

ARTIFICIAL INTELLIGENCE BASED JENNY

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Abstract: Artificial intelligence (AI) is playing an important role in the research of management science and operational research areas. Intelligence is commonly considered as the ability to collect knowledge and reason about knowledge to get to the bottom of complex problems. There are systems available in the market like Apple's SIRI, Microsoft's Cortana, Google's Google now etc. which have the ability to perform tasks which are platform dependent and the tasks which are confined to the device itself. The proposed system can design a software Jenny for those people who are suffering from paralysis, blind people, pregnant woman, old people, and physically handicapped people can use this application except who cannot speak. This application overcomes the platform dependency problem and it is not limited to do the task within the device. This application works on any languages. Any information or data can be retrieved from the internet with the help of this application. Also, the people who are working in the stock market can get the information about updates as well as news of the stock market by using this application. By using this application people can control home appliances such as light, fan etc remotely. This application saves valuable time for those people who are busy in their daily routine.

Keywords - Artificial Intelligence (AI), Visual Studio 2017, HC12 transceiver module, ATMEGA328-PU Microcontroller.

I. INTRODUCTION

Artificial Intelligence is a method of making a computer which is working same as like intelligent humans think [1]. While exploiting the power of the computer systems, the interest of human, lead him to wonder, "Can a machine think and behave like humans do?". Thus, the development of AI started with the goal of creating similar intelligence in machines that we find and regard high in humans.

Every day, we see the people around us who are unable to do their daily tasks by themselves due to some illness or diseases which have made them bedridden or in a handicapped position. There are systems already available that are helpful for these kinds of people but have some limitations like platform dependencies or limitations in performing tasks, etc [2]. Hence, the proposed system Jenny will overcome the above limitations. The main motivation is to develop a system that would avoid these limitations and help these people and also be fruitfully helpful to the others who wish to use this system for their need.

Jenny is like a personal assistant that is interactive. Jenny is capable to perform tasks by taking single voice command in English as an input. In this system, the Mic and the speaker are used for input and output voice commands. The input and output voice commands are processed by using Natural Language Processing (NLP) and integration with Microsoft speech recognition. Jenny also has a feature of Microsoft Speech Software Development Kit (SDK) with the help of it can give output in speech sentences. The proposed system Jenny can be programmed to do tasks such as controlling home appliances like light, fan etc by using Arduino and Relay board, controlling any .exe file from the window, browsers for retrieving anything from the World Wide Web and another task as per requirements.

II. LITERATURE REVIEW

In the current technology-enabled world, changes are rapid and the status is constantly disrupted. Since from 1956, Artificial Intelligence is used in every possible field like gaming, expert systems, medical field, speech recognition, vision system, etc but no one can work on AI as domestic applications.

A survey was conducted in many fields to observe the functioning of Artificial Intelligence and the improvement in every field such as Apple Siri, Windows Cortana and OK Google with the introduction of information technology. The survey reveals that these technologies are platform dependent technologies. These technologies are not able to fulfill the human facilities. Therefore, it is necessary to optimize above technologies to make it more efficient for needy people. Hence, the survey revealed that these technologies can be improved with the help of Artificial Intelligence Technology. The literature survey is done on Artificial Intelligence and many papers are taken into considerations, which are explained below.

Pedro Ferreira [1] describes the conceptual architecture of Artificial Intelligence. This paper gives the brief idea about Artificial Intelligence board which is used for problem resolution and learning system. It has basically main four sub-sections: Intelligent Unit, Problem Management Unit, Artificial Intelligence Description Language (AIDL) Interpreter, I/O Interfaces. Artificial Intelligence designed in two languages such as a Java and C.

Tim and Paul [2] gives the idea about front end of Apple Siri which is developed in iPhone Operating System (iOS), pre-selection of memory to minimize the size of data, module prediction, cost calculation, long units and optimization of Apple Siri.

Patricio Domingues and Miguel Frade [3], in this paper the implementation was done on context awareness and the ability to interact with human through voice. Cortana being enabled by default when Windows 10 is installed, the fact that Cortana scans

emails and calendars among other sensitive items scares privacy-oriented users, resulting in some deactivation of Cortana on the desktop OS. More importantly, support for Cortana is still restricted to a few regions and languages. For example, windows Cortana understand only English language; the Cortana features are only available in Australia, Canada, India, UK and USA. Out of these countries windows Cortana have no access. Now this paper shows that Cortana supported only desktop edition of windows 10 and also it is work in limited region.

Mehdi Assefi, Guangchi Liu, Mike P. Wittie and Clemente Izurieta [4] An Experimental Evaluation of Apple Siri and Google Speech Recognition, explained in this study, aims to develop a Cloud-based speech recognition systems enhances Web surfing, transportation, health care, etc. Using voice commands helps drivers stay connected to the Internet by avoiding traffic safety risks. Thus, under worst condition of network even the performance of these types of applications should be robust. Result of this paper shows that performance of cloud-based speech recognition systems can be affected by jitter and packet loss; which are commonly occurring in WiFi and cellular network connections.

Jatin Borana [5] is explained the working and the different technologies of Artificial Intelligence. Also this paper explains the different applications of AI. AI technologies are used in different field such as Gaming, Expert Systems, and Medicare etc. Some of the systems are designed using different AI technologies which is easy to implement and also it has inbuilt functions for programming, but the whole products become very costly and dependency increases.

The research work carried out in above papers were dependent on software system, also accuracy and cost are the problems which are found during study. The proposed system takes care of all these parameters.

III. PROPOSED SYSTEM

The key motive of the designed system is to who are unable to do their daily tasks by themselves due to some illness or diseases which have made them bedridden. The Proposed System architecture for AI based personal assistant Jenny is as shown in the Figure 1.

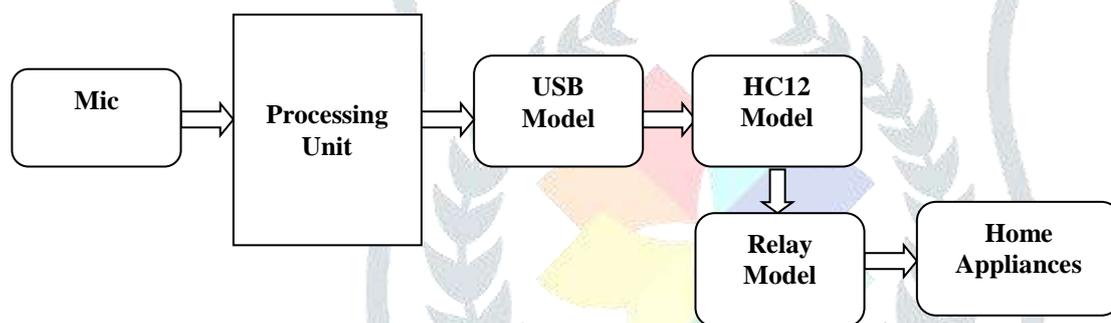


Figure 1: Proposed Block diagram of AI based personal assistant Jenny

The module consists of Mic, Processing unit, CP2102 USB, HC12 module, 4 Relay modules. In this system processing unit collects the instruction from the mic and sends the instruction by using serial communication to further units.

The mic is connected to the processing unit which provides instruction to the processing unit. The input and output voice commands are processed by using Natural Language Processing (NLP). These instructions are further send to the USB module by using serial communication. The USB is connected to the HC12 module. The HC12 module is transceiver wireless module. All instructions are sending by using the HC12 module without any connections. These instructions are processed on ATMEGA324-PU Microcontroller. This microcontroller is used to store the instructions and run properly. There are instructions like turning on or off the light or fan for the execution of these instructions the four relay module is used. Any instructions' regarding home appliances is executed by using four relay modules.

1. Hardware Implementation:

Software Used for PCB design (DipTrace Tool): Diptrace is one of much available scriptable electronic design automation application with schematic capture, printed circuit board layout, auto-router and computer-aided manufacturing features and 3D preview and export, components editor and pattern editor. DipTrace contains a schematic editor for designing circuit diagrams.

Figure 2 shows the circuit implementation which is designed in DipTrace Tool. Below circuit shows the interfacing of different components with HC12 transceiver.

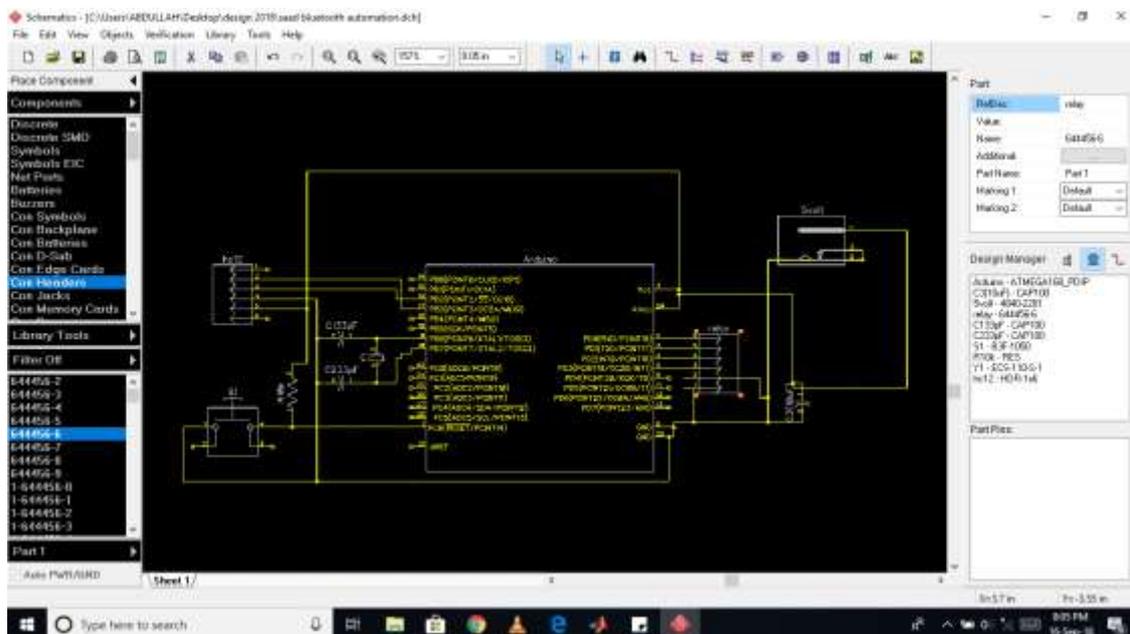


Figure 2: Circuit diagram of System



Figure 3: Top layer PCB

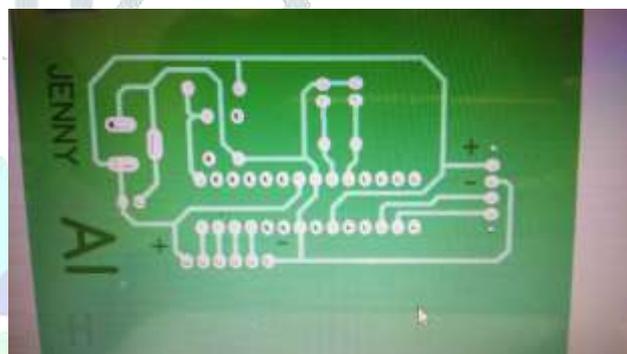


Figure 4: Bottom Layer PCB

Figure 3 and Figure 4 shows the PCB Layout which contains Top and Bottom Layer respectively.

Main PCB of system: The main PCB board of system, where system is interfaced with main processing unit. This system is based on HC12 model. This board contain power supply, input pins where output will be provided to 4 relay model for further processing, interfacing of USB connectors for serial communication.

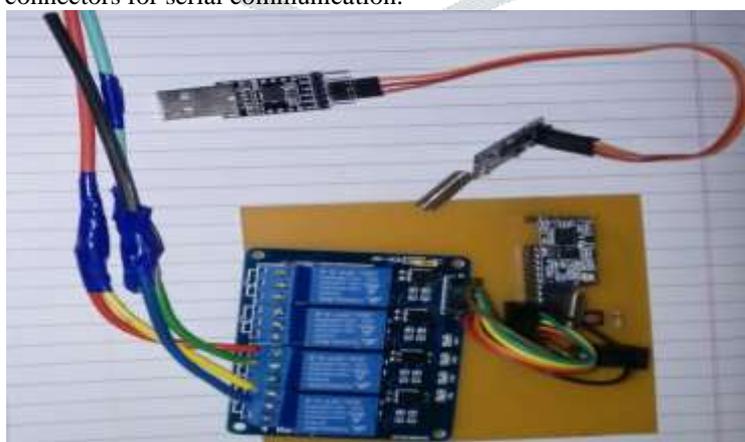


Figure 5: Main Hardware Board of System

Figure 5 shows the main PCB board of system, where different components are interfaced with HC12 transceiver module.

2. Software Implementation

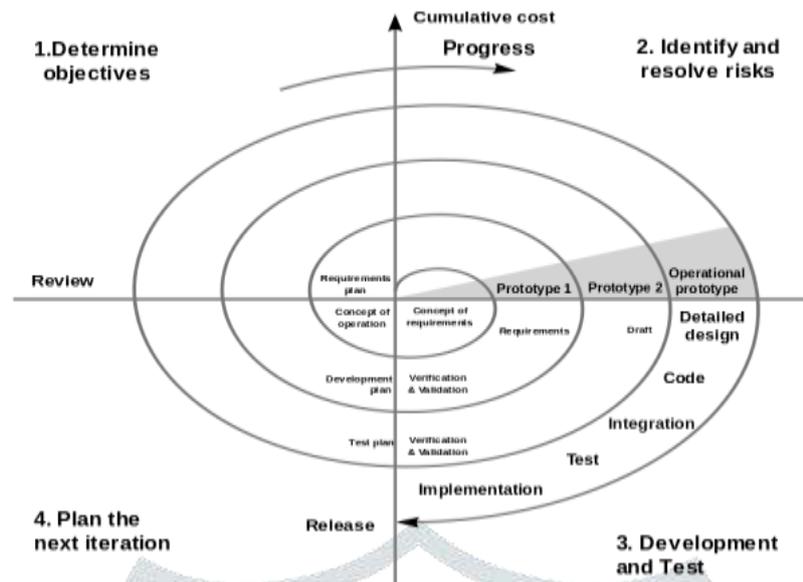


Figure 6: Spiral Model [6]

For the software implementation Boehm's Spiral Model is used. There are six invariants of spiral model for making the software. These are as follows:

1. **Define artefacts concurrently:** The key artefacts defining a project often lower the possibility of developing a system that meets stakeholder "win conditions". The water fall model is not suitable for this work. Hence, the artefacts are concentrating on basic requirements of software implementation.
2. **Perform basic activities in every cycle:** This invariant identifies the four activities that must occur in each cycle of the spiral model. Consider win the conditions of all success-critical stakeholder. Identify and evaluate alternative approaches for satisfying the win conditions. Identify and resolve risks that stem from the selected approaches. Obtain approval from all success-critical stakeholders, plus commitment to pursue the next cycle. These activities apply on every stage of project; the risk will be reduced.
3. **Risk determines level of efforts:** The project team must decide how much effort is enough for any project activity (e.g., requirements analysis, design, prototyping, testing). In spiral process cycles, these decisions are made by minimizing overall risk.
4. **Risk determines degree of details:** In this section project team members should decide how much details for project required (e.g., requirements specification, design document, test plan). These decisions are minimizing overall risk. Considering requirements specification as an example, interfaces between hardware and software, interfaces between prime and sub-contractors. The project should not precisely specify those features where precise specification increases risk (e.g., graphical screen layouts, behaviour of off-the-shelf components).
5. **Use anchor point milestones:** The Boehm's spiral model introduce three anchor point milestones that provide as development and point of commitment. These anchor point milestones can be categorised by using key questions. The life cycle of objectives, the life cycle of architecture and initial operational capabilities. It is very important to check the life cycle of objectives, architecture and capabilities.
6. **The system and its life cycle:** By using above steps implement the system and check the life cycle of the system as per the requirements [6].

IV. RESULTS AND DISCUSSION

This personal assistance Jenny, system is implemented for patients or normal person to operate easily only on voice command. This system is based on AI, hardware and software.

The proposed system perform various tasks such as controlling home appliances, controlling any .exe file of windows, browser for retrieving anything from the Wild Wide Web and other task as per requirements.

All the instructions displayed on the computer screen by using voice command. Personal assistant can work within 0.3µsec on any instruction. The instructions which are displayed on the computer screen are as follows:

1. Introduction to PA.
2. Showing emails.
3. Showing stalks market.
4. Mathematical calculation.
5. Showing prime minister of any country.
6. Opening my computer.
7. Controlling home appliances such as on/off light and fan.

It is seen from figure 7, when instruction is given Hello to the system the proposed system is initialized with displaying image of PA with introduction (“I am Jenney, I am awake and listening”) on computer screen. Then PA asks to instructor “How can I help you?”. As per requirement instructor will give any instruction.

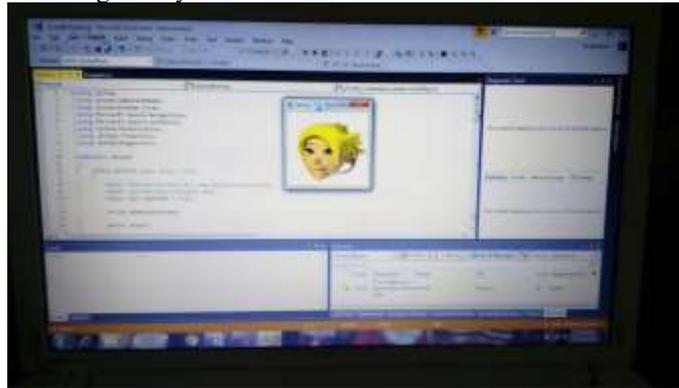


Figure 7: Initialization of System

After initialization of system instructor will give any instruction to PA as per his/her requirements. If instructor want to open his/her emails then instructor will give the order to PA “show my emails”. PA will first open chrome and then showing email on the screen as shown in below figure 8.

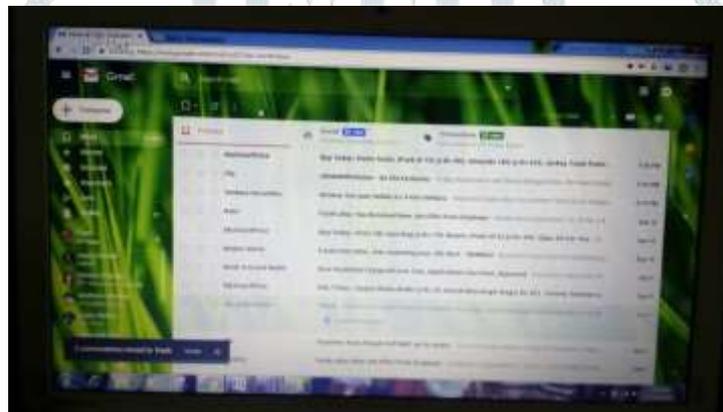


Figure 8: Opening Email

If instructor wants to see the daily stalk market he/she will give order to PA “show me the stalk market” PA will open following page on window shown in figure 9.

If instructor wants to know about prime minister of any country or any information about prime minister of any country then he/she will give order to the PA “who is the prime minister of countries name”. Following figure 10 shows the result of prime minister of India.



Figure 9: Showing Stalk market



Figure 10: Showing Prime Minister of India

If instructor wants to open My Computer he/ she will give the order to PA “open my computer”. PA will open the My Computer on the screen shown in figure 11.



Figure 11: Opening My Computer

If instructor wants to turning on/off the light, fan or any home appliances then give order to PA “turn on the light or fan” as per need as shown in figure 12. In this hardware the instructions send via USB to HC12 module. The HC12 module further sends the instruction to relay module by using ATMEGA328-PU microcontroller. Relay module is used for on and off the 240V home appliances. When instruction comes on relay module, relay will glow the LED and turning on the light or fan. The same procedure follows for turning off the light or fan.



Figure 12: Turning ON/OFF the home appliances

The following observation table 1 shows the difference between previous system and proposed system.

Table 1: Observation table of previous system and proposed system

Parameters	Apple Siri [2], Windows Cortana [3], OK Google [4]	Proposed System (Jenny)
Control Software	Only software controlling	Both hardware and software controlling
Internet	Only working on internet	For browsing purpose internet required
Customization	Cannot do	Can do
Industrial Automation	Cannot do	Can do
Cost	Cost of Apple Siri- Rs. 25,645.44 Cost of Windows Cortana- Rs. 14,679.33 Cost of OK Google- Rs. 9,478.34	Cost of Jenny- Rs. 1,234

V. CONCLUSION

There are many technologies available that could be implemented in AI and improve work conditions. AI has the wide range of applications, including smart system, which is a primary focus of this work.

Jenny is capable to perform tasks by taking single voice command in English as an input. In this system, the mic and the speaker are used for input and output voice commands. The input and output voice commands are processed by using Natural Language Processing (NLP). The system can perform the tasks by controlling home appliances like light, fan etc. by using Arduino and relay board, controlling any .exe file from the window, browsers for retrieving anything from the World Wide Web and another task as per requirements.

The proposed system is useful especially for physically handicapped and bedridden people as it overcomes the drawbacks of the existing systems of physical involvement to start the system. The key motive behind the proposed system is to provide better and efficient service for normal people as well as needy people to make their everyday tasks easier and hence save the time. The proposed system is 100% efficient.

VI. FUTURE SCOPE

The enhancement in the proposed system will be operating in any of the languages such as Spanish, Hindi, Marathi, German etc. In designed system we can also use Internet of Things (IoT) to give voice command to Jenny to send a SOS to its relative. The people who are working in the stock market can get information about updates as well as news of the stock market by using Data mining.

In the proposed system, Jenny will develop as a security feature. If anyone's wants to secure their important data or file from the fraud then he/she will give authentication by using their own voice.

VII. ACKNOWLEDGEMENT

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