

**Design of Mobile Tracking Application System for Postgraduate
Office at UUM**

Nooreddin Mansoor Ali Hmedat

Universiti Utara Malaysia

2009

**Design of Mobile Tracking Application System for Postgraduate
Office at UUM**

**A thesis submitted to the Graduate School in partial fulfillment of the
requirements for the degree Master of Science (Information Technology)**

Universiti Utara Malaysia

By

Nooreddin Mansoor Ali Hmedat

Copyright© 2009 All rights reserved.



**KOLEJ SASTERA DAN SAINS
(College of Arts and Sciences)
Universiti Utara Malaysia**

**PERAKUAN KERJA KERTAS PROJEK
(Certificate of Project Paper)**

Saya, yang bertandatangan, memperakukan bahawa
(I, the undersigned, certify that)

NOOREDDIN MANSOOR ALI HMEDAT
(800327)

calon untuk Ijazah
(candidate for the degree of) **MSc. (Information Technology)**

telah mengemukakan kertas projek yang bertajuk
(has presented his/her project paper of the following title)

**DESIGN OF MOBILE TRACKING APPLICATION
SYSTEM FOR POSTGRADUATE OFFICE AT UMM**

seperti yang tercatat di muka surat tajuk dan kulit kertas projek
(as it appears on the title page and front cover of project paper)

bahawa kertas projek tersebut boleh diterima dari segi bentuk serta kandungan
dan meliputi bidang ilmu dengan memuaskan.
(that the project paper acceptable in form and content, and that a satisfactory
knowledge of the field is covered by the project paper).

Nama Penyelia Utama
(Name of Main Supervisor): **PROF. DR. ZULKHAIRI MD. DAHALIN**

Tandatangan
(Signature)

: 

Tarikh
(Date)

: 17/05/09

PERMISSION TO USE

In presenting this thesis in partial fulfilment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence by the Dean of the Graduate School. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Requests for permission to copy or to make other use of materials in this thesis, in whole or in part, should be addressed to

**Dean of Graduate School
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman.**

ACKNOWLEDGMENTS

بسم الله الرحمن الرحيم قال تعالى:

((وقل اعملوا فسيراً الله عملكم ورسوله والمؤمنون))

صدق الله العظيم

الحمد لله رب العالمين، و الصلاة و السلام على سيد الأنبياء و المرسلين و على أهل و صحبه أجمعين.

Conducting this project marks the end of an interesting and eventful journey. The completion of this thesis took a longer time than I expected to signify the fulfillment of a long-awaited goal. It could not have been achieved without the academic professional and personal support of the following people.

Firstly, I would like to extend special thanks to my research advisor, Prof. Dr. Zulkhairi Md Dahalin , Faculty of Information Technology, Universiti Utara Malaysia (UUM) for tirelessly offering his encouragement, wisdom and experience, who provided me with constant guidance and constructive criticism throughout all stages of my research.

Secondly, I am grateful to all FTM lecturers for their guidance and unconditional support, also for all UUM staff who provided me with a warm hospitality and assistance during my time in Sintok.

Thirdly, Much appreciation to my friends, who have helped me to get accustomed to the culture and traditions, and have showed me a magnificent meaning of friendship at every crossroad. Their warmth and empathy will ever never be forgotten.

Finally, a very big thank must go to all my family members for their immeasurable support. I wish to acknowledge my parents for their unwavering support and confidence in me. There are not enough words for me to express my feelings of deep appreciation to my parents. Many thanks as well as to my brothers and sisters for their assistances and do all my business in Libya during the time I m doing my Master.

For those all, I would like to say ‘شكراً لثقتكم بي و دعمكم اللامتناهي لي’.

ABSTRACT

Mobile devices technology developed rapidly, most of students have mobile devices and they use the communication technologies devices to accomplish their tasks. Students face problems to track their application forms status since they have to call or go to the postgraduate office to check about their application forms status, this study led to the development of Mobile web-based prototype to help the students to submit their application forms from their mobiles and track their application forms by using the mobile application tracking system which reduces the efforts. Postgraduate office can view and change the status of application forms directly by using web tracking system which has been developed. Two systems prototype has been developed and tested successfully. The future work is how to implement those systems online web world and make some enhancements to meet the requirements of technologies.

Table of content

ACKNOWLEDGMENTS	ii
ABSTRACT	iv

CHAPTER ONE INTRODUCTION

1.1	Introduction	1
1.2	Problem statement	3
1.3	Research questions	4
1.4	Research objectives	4
1.5	Scope of the study	5
1.6	Significance of the study	5
1.7	Outline of the report	6
1.8	Summary	7

CHAPTER TWO LITERATURE REVIEW

2.1.	Wireless and mobile technology	8
2.2.	Wireless Application Protocol (WAP)	10
2.2.1	Wireless Application Environment (WAE)	12
2.2.2	Wireless Session Protocol (WSP)	13
2.2.3	Wireless Transaction Protocol (WTP)	13
2.2.4	Wireless Transport Layer Security (WTLS)	14
2.2.5	Wireless Datagram Protocol (WDP)	14
2.3	Related Works	14
2.4	Usability testing	18
2.5	Summary	19

CHAPTER THREE
METHODOLOGY

3.1	Introduction	20
3.2	Object-oriented system analysis and design (OOSAD)	20
3.2.1	Stage1: Selection and planning	21
3.2.2	Stage2: Requirement analysis	22
3.2.3	Stage3: Design requirements model	23
3.2.4	Stage4: Usability testing	23
3.2.5	Stage: Documentation	24
3.1	Summary	24

CHAPTER FOUR
ANALYSIS AND DESIGN

4.1	System Requirements Analysis	25
4.1.1	Use Case Diagram Specification for mobile application	26
4.1.2	Use Case Diagram Specification for web application	27
4.1.3	Sequence Diagram for mobile application	31
4.1.4	Sequence Diagram for web application	33
4.2	Design Requirement Model	36
4.2.1	Coding	36
4.3	Summary	37

CHAPTER FIVE
IMPLEMENTATION AND EVALUATION

5.1	Introduction	38
5.2	Design Requirements of the System	38

5.3	Screenshots of the Web-Based System with Explanation	39
5.4	The Screenshots of the Mobile System and its Explanation	48
5.5	Results of the Usability Testing	51
5.6	Evaluation	52
5.7	The Level of study of respondents	54
5.8	Summary	55

CHAPTER SIX
CONCLUSION AND RECOMMENDATION

6.1	Conclusion	56
6.2	Future Work	57
6.3	Limitation	58
6.4	Summary	58

Reference:	60
-------------------	----

Appendix:	67
------------------	----

LIST OF FIGURES

Figure 2.1: A Wireless Application Protocol network architecture.	10
Figure 2.2: The five Wireless Application Protocol layers.	12
Figure 3.1: Object-oriented system analysis and design (OOSAD).	21
Figure 4.1: Use Case Diagram for WAP Tracking System.	26
Figure 4.2: Use Case for Filling Application.	26
Figure 4.3: Use Case for Check Status.	27
Figure 4.4: Use Case Diagram for Model Requirement Application.	28
Figure 4.5: Use Case for Manage Application.	29
Figure 4.6: Use Case for Manage Requirement.	29
Figure 4.7: Use Case for Manage Employee.	30
Figure 4.8: Use Case for Manage Admin Account.	30
Figure 4.9: Sequence Diagram for Fill-in Application Information.	31
Figure 4.10: Sequence Diagram for Track Application Status.	32
Figure 4.11: Sequence Diagram for Manage Application.	33
Figure 4.12: Sequence Diagram for Manage Requirement.	34
Figure 4.13: Sequence Diagram for Add Employee	35
Figure 4.14: Sequence Diagram for Edit Admin Account	36
Figure 5.1: Login Page for the Web Tracking Application System.	39
Figure 5.2: Control Panel of Tracking Application System.	40
Figure 5.3: Administrator Main Page to Add New Employee.	41
Figure 5.4: Edit Employee Page.	42
Figure 5.5: View Applications Page.	43
Figure 5.6: Add New Requirement Page.	44
Figure 5.7: Control Panel for Employee.	45
Figure 5.8: View Application Page.	46
Figure 5.9: View Application Form Page.	47
Figure 5.10: Edit Employee Account.	48

Figure 5.11: Mobile Tracking Application System Main Page.	49
Figure 5.12: Add New Application Form in Mobile Application.	50
Figure 5.13: Track Application Form Pages.	51
Figure5.14: Graph of the Usability Testing	54

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter describes the background study of mobile and wireless devices technologies. This chapter continues to discuss the problem statement which is related to the WAP Tracking System for UUM Postgraduate Application, which gives the motivation of pursuing to this study. It also discussed research questions and research objectives in Section 1.3 and Section 1.4 respectively. The scope of the study and its significance of the study are explained in the Section 1.5 and Section 1.6 respectively.

Recent advances in hardware technologies as such portable wireless communication networks lead and computers to the emergence of mobile computing systems (Dunham & Helal, 1995). Zheng and Lee (2001) mentioned that the advance of the wireless network and the popularity of the portable devices improved the growth of mobile computing and becomes one of the hottest issues in academic and manufacturing. In other word, technological wireless developments as such 3G wireless application protocol (WAP), mobile phones, General Packet Radio Services (GPRS) and others plays an essential significant role in our life in communicating, entertaining and transacting information (Agrawal and Zeng, 2003). Furthermore, Nadia (2006)

The contents of
the thesis is for
internal user
only

Reference:

Abdul Hamid @ Hamid bin Haji Hassan (2003). Requirement analysis on wireless network infrastructure in UUM College. A master project in partial fulfillment of the requirements for the degree of Master of Science (Information Technology), University Utara Malaysia.

Abdualromae Hawor (2004). User's satisfaction of using mobile reservation technology case study: Mobile ticketing reservation system. A master project in partial fulfillment of the requirements for the degree of Master of Science (Information Technology), University Utara Malaysia.

Agrawal, D.P. & Zeng, Q.-A. (2003), Introduction to wireless and mobile systems, Brooks/Cole Publishing, Pacific Grove, Calif.

Ahmad Hisham, Z. A. (2002). ATM in your pocket: A proposed framework for Mobile Internet banking. A master project in partial fulfillment of the requirements for the degree of Master of Science (Information Technology), University Utara Malaysia.

Antovski, L. & Gusev, M. (2003). M-Payments. Information Technology Interfaces, 2003.ITI 2003. *Proceedings of the 25th International Conference*, pp,95-100.

Bick, A. (2005). The impact of personal digital assistants on academic achievement.

Retrieved 1 July 2008 from <http://www.millburn.org/science/pda/NatJSHS.pdf>

Bury, S. (2005). Usability testing of an online information literacy tutorial. *Reference*

Services Review. Vol. 33 No. 1. pp. 54-65.

Campbell, M. (2007). Identifying success factors of ICT in developing a learning

community, Case study Charles Sturt University, Campus-Wide Information

Systems Vol. 24 No. 1, pp. 17-26.

Chan, D. & Roddick, J. F. (2003). Context-Sensitive Mobile Database Summarisation.

Twenty-Sixth Australasian Computer Science Conference (ACSC2003),

Adelaide, Australia.

Cervera, A. (2002). Analysis of J2ME for developing Mobile Payment Systems,

Retrieved September 1, 2008 from

www.microjaya.com/articles/techtalk/mpayment?content_id=3734.

Colafigli, C., P. Inverardi, and R. Matricciani. (2001). InfoParco: An Experience in

Designing an Information System Accessible through WEB and WAP

Interfaces.

- Danesh, A. et al. (2001). Geney: Designing a collaborative activity for the palm handheld computer. *In Proceedings of CHI Conference on Human Factors in Computing Systems, 3(1)*. Retrieved 31 December 2005 from <http://www.ece.ubc.ca/~elec418/resources/geney.pdf>
- Dunham, M. H. & Helal, A. (S.) (1995). Mobile computing and database: Anything new? *SIGMOD Record*, Vol. 24, No. 4.
- Goto, K. & Kambayashi, Y. (2002). A new passenger support system for public transport using mobile database access. *Proceedings of the 28th Very Large Data Bases (VLDB) Conference, Hong Kong, China*.
- Georgievski, M. & Sharda, N. (2006). Re-engineering the usability-testing process for live multimedia systems. *Journal of Enterprise Information Management*. Vol. 19 No. 2, pp. 223-233.
- Hinze, A. & Buchanan, G. (2006). The challenge of creating cooperating mobile services: Experiences and lessons learned.
- Hinze, A. & Buchanan, G. (2005). Cooperating services in a mobile tourist information system. *Proceedings of the Conference on Cooperative Information Systems (CoopIS)', Agia Napa, Cyprus*.

Hoffer, J. A., George, J. F & Valacich, J. S. (2004). *Modern Systems Analysis and Design* (2nd Edition). United Kingdom : Addison Wesley Longman.

Kalliola, M. (2005). Mobile payment. Retrieved September 1, 2008 from:

www.tml.hut.fi/Opinnot/T-109.551/2005/reports/Mobile_payments.doc

King, H. J. & Jannik, C. M. (2005). Redesigning for usability Information architecture and usability testing for Georgia Tech Library's website. *OCLC Systems & Services*. Vol. 21. No. 3. pp. 235-243.

Kumar, V., Parimi, S. and Agrawal, D. P. (2003). WAP: Present and Future *IEEE CS and IEEE Communications Society*. Retrieved September 1, 2008 from:

http://www.sis.pitt.edu/~dtipper/wap_paper.pdf

Lim chee chian, (2004). Multimodal-based mobile application: a development of prototypes for accessing students academic result at UUM. A master project in partial fulfillment of the requirements for the degree of Master of Science (Information Technology), University Utara Malaysia.

- Lin, H. H. and Wang, Y. S. (2006). An examination of the determinants of customer loyalty in mobile commerce contexts, *Information & Management*, 43, pp.271–282.
- Luchini, K., Quintana, C. and Soloway, E. (2004). Design guidelines for learner-centered handheld tools. In *Proceedings of the SIGCHI conference on Human Factors in Computing Systems*. Pp. 135-142, ACM Press.
- Mohd Yusuf, M. S. (2005). Requirements analysis and proposed model for a wireless network infrastructure in Bukit Kachi student college UUM. A master project in partial fulfillment of the requirements for the degree of Master of Science (Information Technology), University Utara Malaysia.
- Nadia Diyana, M. (2006). Modeling final driving test system for JPJ using mobile technology. A master project in partial fulfillment of the requirements for the degree of Master of Science (Information Technology), University Utara Malaysia.
- Nor Shahriza Abdul Karim, Siti Hawa Darus & Ramlah Hussin (2006) Mobile phone applications in academic library services: a students' feedback survey, Vol. 23 No. 1, 2006. pp. 35-51 Gombak, Kuala Lumpur, Malaysia.

- Porter, L. (2007). Library applications of business usability testing strategies. *Library Hi Tech*. Vol. 25 No. 1. pp. 126-135.
- Ramsay, M. and Nielsen, J.. *WAP Usability: 2000 All Over Again*. Nielsen Norman Group. Retrived May 15, 2007 from <http://www.useit.com/alertbox/20001210.html>.
- Shaizan, H. & Li, F. (2003) Utilizing IGV Approach In Evaluating the Usability of Web Sites, *Journal of Information and Communication Technology*,2(2), 25-40
- Schaumann, J. (2002). WAP vs i-MODE. Retrieved July 18, 2008, From www.netmeister.org/palm/WAP_iMODE/
- Shoniregun A. C. (2004). Classification and Taxonomy of TEISMEs, *Sixth International Conference on Electronic Commerce Edited by: Marijn Janssen, Henk G. Sol, and René W. Wagenaar Copyright ACM 1-58113-930-6/04/10*.
- Teng et al. (2007). Mobile G-portal supporting collaborative sharing and learning on geography fieldwork: An empirical study, *JCDL '07*, June 18–23, 2007, Vancouver, British Columbia, Canada.
- Turker, M. A. (2000). Electronic delivery of financial services. *Garanti technology*.

Vahey, P. & Crawford, V. (2002). Palm education pioneers program: final evaluation report. SRI International. Retrieved 28 Novemebr 2005, from www.palmgrants.sri.com/PEP_Final_Report.pdf.

Wireless Application Protocol Forum (1999). Wireless application protocol, wireless markup language specification Version 1.2. Retrieved September 1, 2008 from: <http://www.wapforum.org/what/technical/SPEC-WML-19991104.pdf>

WAP Forum (2002). WAP 2.0 Technical White Paper. Retrieved September 1, 2008 from www.wapforum.org/what/WAPWhite_Paper1.pdf

Williams, L. (2006). Insight: Don't call us, *The Sydney Morning Herald*, p.20.

Zheng, B. & Lee, D, L. (2001). Processing Location Dependent Queries in a Multi cell Wireless Environment, *ACM*.