_____

Review Paper on Smart Systems

Mrs. Nisha Vanjari
Asst. Professor – KJSIEIT
Mumbai, India
nvanjari@somaiya.edu

Mr. Ketan Pansare
Bachelor of Computer Engineering, KJSIEIT
ketan.pansare@somaiya.edu

Mr. Saurabh Chaugule
Bachelor of Computer Engineering, KJSIEIT
saurabh.chaugule@somaiya.edu

Mr. Rohan Mishra
Bachelor of Computer Engineering, KJSIEIT
rohan.mishra@somaiya.edu

Abstract –Nowadays, technology has become an inseparable part of human lives. Technologies are smart enough to respond to human commands, provide protection to them and their accessories. Smart systems provide functionalities that of humans and are able to execute them much more efficiently than us. Smart systems search for multiple solutions for a particular problem and based on their intellectual capability and available knowledge base and are able to process solutions from solution set to give optimized output to the user.

Keywords: Smart Systems, Artificial Intelligence, Knowledge Base, Database.

_____*****_____

I. INTRODUCTION

What are Smart Systems? Smart Systems are machines which are adaptive in nature. These systems can predict possible outcomes for particular problem with help of their previously solved problems which are stored in knowledge base. Smart devices imitate the functionalities provided by human such as Sensing, Actuating and Control in order to specify and analyze the situation in adaptive and predictive manner. Smart systems have their own views and viewpoints and can perform comparison between different views. Smart Systems are deployed based on their networking capabilities, their computational power

and energy efficiencies. These devices have become an integral part of our day-to-day lives. From using smart phones to smart assistants to big cognitive computational machines we are surrounded by Smart systems. The main crux part of the smart systems is that their whole computational capabilities are based on Artificial Intelligence (similar to mimicking a human brain) with the help of neural networks and Fuzzy logic. Smart systems are Smart assistants to human beings. Smart systems have led to increase in demand and production of many industrial goods and services and has also reduced the error rate when compared to human labor.

II. EXISTING SYSTEM SURVEY

Existing system

Fig 1.1 Amazon Echo

A. Amazon Echo:

Amazon Echo is a voice based home automation system. Echo has no GUI. The device has a hassle free voice based user interface. It uses Natural Language Processing (NLP) to process the inputs and gives the output that the user has requested. It provides weather reports, news reports, setting reminders and alarms, plays requested music, answers your questions, reads the news for you,gives live traffic information and reads audiobooks from Audible, gives info on local businesses, provides sports

_____

scores and schedules, and more using the Alexa Voice Service .

It also controls lights, fans, switches, thermostats, garage doors, sprinklers, locks, and more with compatible connected devices from We-Mo, Philips Hue, Samsung Smart Things
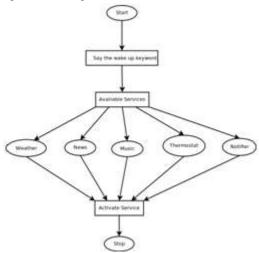

Fig 1.2. Amazon Echo Flowchart

B. IBM Watson:

Fig 2.1.IBM Watson

IBM Watson is a super computer that is a combination of artificial intelligence and sophisticated analysis software for optimal performance. The super computer is named after the founder of IBM Thomas J. Watson.

This computer is capable of processing data at the rate of 80 teraflops (trillion floating point operations per second). This is more or less equal to the high functioning human ability to answer questions.

1.Apache UIMA (Unstructured information management Architecture) frameworks, infrastructre and other elements required for analysis.
2. SUSE Enterprise Linux server 11
3. 2,880 processors cores.
4. 15 terabytes of RAM.

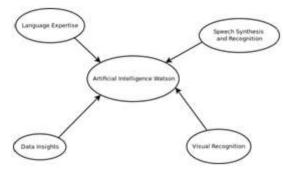5. IBM's Deep QA software, which is based on natural language processing and machine learning.

Fig 2.2. IBM Watson Flowchart

III. ARTIFICIAL INTELLIGENCE

Intellectual capability of any smart devices is termed as Artificial Intelligence. AI has been implemented before the creation or invention of smart devices. For example, opponents in video game are constructed using AI. Here the quality and performance of a video game is judged based on its Artificial Intelligence's accuracy. In smart devices AI plays the most important role.
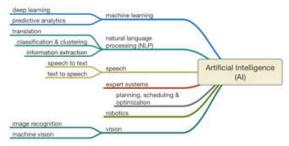

Fig 3.1. Artificial Intelligence

It is to AI that the any system with efficient AI is considered smart system, if their AI is not smart enough then devices are not considered to be smart.

Research has been conducted in this field to improve the logic and deduction capabilities to be applied by the system. If the AI is accurate then it performs more human-like.

IV. MACHINE LEARNING

This is responsible for making system compete in certain scenarios. Machine Learning induces predictability in the system. It helps the system to store certain concepts as well as solutions so that the system can perform well without any more computation if the system encounters similar type of problem in future.
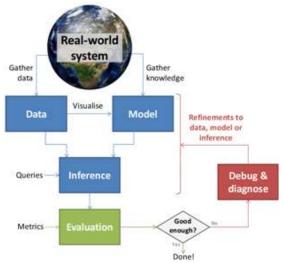
Fig 4.1.Machine Learning

V. NATURAL LANGUAGE PROCESSING

Natural Language Processing is an integral part of the smart system. Human language is the best and most efficient way to communicate. To increase usability of the system first thing one can do it to increase communication between human and system. For communicating with humans NLP was introduced. NLP focuses on grammars and sentences while parsing words. Parsing is a process in which consistency and applicability of the words are checked. It also divides the sentence into group of tokens which are then checked individually for any inconsistency. Natural language processing has two aspects:

1. Speech Recognition:

It is the first phase of NLP. Here, the sentences are broken down into tokens and for keywords to be captured by the system, a range is defined for the words. For different accents and dialects a dictionary is made which stores all the required data for the speech to be recognized by the system. After this process the collected word or sentence is stored and analyzed thereafter.

2. Speech Synthesis:

In this phase, the message is conveyed to user in layman language by machine. Here, humans understanding of the particular language is taken into account and based on that result the difficulty of the sentences are justified.
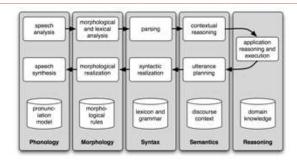

Fig 5.1. NLP

VI. EXPERT SYSTEM

Expert systems are smart systems which are created for a specific task. Expert systems contains all related facts and also have knowledge about all the special cases that may exist in their domain. Knowledge base which stores the fact and previous results of solved problems are updated regularly by human experts. The expert system MYCIN is used to describe cure of certain sickness to the user. It asks user about the symptoms, amount of time they had this sickness and on the basis of answers given by user it describes or states medicines to be provided to the patient. There are many such expert systems in the market deployed in different fields and which have their own significance.
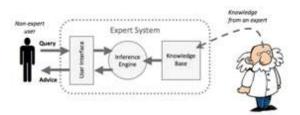

Fig 6.1. Expert System

VII. CONCLUSION

Smart systems have been developing at an astonishing rate in different fields. These systems use only certain features from an entire pool of functionalities. Alexa uses voice based functionalities to perform certain tasks such as playing music or reading news whereas IBM watson is more of a conversational system where it talks with the user in a more humane manner. Though there has been so much development in this area, expert systems still have limited functionalities and those which are used are not fully explored. Making systems to achieve more than there full potential is a challenging part here. Smart systems are focused on domains like medical services, security services, etc but there is so much more that can be done with the help of such smart systems.

_____

Ambadekar and also to our Computer department who provided us with such immense knowledge because of which we were able to comprehend certain concepts about smart systems.

REFERENCES

[1] Ishan Krishna, K. Lavanya "Intelligent Home Automation System using BitVoicer" 16 February 2017 IEEE paper

[2] M. Sarkar, M. Z. Haider, D. Chowdhury "An Android based human computer interactive system with motion recognition and voice command activation" 01 December 2016 IEEE paper.

[3] Grant Clauser "What is Alexa? What is the Amazon Echo, and Should you get one?" https://www.tomzap.com/notes/TechCommunicationsEE333T/IEEE_ReferenceExamples.pdf, February 10, 2017.

[4] Robin "Steps to create an expert system", http://intelligence.worldofcomputing.net/ai-branches/steps-to-create-an-expert-system.html#.WNVUFPmGNPY, January 5, 2013.

_____