: (Speech or DTMF entry) 8 0 0 5 5 5 1 2 1 2

System: Thanks. I heard 8 0 0 5 5 5 1 2 1 2. Is that right?

Caller: Yes.

System: Thanks. And next, I need to get the 4-digit enrollment code from the enrollment notice that we sent you. So take a moment to find that code now, and when you're ready, go ahead and say it, or just key it in.

Caller: 1 2 3 4

System: Thanks. I heard 1 2 3 4. Is that right?

Caller: Yes.

System: Great. Now, it looks like we haven't yet enrolled you in the Voiceprint Verification System. This'll let us identify you using your unique voiceprint, which is faster and more convenient than a PIN or password. We only need to enroll you once, and it'll just take a minute. If you'd like more information about voice verification before we get started, just say 'tell me more.' Otherwise, to go ahead with the enrollment process right now, say "enroll me now."

Caller: Enroll me now.

System: OK. Now, to create your voiceprint, first I'll ask you to count from 1 to 9, three separate times, so that the system can analyze your voice. Then I'll ask you for some secret information that we might need to get from you occasionally, just for extra security. So to get started, please count out loud, once, from 1 to 9 like this: one, two, three, and so on.

Caller: 1 2 3 4 5 6 7 8 9

System: And, once more, please?

Caller: 1 2 3 4 5 6 7 8 9

System: And one last time.

Caller: 1 2 3 4 5 6 7 8 9

System: Thanks. Now, next, I'll get the secret information that we'll ask you for occasionally. This'll be a date that's easy for you to remember, but hard for others to guess, like a special anniversary or a friend's birthday. So, think of the secret date you'd like to use, and when you're ready, just tell me that date, including the year, like this: 'April 1st, 1998.' Or say, 'I want to enter it using touch-tones.'

Caller: November 10th, 1998.

System: I heard that date as: November 10th, 1998. Did I get that right?

Caller: Yes.

System: Great. Now, think of a hint that'll remind you of that date. After you hear the beep, tell me that hint and we'll record it so that we can play it back to you later. So, for example, you might say 'my mother's birthday,' or 'my graduation date.' (Hard-coded system beep)

Caller: My cat's birthday.

System: OK! We've successfully enrolled your voiceprint. Thanks for calling Nuance Caller Authentication. Goodbye!

SAMPLE NCA SYSTEM VOICE AUTHENTICATION CALL FLOW

Scenario 1. In the first scenario, the system is “sure” of the decision after the first Enrollment Digit String (EDS) utterance.

*System: Welcome to Nuance Caller Authentication, powered by Nuance Verifier.
To get started, go ahead and say or key-in your 10-digit account number.*

Caller: 8 0 0 5 5 5 1 2 1 2.

System: Thanks. I heard: 8 0 0 5 5 5 1 2 1 2. Did I get that right?

Caller: Yes.

System: Thanks. Now, to verify your voice, please count out loud from one up to nine.

Caller: 1 2 3 4 5 6 7 8 9.

System: You've been verified.

Scenario 2. In the second scenario, the system is “unsure” of the decision even after two repetitions of the EDS, and uses knowledge verification (where the knowledge is a secret date selected by the caller at enrollment time) to make the final decision.

*System: Welcome to Nuance Caller Authentication, powered by Nuance Verifier.
To get started, go ahead and say or key-in your 10-digit account number.*

Caller: 8 0 0 5 5 5 1 2 1 2.

System: Thanks. I heard: 8 0 0 5 5 5 1 2 1 2. Did I get that right?

Caller: Yes.

System: Thanks. Now, to verify your voice, please count out loud from one up to nine.

Caller: 1 2 3 4 5 6 7 8 9.

System: And, once more, please?

Caller: 1 2 3 4 5 6 7 8 9.

*System: OK. And finally, think of the date that answers this hint:
(Playback of caller's recorded hint)*

“My cat's birthday.”

Now, give me that date, including the year. You can either say it, or use your touchtone keypad to enter the 8 digits that represent it, using 2 digits for the month, 2 for the day, and 4 for the year.

Caller: November 10th, 1998

System: Great. You've been verified.

PARTICIPANT CONSENT FORM

Introduction. You are invited to participate in Naval Postgraduate School's (NPS) Voice Enrollment and Verification Test. This test is in support of NPS's Iraqi Enrollment via Voice Authentication Project (IEVAP). The research program is conducted by NPS and is sponsored by the Office of Secretary of Defense (OSD). The test will attempt to study the feasibility of remote voice enrollment and voice verification in support of War on Terrorism (WoT) security requirements. During this test NPS will evaluate the voice verification accuracy of a commercially packaged voice verification application called Nuance Caller Authentication (NCA) 1.0 provided by Nuance Communications Inc.

Background Information. The Naval Postgraduate School's Voice Authentication Research Team is conducting this study.

Procedures. If you agree to participate in this study, the researcher will explain the tasks in detail. There will be ten required session: User will enroll and verify their voice biometric by calling into ASR phone system during which you will be expected to accomplish a number of tasks related to remote voice enrollment and verification.

Risks and Benefits. This research involves no risks. The benefits to the participants are gaining techniques for the demonstration of this technology for subsequent research and development.

Compensation. There is no compensated for participating in this study. A copy of the test results will be available to you at the conclusion of the experiment.

Confidentiality. The records of this study will be kept confidential. No information will be publicly accessible which could identify you as a participant.

Voluntary Nature of the Study. If you agree to participate, you are free to withdraw from the study at any time without prejudice. You will be provided a copy of this form for your records.

Points of Contact. If you have any further questions or comments after the completion of the study, you may contact the research supervisor, Mr. James Ehlert at (831) 656-3002, jfehlert@nps.navy.mil.

Statement of Consent. I have read the above information. I have asked all questions and have had my questions answered. I agree to participate in this study.

Participant's Signature

Date

Researcher's Signature

Date

PRIVACY ACT STATEMENT

**NAVAL POSTGRADUATE SCHOOL, MONTEREY, CA 93943
PRIVACY ACT STATEMENT**

Purpose: The purpose of this research is to create a pilot POC system using existing commercial off the shelf (COTS) Automated Speech Recognition (ASR) technology and COTS Voice Verification (VV) technology in order to expedite a visitor's entry to a controlled facility/secure space.

This research initiates a series of investigations into the application of voice technologies by developing a pilot POC system that integrates ASR and VV technology into a mobile platform in order to demonstrate a functionality that does not exist in order to meet war-fighter requirements. Specifically, this research is intended to contribute toward the future employment of voice authentication technologies in a variety of coalition military operations.

Use: Data collected from this research will be used for statistical analysis by the Departments of the Navy and Defense, and other U.S. Government agencies, provided this use is compatible with the purpose for which the information was collected. Use of the information may be granted to legitimate non-government agencies or individuals by the Naval Postgraduate School in accordance with the provisions of the Freedom of Information Act.

Disclosure/Confidentiality:

I have been assured that my privacy will be safeguarded. I will be assigned a control or code number that thereafter will be the only identifying entry on any of the research records. The Principal Investigator will maintain the cross-reference between name and control number. It will be decoded only when beneficial to me or if some circumstances, which is not apparent at this time, would make it clear that decoding would enhance the value of the research data. In all cases, the provisions of the Privacy Act Statement will be honored.

I understand that a record of the information contained in this Consent Statement or derived from the experiment described herein will be retained permanently at the Naval Postgraduate School or by higher authority. I voluntarily agree to its disclosure to agencies or individuals indicated in paragraph 3 and I have been informed that failure to agree to such disclosure may negate the purpose for which the experiment was conducted.

USER FEEDBACK QUESTIONNAIRE

1. What 10-digit number did you use to enroll and verify your voice biometric?

2. What medium did you use to conduct voice enrollment? (Circle one)

- a. Landline telephone
- b. Cellular telephone
- c. VoIP phone
- d. Microphone & speaker

3. What medium did you use to conduct voice verification? (Circle all that applies)

- a. Landline telephone
- b. Cellular telephone
- c. VoIP phone
- d. Microphone & speaker

4. What is your overall opinion of this form of biometric technology? (Circle one)

- a. strongly in favor
- b. moderately in favor
- c. no opinion
- d. moderately opposed
- e. strongly opposed

5. Did you experience any problems during the voice enrollment process? (Circle one) YES NO

If so, please provide detail in box, to include date and time of call. For additional space, please use back of sheet.

6. Did you experience any problems during the voice verification process? (Circle one) YES NO

If so, please provide detail in box, to include date and time of call. For additional space, please use back of sheet.

7. Would you be willing to use voice biometrics to confirm identity in support of military operations? (Circle one)

- a. strongly in favor
- b. moderately in favor
- c. no opinion
- d. moderately opposed
- e. strongly opposed

**APPENDIX C. NPS SPEAKER VERIFICATION CALL LOG
SUMMARY**

	GroupId	nbVerifications	nbAuthentications	total calls	last call date
1	\$111111111111\$	5	0	5	24-Apr-05
2	\$1122334455\$	4	1	5	6-May-05
3	\$1234567899\$	20	0	20	24-Apr-05
4	\$2083789591\$	12	0	12	5-May-05
5	\$2084091877\$	1	0	1	24-Apr-05
6	\$2085626301\$	9	1	10	8-May-05
7	\$2088468779\$	2	0	2	5-May-05
8	\$2088711181\$	2	0	2	22-Apr-05
9	\$2814658756\$	9	2	11	5-May-05
10	\$2815433846\$	11	0	11	5-May-05
11	\$2817020380\$	8	0	8	4-May-05
12	\$3615334051\$	4	0	4	8-May-05
13	\$4046643228\$	4	0	4	20-Apr-05
14	\$4048088321\$	9	0	9	8-May-05
15	\$4105622615\$	1	0	1	20-Apr-05
16	\$4128492799\$	2	0	2	8-May-05
17	\$4129512235\$	0	1	1	8-May-05
18	\$4129512236\$	6	0	6	8-May-05
19	\$4436109744\$	1	0	1	20-Apr-05
20	\$5138994280\$	10	0	10	4-May-05
21	\$5384276532\$	4	0	4	4-May-05
22	\$5712511799\$	6	1	7	8-May-05
23	\$6194597270\$	9	0	9	4-May-05
24	\$6384276532\$	1	0	1	7-May-05
25	\$6385276532\$	0	1	1	7-May-05
26	\$7032723578\$	1	0	1	2-May-05
27	\$7142067685\$	34	0	34	8-May-05
28	\$7243273272\$	5	0	5	6-May-05
29	\$7243277727\$	6	0	6	23-Apr-05
30	\$7247332939\$	6	0	6	23-Apr-05
31	\$7819812682\$	16	0	16	7-May-05
32	\$7819812703\$	4	0	4	22-Apr-05
33	\$7819814494\$	1	0	1	21-Apr-05
34	\$8032613610\$	4	1	5	24-Apr-05
35	\$8058787934\$	2	0	2	6-May-05
36	\$8084733222\$	3	0	3	22-Apr-05
37	\$8312102949\$	3	0	3	20-Apr-05

	GroupId	nbVerifications	nbAuthentications	total calls	last call date
38	\$8312103096\$	1	0	1	20-Apr-05
39	\$8312244317\$	12	0	12	8-May-05
40	\$8312746454\$	9	0	9	8-May-05
41	\$8312746474\$	3	2	5	8-May-05
42	\$8312771404\$	3	0	3	6-May-05
43	\$8312953880\$	7	0	7	7-May-05
44	\$8313331562\$	9	1	10	4-May-05
45	\$8313339467\$	7	0	7	4-May-05
46	\$8314021584\$	5	0	5	23-Apr-05
47	\$8314436128\$	10	0	10	7-May-05
48	\$8314793542\$	2	0	2	23-Apr-05
49	\$8316449484\$	11	0	11	8-May-05
50	\$8316465922\$	1	0	1	22-Apr-05
51	\$8316492592\$	5	0	5	23-Apr-05
52	\$8316551833\$	9	0	9	8-May-05
53	\$8316561006\$	4	0	4	6-May-05
54	\$8316561905\$	1	0	1	24-Apr-05
55	\$8316563837\$	8	0	8	21-Apr-05
56	\$8318404507\$	5	0	5	23-Apr-05
57	\$8318404508\$	5	0	5	6-May-05
58	\$8318690006\$	1	0	1	20-Apr-05
59	\$8318690365\$	0	2	2	8-May-05
60	\$8318691356\$	4	0	4	20-Apr-05
61	\$8318699638\$	41	0	41	6-May-05
62	\$8318840849\$	1	0	1	21-Apr-05
63	\$8319159995\$	1	0	1	6-May-05
64	\$8319172699\$	6	0	6	3-May-05
65	\$8325850031\$	5	0	5	20-Apr-05
66	\$9042372253\$	1	0	1	20-Apr-05
67	\$9167059780\$	1	0	1	21-Apr-05
68	\$9287654321\$	0	1	1	22-Apr-05
69	\$9876543210\$	8	0	8	5-May-05
70	\$9988776655\$	5	0	5	22-Apr-05

APPENDIX D. NPS SPEAKER VERIFICATION REJECTED CALL SUMMARY

True Failures (False Rejections)(12 attempts)

User ID	Time Stamp	Remarks
\$1234567899\$2734	4/20/2005 17:39	True Failure
\$5712511799\$	5/7/2005 12:38	True Failure
\$7142067685\$	5/4/2005 9:48	True Failure
\$7142067685\$	5/5/2005 9:57	True Failure
\$7142067685\$	5/5/2005 18:15	True Failure
\$7142067685\$1123	4/23/2005 12:16	True Failure
\$7819812682\$1111	4/20/2005 22:40	True Failure
\$7819812682\$1111	4/20/2005 22:32	True Failure
\$7819812682\$1111	4/20/2005 22:35	True Failure
\$7819812682\$1111	4/21/2005 10:24	True Failure
\$8312244317\$	5/8/2005 10:49	True Failure
\$8312953880\$1234	4/23/2005 7:46	True Failure

Incomplete Data (13 attempts)

User ID	Time Stamp	Remarks
\$1234567899\$2734	4/20/2005 17:40	Utterance 3 is empty
\$2814658756\$	5/5/2005 18:55	Hung up. Man enrolled. Female started the process
\$2814658756\$	0455:46 PM	Hung up. Man enrolled. Female and male voice mix up
\$2815433846\$	5/5/2005 19:00	Incomplete data. Tried to fool the system by saying numbers in Spanish. Did give only one utterance
\$4048088321\$	5/8/2005 9:20	Did not complete the numbers. Only uttered up to 4 or 5
\$7142067685\$1123	4/21/2005 7:26	Many utterances are empty
\$7142067685\$1123	4/22/2005 9:39	Third utterance was inaudible
\$8316561006\$	4/24/2005 12:48	Incomplete data.
\$8316563837\$	4/21/2005 10:36	Hung up. Did not utter 1-2-3-
\$8318404508\$	4/20/2005 14:42	Did not utter 1-2-3 at all
\$8318690365\$	5/7/2005 16:29	Not previously enrolled
\$8318690365\$	5/8/2005 11:14	Not previously enrolled
\$83192712699\$	4/23/2005 22:01	Did not utter 1-2-3 at all

Correct Rejections (10 attempts)

User ID	Time Stamp	Remarks
\$1234567899\$2734	4/20/2005 17:39	Sam was trying to break into Jim's account
\$1234567899\$2734	4/20/2005 17:40	Sam was trying to break into Jim's account
\$1234567899\$2734	4/22/2005 13:54	Jim was holding his nose tight not normal
\$5138994280\$	5/4/2005 17:29	Imposter attempt thwarted. Female original male imposter
\$8316561006\$	5/5/2005 18:34:20 PM	This was an attempt to break into the system
\$8316561006\$	5/6/2005 17:27:18 PM	This was an attempt to break into the system
\$8316561006\$	5/6/2005 17:29:08 PM	This was an attempt to break into the system
\$8316561905\$1972	4/24/2005 13:41	This was an attempt to break into the system
\$8318691356\$	4/20/2005 17:45	This was an attempt to break into the system
\$8318699638\$1234	4/20/2005 17:43	Imposter Attempt Failed

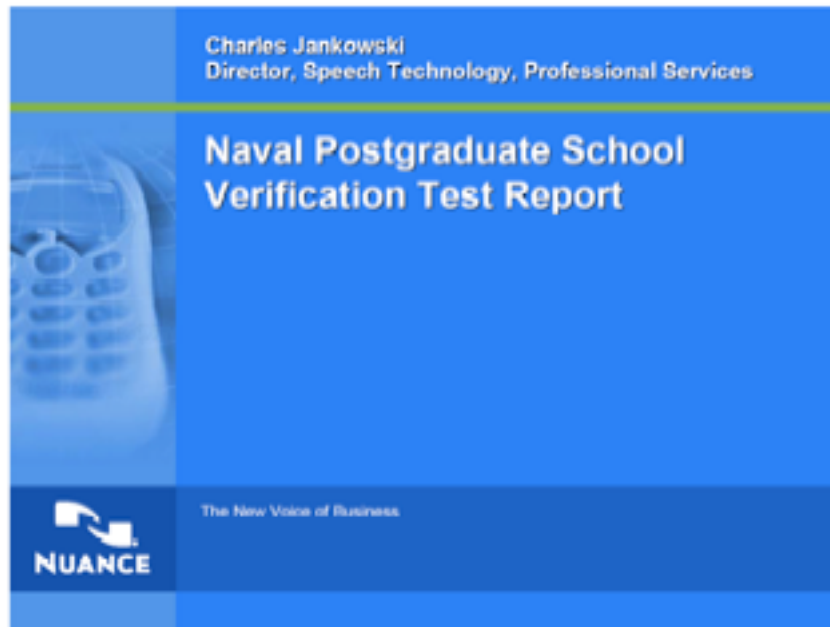
False Acceptances (5 attempts)

User ID	Time Stamp	Remarks
\$4046643228\$	4/20/2005 17:32	Imposter attempt system failed
\$4046643228\$	4/20/2005 5:37	Imposter attempt system did not detect
\$4046643228\$	4/20/2005 5:44	Imposter attempt system did not detect
\$8316561006\$	5/5/2005 18:31:51 PM	Imposter attempt system failed
\$8318691356\$	4/20/2005 0:34	Imposter attempt system did not detect

Failure to Enroll (12 attempts)

User ID	Time Stamp	Remarks
\$1122334455\$	4/22/2005 12:11	Failed to enroll
\$2085626301\$	5/3/2005 18:51	Failed to enroll
\$4129512235\$	5/8/2005 10:21	Failed to enroll. Hung up
\$5712511799\$	4/22/2005 20:27	Failed to enroll
\$6385277653\$	5/7/2005 9:18	Failed to enroll. Hung up
\$8032613601\$	4/23/2005 13:05	Failed to enroll
\$8032613601\$	4/23/2005 13:10	Failed to enroll
\$8084733222\$		Failed to enroll
\$8312746474\$	5/4/2005 9:03	Failed to enroll. Hung up
\$8312746474\$	5/4/2005 9:05	Failed to enroll. Hung up
\$8313331562\$	5/4/2005 12:36	Failed to enroll. Hung up
\$9287654321\$	4/22/2005 19:47	Failure to enroll

APPENDIX E. NUANCE ANALYSIS SUMMARY



Outline

- > Overview
- > Basic Statistics
- > Analysis Methodology
- > Analysis
- > Summary

Overview

- > Deployed Instance of Nuance Caller Authentication
 - Packaged solution for speaker verification
 - 3 examples of 1-9 for Enrollment
 - 1 or 2 examples of 1-9 for Verification
 - In the field, 80% of callers would need only 1 example
 - No knowledge verification
 - PIN, secret date
- > Conducted Verification Test
 - Variable-length-verification off
 - (Almost) all speakers experienced 2 verification utterances
 - No speaker adaptation
- > Goal: Present speaker verification results
 - Basic statistics
 - False Accept/False Reject rates



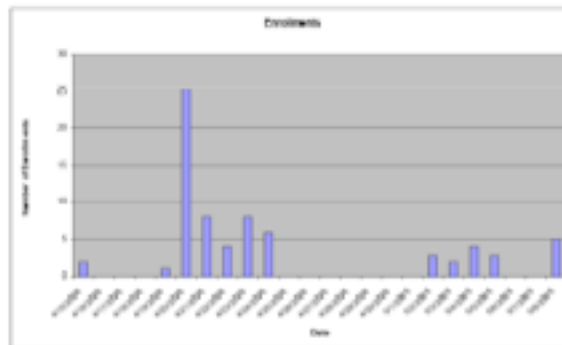
Basic Statistics

- > Enrollments
- > Verifications
- > Rejected calls
- > Two data collection phases
 - Phase I -- Late April
 - Phase II -- Early May



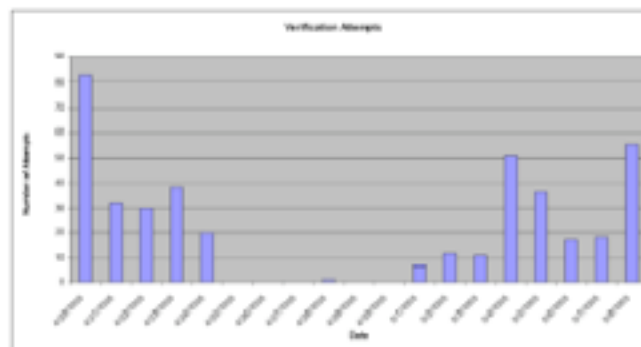
Basic Statistics – Enrollments

- > 71 Total Enrollments
 - 54 in Phase I
 - 17 in Phase II



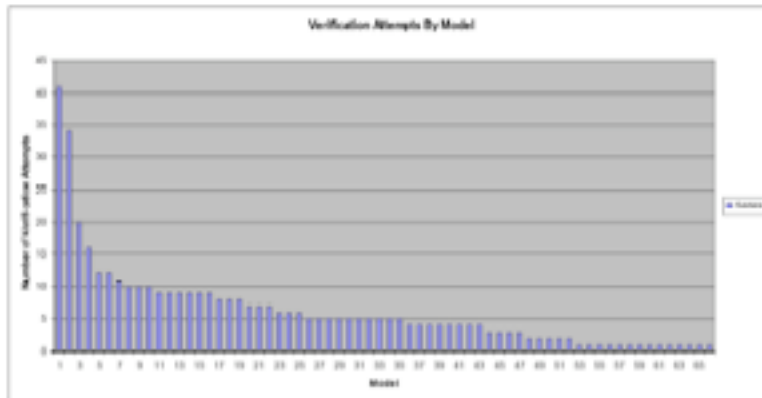
Basic Statistics – Verifications

- > 411 Total Verification Attempts
 - 204 in Phase I
 - 207 in Phase II



Basic Statistics – Verifications

> Number of attempts by user



Basic Statistics – Rejected Calls

> $46/411 = 11.1\%$ Rejected True Speaker Attempts

- $24/204 = 11.8\%$ in Phase I
- $22/207 = 10.6\%$ in Phase II

> Not all were false rejects

- 7 identified as "correct rejects" by listening



Analysis Methodology

- > Get raw data from application
- > Generate first pass at basic statistics
- > Listen to rejects
 - Enrollment and verification sessions
 - Identify "correct rejects"
- > Generate second pass at statistics
 - Incorporate correct rejects
- > Run batchrec with off-line impostor trials
 - Result: ROC curve
 - FA/FR tradeoff



Analysis Methodology

- > False Reject Rate
 - Verification Attempts
 - Correct rejects inserted by listening
 - 411 attempts
- > False Accept Rate
 - Off-line
 - Each verification session run against all other voiceprints
 - ~4300 simulated impostor attempts



Analysis

> Identified 7 "correct rejects"

• Examples

	Enrollment	Verification
Different Speaker		
Different Speaker		
"Playing" with system		



Analysis

> Identified 3 model pairs enrolled by the same speaker

- \$5384276532\$9120 and \$6384276532\$9121
- \$8314021584\$1111 and \$8316563837\$1111
- \$4128492799\$2480 and \$1122334455\$8282

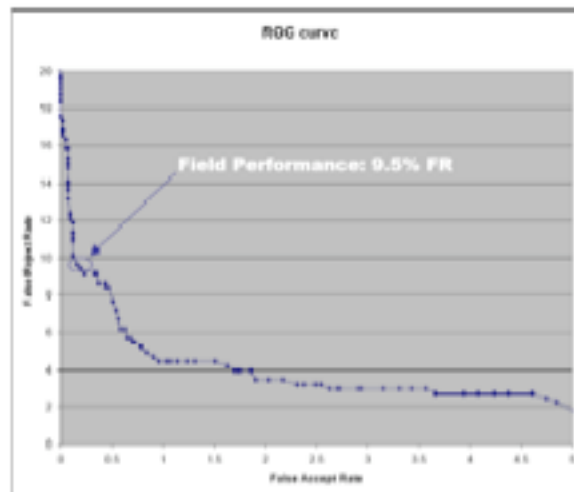
> During off-line impostor simulation, those pairs not used



Analysis

> ROC curve

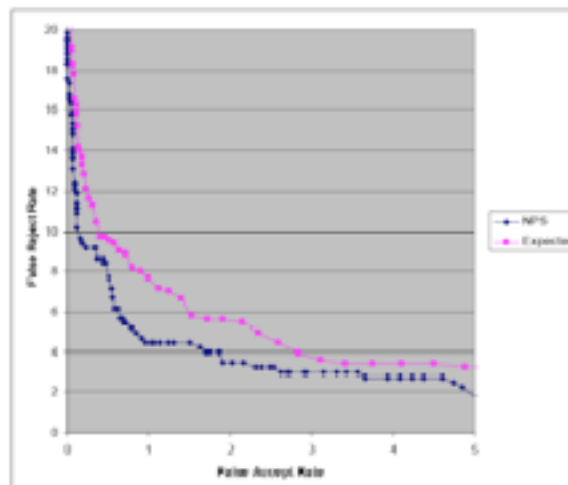
- Equal Error Rate: 3.0%
- Can achieve lower FR with lower threshold



Analysis

> Comparison with expected performance

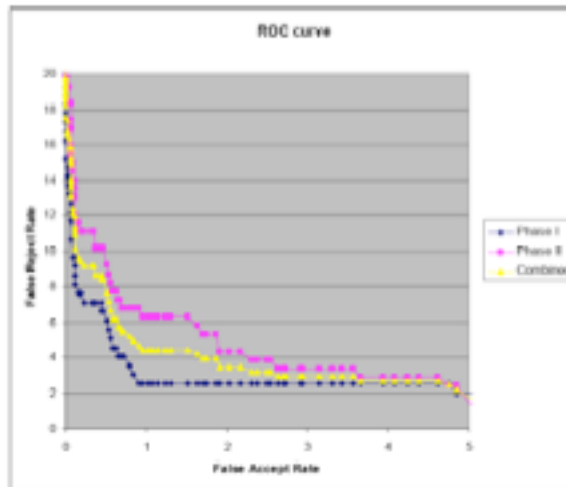
- Within range of expectations from other data sets
- Other data: EER=3.4%



Analysis

> Phase I/Phase II

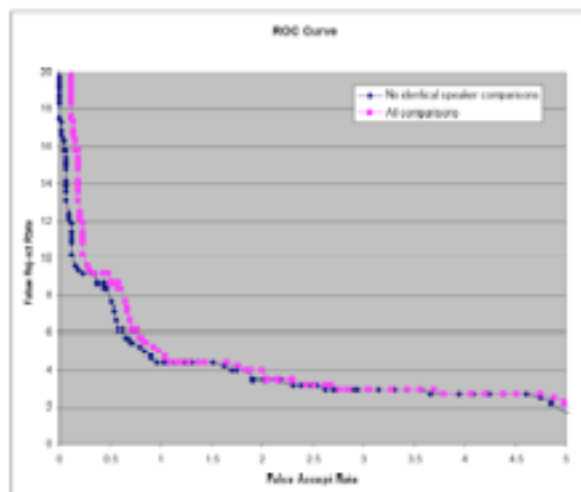
- Phase I EER: 2.5%
- Phase II EER: 3.4%
- Slight reduction in performance between sessions
- Still well within expected performance
- Actual application would use adaptation
 - 25% reduction in FR @ FA=1% after 3 calls, 35% after 6 calls



Analysis

> Speakers with multiple enrollments

- Effect of removing
- Same EER
- More difference at low FA



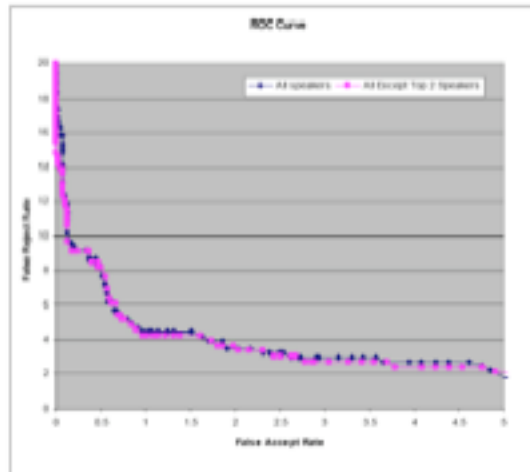
Analysis

> Remove top 2 most frequent speakers

- Responsible for 18% of verification attempts
- Do not want to overly skew results

> Result

- No significant change in performance
- Most frequent speakers not skewing performance



Other Studies

> University of Edinburgh

- 1.2% Half Total Error Rate (HTER)
 - $(FA + FR)/2$
- At $FA=1\%$, current application performing at 2.7%
 - Lower than 3% EER reported: $HTER < EER$
- More data for enrollment and verification than with current trial
 - Multiple phrases

> IBG

- 0.8% FAR/1.0% FRR for landline
- Completely matched handsets
- More data
 - 3x 16 digits for both enrollment and verification



Summary

- > Verification Performance excellent
- > Well within expected ranges
- > Slight decrease between phases, would be (more than) addressed using adaptation
- > Performance not skewed by most frequent speakers



The New Voice of Business

19

Charles Jankowski
charlesj@nuance.com

www.nuance.com



The New Voice of Business

LIST OF REFERENCES

1. Office of the Secretary of Defense, "Iraqi Enrollment via Voice Authentication Project Concept of Operations draft 2.0," Department of Defense, 7 March 2005.
2. Campbell, J.P., "Speaker Recognition: A Tutorial," *Proceedings of the IEEE*, vol. 85, no. 9, pp. 1437-1462, September 1997.
3. Reynolds, D.A. "An Overview of Automatic Speaker Recognition Technology," In Proc. International Conference on Acoustics, Speech, and Signal Processing in Orlando, FL, IEEE, pp. IV: 4072-4075, 13-17 May 2002.
4. E-mail correspondence between Dr. Joseph Campbell, MIT-LL and the author, 29 April 2005.
5. Reynolds, D.A., and others, "Beyond Cepstra: Exploiting High-Level Information in Speaker Recognition," In Proc. Workshop on Multimodal User Authentication in Santa Barbara, California, pp. 223-229, 11-12 December 2003.
6. Martin, A.F. and Przybocki, M.A., "Speaker Recognition in a Multi-Speaker Environment," In Proc. 7th European Conference on Speech Communication and Technology (*Eurospeech 2001*), pp. 787-790, 2001.
7. Campbell, J.P., and Reynolds, D.A., "Corpora for the Evaluation of Speaker Recognition Systems," In Proc. International Conference on Acoustics, Speech, and Signal Processing in Phoenix, Arizona, IEEE, pp. 829-832, 15-19 May 1999.
8. Toh, K.A., "Fingerprint and Speaker Verification Decisions Fusion," Image Analysis and Processing, 2003 Proceedings, 12th International Conference, pp. 626-631, 17-19 September 2003.
9. Gamassi, M., and others, "Accuracy and Performance of Biometric Systems," Instrumentation and Measurement Technology Conference, 2004, Proceedings of the 21st IEEE, vol. 1, pp. 510-515, May 2004.
10. Jain, A.K., Ross A., and Prabhakar, S., "An Introduction to Biometric Recognition," *IEEE Transactions on Circuits and System for Video Technology*, vol. 14, no. 1, pp. 4-20, January 2004.
11. Klevans, R.L. and Rodman, R.D., *Voice Recognition*, Artech House, 1997.
12. Reynolds, D.A. "Automatic Speaker Recognition: Current Approaches and Future Trends," Third Workshop On Automatic Identification Advanced Technologies, New York, 14-15 March 2002.
13. Reynolds, D.A. and Heck, L.P., "Automatic Speaker Recognition: Recent Progress, Current Applications and Future Trends," American Association for the Advancement of Science (AAAS) Symposium, February 2000.

14. Ortega-Garcia, J., Bigun J., Reynolds, D., and Gonzalez-Rodriquez, J., "Authentication Gets Personal with Biometric," *IEEE Signal Processing Magazine*, vol. 21, pp. 50-62, March 2004.
15. National Physical Laboratory Report CMSC 14/02, *Best Practices in Testing and Reporting Performance of Biometric Devices Version 2.01*, by A.J. Mansfield and J.L. Wayman, August 2002.
16. Liu, S. and Silverman, M., "A Practical Guide to Biometric Security Technology," *IEEE Computer Society, IT Pro - Security*, January-February 2001.
17. Nuance Communications, Inc., "Company Information: Customers," [<http://www.nuance.com/corp/customers/index.html>]. August 2005.
18. Nuance Communications, Inc., "Press Release: ScanSoft and Nuance to Merge, Creating Comprehensive Portfolio of Enterprise Speech Solutions and Expertise," [http://investor.nuance.com/ireye/ir_site.zhtml?ticker=nuan&script=400]. May 2005.
19. Nuance Communications, Inc., *Nuance Voice Platform: Getting Started*, Nuance Communications, Inc., Menlo Park, California, 1994.
20. World Wide Web Consortium, Voice Extensible Markup Language (VoiceXML) Version 2.0 [<http://www.w3.org/TR/voicexml20>]. August 2005.
21. Nuance Communications, Inc., *Nuance Voice Platform: Localization Guide*, Nuance Communications, Inc., Menlo Park, California, 1994.
22. Nuance Communications, Inc., *Nuance V-Builder 3.0 Feature Pack 1 User's Guide*, Nuance Communications, Inc., Menlo Park, California, 1994.
23. Nuance Communications, Inc., *Nuance Voice Platform: Application Developer's Guide*, Nuance Communications, Inc., Menlo Park, California, 1994.
24. E-mail correspondence between Major Robert Berry, USA and the author, 25 January 2005.
25. Nuance Communications, Inc., *Nuance Caller Authentication User's Guide*, Nuance Communications, Inc., Menlo Park, California, 1994.
26. University of Edinburgh, *Large Scale Evaluation of Speaker Verification Technology Report*, The Center for Communications Interface Research at University of Edinburgh, May 2000.
27. E-mail correspondence between Mike Crawford, Nuance Communication, Inc., and the author, 1 February 2005.
28. International Biometric Group, *Speaker Verification Testing Final Report Draft 1.0*, [<http://www.biometricgroup.com/reports/speaker%20verification.html>]. February 2004.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
Ft. Belvoir, Virginia
2. Dudley Knox Library
Naval Postgraduate School
Monterey, California
3. Marine Corps Representative
Naval Postgraduate School
Monterey, California
4. Director, Training and Education, MCCDC, Code C46
Quantico, Virginia
5. Director, Marine Corps Research Center, MCCDC, Code C40RC
Quantico, Virginia
6. Marine Corps Tactical Systems Support Activity (Attn: Operations Officer) Camp
Pendleton, California
7. Linton Wells II
Office of the Secretary of Defense
Pentagon, Washington D.C.
8. Brian Fila
Office of the Secretary of Defense
Pentagon, Washington D.C.
9. Dan Boger
Naval Postgraduate School
Monterey, California
10. James F. Ehlert
Naval Postgraduate School
Monterey, California
11. Pat Sankar
Naval Postgraduate School
Monterey, California

12. Harold Hoffman
Nuance Communication, Inc.
Menlo Park, California