

ERUDITO: The Voice Controlled Robot

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Abstract – Over the last few years smart phones have gained very much popularity around us. People enjoy using Smart Phones because of their simple and user friendly UI. However the humans are always looking for effortless ways to do their works. Nowadays they interact with the Virtual Assistant like Siri, Cortana, Alexa and Google assistant for all their work but somehow the virtual assistants are limited to phones and some other devices like Google Home and Alexa, which cannot do much tasks around us. But in today's world the old age and blind people are deprived of these technologies. They are facing problems such as lack of emotional support, lack of social interaction, difficulties in reading textual notes but especially blind peoples are facing the problems on navigating around the places. ERUDITO (Personal assistant) that can give the output based on the user's voice command. Additionally, which also perform different tasks like controlling movement as instructed by the user, weather forecasting report and so forth. Hence the virtual assistant bot is highly beneficial for visually impaired and old aged people because it can perform various functions such as information about the weather conditions, stock price variations in the market, performing simple calculations, telling jokes or playing songs all done through voice/Audio.

Key Words: Human interaction with Robot, Access to internet, accessing the pre- determined Voice direction, Speech to text conversion.

1. INTRODUCTION

In general, when people hear the word “Robot”, they normally think of a piece of machinery that looks and act like a human. But a Robot is actually a machine, especially one programmable based on the user's requirements. Which capable of carrying out complex series of actions automatically or semi-automatically. The Robots can be classified into many types based on their locomotion, size, shapes and nature of action. ERUDITO is a Robot that is capable of moving around the surrounding, which is artificially intelligent and controlled through the predefined voice commands. Which gets a consistent signal from the Ultra-sonic sensor so as to locate the uninterruptable and constant way and to avoid the collision between the objects which encounters in the middle of the path. In today's world, people are rushing towards screen-less interface or Zero UI (user interface) which is Virtual Assistants, nowadays there

are so many devices like this in the market. So that ERUDITO also have such virtual assistant model with in it, it can perform simple arithmetic computation depending on voice commands and giving back the processed solution through voice signal on the speakers. Furthermore, it can perform various web based functions such as telling about the weather forecasting, stock prices, telling jokes or playing songs all depended on voice commands by the user and it will give back the processed solution through Audio.

2. OBJECTIVE

To build a Personal Assistant Bot using Raspberry Pi, the movements of the bot will be controlled by voice indicated directions and to help the outwardly disabled to connect with the world by providing them access to internet by using their voice as the command.

3. METHODOLOGY

The ERUDITO the voice controlled robot is comprises of two fundamental modules:

(i) *Voice Control*: This bot can be controlled by the user, by giving predefined voice directions. After the reception of the command from user, the received speech is converted into text format. At this time, the content in the text is processed and when the order given to the bot is recognized, the bot will react by moving in a provided specific direction.

Our idea is to create a database for controlling the movements of bot, where the database will have the directions of bot.

The steps for controlling bot are as follows:

- It will take the speech as an input from the user.
- Received command will convert into plain text.
- Then search for the presence of direction commands in the plain text generated in step2.
- Then Bot will try to move in the provided direction if the path is detected otherwise Bot will stop.

(ii) *Virtual Assistant*: In this module, we used the Google Assistant API because it is one of the best remote helper. It got a little-preferred standpoint over others for precedents

Alexa, google assistant and Siri. It answers the most inquiries effectively and also increasingly conversational. With Alexa and Siri, it is difficult to get the command without flaw so google server will help us to minimize the errors in recognizing the words from user's query.

Procedure:

- Assistant first collects user's command and send it to the Google server to be analyzed the command more efficiently.
- Server will separates user's speech into individual sounds. At that time, it analyses the database containing different word's to discover which words most intently matches with the individual sounds of the user's query.
- Then it will recognizes keywords to understand the tasks to be done and do relating functions. For example, if user's query contains words like "search" preceding with a statement, it would search in the web.
- The google Server sends processed information back to ERUDITO and gives the data through speakers.

4. FUNCTIONAL PARTITIONING

The proposed system is demonstrated in the following fig.1. The setup consists of sensors, DC motors, Pi-camera/webcam, speaker, microphone and motor driver connected to a Raspberry pi. ERUDITO is AI based and controlled through the predetermined voice commands/directions. It makes the use of the Pi camera module for recognize the object which interrupting its moving path and articulate it to the user using a speaker. It can perform simple calculation depend on voice commands and giving back the calculated solution through a voice and if user's query is web dependent then it will look into it and giving back the answer through a voice/audio. Whose movement is also controlled through voice indicated direction.

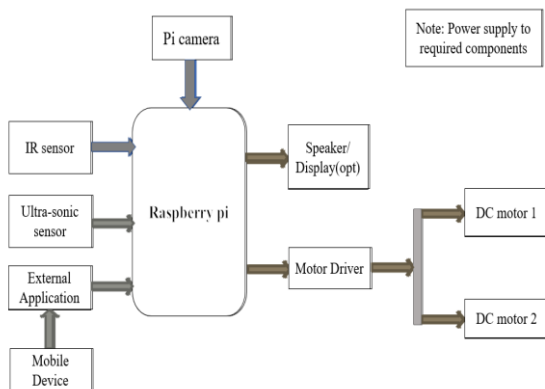


Fig. 1: Block diagram demonstrating the voice controlled robot

The below fig: 2 shows the flow chart of working of the

voice controlled robot

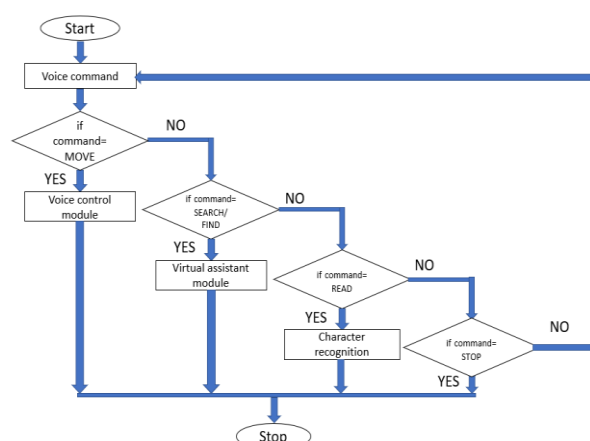


Fig. 2: Flow chart of working of voice controlled robot

5. OUTCOME

ERUDITO The Voice Controlled Robot is accomplished by the using of the Raspberry pi. As the assistant uses Google Assistant API therefore it will answers the user's query accurately. The actions like simple calculation and web search are performed by ERUDITO and the movement of bot is trailed and the bot moves in FORWARD, BACKWARD, RIGHT and LEFT as indicated by the user and STOPs either any interrupts occurs in its path or by the commands.

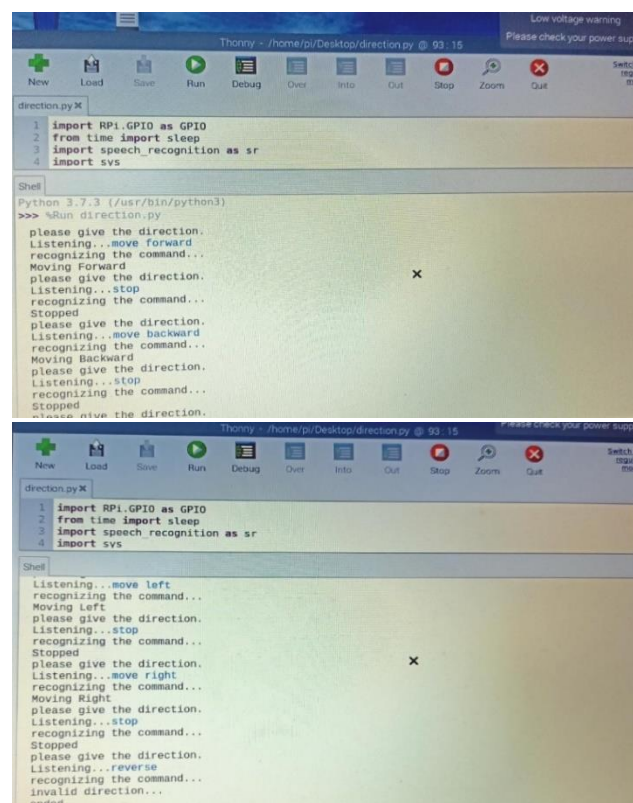


Fig. 3: Output of Voice controlled Robot

6. ADVANTAGES

- The people with minimum technical knowledge can access this system, because they can access the system by knowing some specific predefined commands.
- This system doesn't have any User Interface (UI) or it is a Zero UI system so visually impaired people can access this with any difficulties.
- In extreme conditions like high radiation areas or deep surfaces it can go very easily by the user's command from control stations.

7. FUTURE SCOPE

- Used to help visually impaired/old aged people to connect with the world like calculator, Gmail, Music etc. and the caretaker can access it through their mobile phone or pc.
- Voice controlled calculator: for visually impaired people in primary schools

8. CONCLUSION

This system is successfully accomplished by using the Raspberry Pi as its processing board and which uses the Google Assistant API to assist user's queries accurately and precisely. By using camera module it is able to recognize object which encounters in its moving path and at the end the solutions for all user's queries will solely giving through audio by speaker. Additionally it can perform movement on voice indicated directions and so on. This system is a model for a mixture of works to be done.

9. REFERENCES

- [1] "An embedded real time object detection and measurement of its size" by Mehmet KARAKOSE and Nashwan Adnan OTHMAN, Computer Engineering Department , Firat University, Elazig Turkey , mkarakose@firat.edu.tr
- [2] "Multiple object detection using OpenCV" by Souhail Guennouni and Ali Ahaitouf, Sidi Mohammed Ben Abdellah University, School of Science and Technology, Signals Systems and Components Laboratory, B.P. 2202, 30000 Fez, Morocco.
- [3] "Text Recognition using Image Processing," by Chowdhury Md Mizan, Tridib Chakraborty, and Suparna Karmakar, International Research Journal of Engineering and Technology (IRJET) Volume: 08 Issue: May-June 2017
- [4] "Robot Control Based on Voice Command " by Xiaoling Lv Minglu Zhang and Hui Li, IEEE International Conference on Automation and Logistics Qingdao, China September 2008
- [5] "Smart Home With Virtual Assistant Using Raspberry Pi" by Shubhang Khattar, Anisha Sachdeva, Rishi Kumar and Richa Gupta, 9th International Conference on Cloud Computing, Data Science & Engineering (Confluence).
- [6] "Power efficient smart home with voice assistant" by Rahul Kumar and Nehal Shah, Sarvajanic college of Engineering