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Voice Controlled Artificial Intelligence Included Wheel Chair/Drone

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ABSTRACT: Many disabled people usually depend on others in their daily life especially in moving from one place to another. For the wheelchair users, they need continuously someone to help them in getting the wheelchair moving. By having a wheelchair control system they become more independent. The aim of this research project is to design and fabricate a voice controlled wheelchair for physically disabled people. The wheelchair control system which employs a voice recognition system for triggering and controlling all its movements. It integrates a raspberry pi, microphone, voice recognition processor, motor control interface board to move the wheelchair. By using the system, the users are able to operate the wheelchair by simply speaking to the wheelchair microphone. The basic movement functions includes forward and reverse direction, left and right turns and stop. The spoken words are linked to the voice recognition processor via a microphone attached closed to the user's mouth. It utilizes a raspberry pi to control the system operations. It communicates with the voice recognition processor to detect word spoken and then determines the corresponding output command to drive the left and right motors.

KEYWORDS: Raspberry-Pi, Voice HAT, DC motor, speech recognition

I. INTRODUCTION

The idea of using voice activated technology for controlling the motion of the wheelchair and home automation are to prove that it can be a unique concept that would stand apart from the rest of the average projects. The use of this new technology in conjunction with a mechanical system in order to simplify everyday life and it would spark interest in an ever growing modern society. A joystick controlled wheelchair is a replacement of standard wheelchair. These wheelchairs are powered by the electric current and the direction of wheelchair controlled by use of joysticks. It removes the effort of the patient or some other person for propelling the wheelchair. A new advancement in the development of the wheelchair is voice controlled wheelchair. Voice recognition depends on converting a particular spoken word to an electrical signal which is further digitized in order to be processed by a computer or Raspberry pi. The aim of this study is to implement an interesting application using small vocabulary word recognition system. The methodology adopted is based on grouping a raspberry pi with a speech recognize development kit for isolated word from a dependent speaker. The resulting design is used to control a wheelchair for a handicapped person based on the vocal command. The system comprises of transmitting section and receiving section. Initially, the voice command is stored in the data base with the help of the function keys. Then the input voice commands are transmitted through wireless.

II. LITERATURE SURVEY

Several researchers have considered using human voice to control powered wheelchairs, see, e.g., Simpson and Levine (2002), a wheelchair voice control system should operate reliably for a large number of users, reduce the physical requirements; and if avoiding the need to move on one or more road extremities, should assist a control; rather its use is user in maintaining well the chair position. Thus, voices interface has yet to become commercially viable for wheelchair normally suggested in combination with a navigation assistance system for obstacle identification and avoidance in the wheelchair's path (Q.P. Ha, T.H. Tran and G. Dissanayake,2005).

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III. RELATED WORK

From the Research it is suggests that the current power wheelchair control interfaces used may not, be adequate to provide truly independent mobility for substantial number of person with disabilities. The concept of the design is to make a voice activated wheelchair, which can replace the use of a joystick. In the past decades GUI (Graphical User Interface), Keyboard, Keypad, Joystick is the dominating tools for Interaction withmachine.TheRespondents to the survey reported on average that approximately ten percent of the patients trained to operate a power wheelchair cannot use the chair upon completion of training for activities of daily living or can do so only with extreme difficulty.

IV. BLOCK DIAGRAM

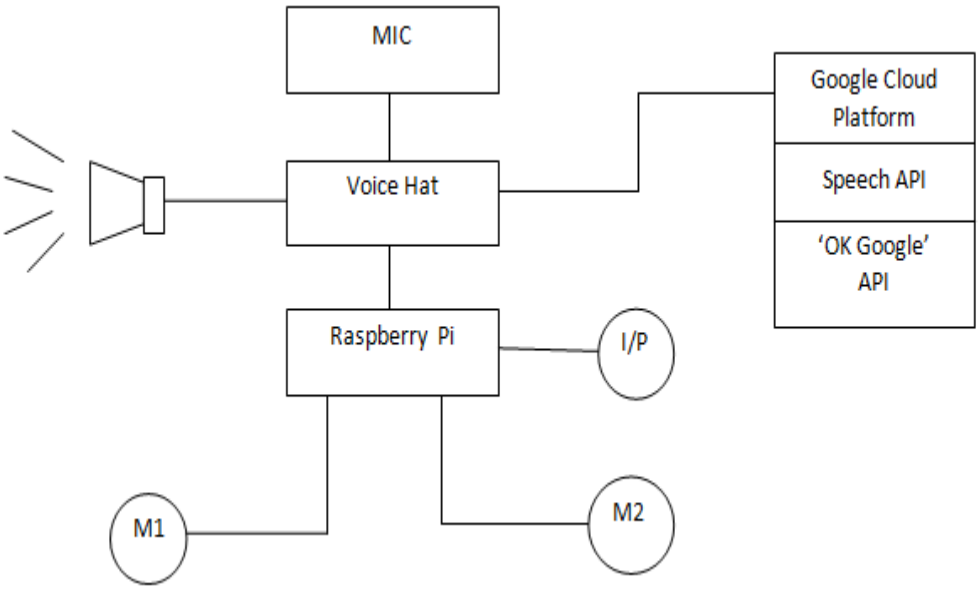

Fig. 1 Block Diagram

The block diagram represents Raspberry pi controller which controls all functions. There is an inbuilt mic & speaker present on the voice HAT. Voice HAT is actually acts as voice to text converter where the speech commands are input to the mic & they are recognized at speaker output. There is an inbuilt Wi-Fi model on Raspberry pi. Because of this facility we can connect the internet to it. When we connect power supply the system will turn on & we connect internet to Raspberry pi model. So according to it when we give instruction to it, it will responds the movement of wheelchair. We have given the keywords forward, back, left, right, stop. We give the python code to Raspberry pi controller. When we start system then it will detects the particular keywords that we have given to it & it will gives that keywords to the Google cloud. We have interfaced Google speech API to Google search API to perform above activities.

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IV. SYSTEM SPECIFICATION

There are different components are used in this system to run the wheelchair. The specifications of these components are as follows:

- Raspberry pi 3 model B: Broadcom BCM2387 chipset,1.2GHz Quad-Core ARM Cortex-A53 (64Bit)
  Raspberry pi is the main controller of the system. It will control all the operations of the system. It is the 40 pin GPIO operates on 5V supply.
- Voice HAT: It is used to convert audio to text.
- MIC:It is used to take voice input.
- Speaker: It is used to give the output.
- Motors:There are total 2 DC motors used in the system is of 50 RPM.

V. SYSTEM DESIGN

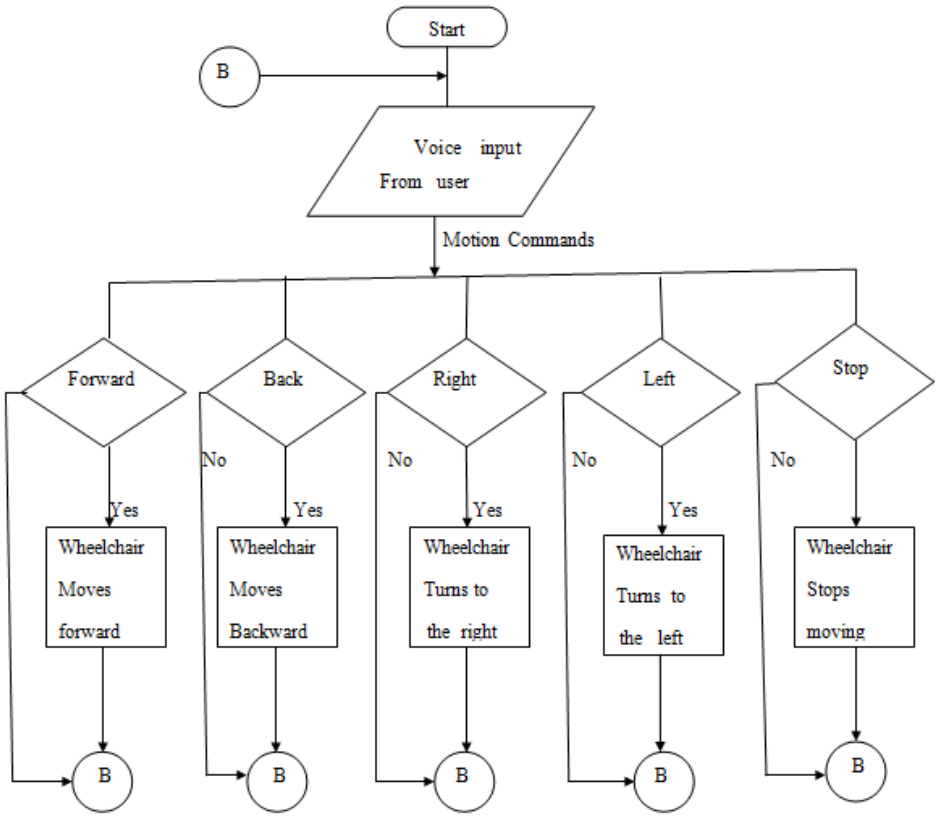

Fig. Flow chart for the motion control wheelchair using voice

VI. RESULT

After the design and development of the wheel chair with respective interfacing circuits, the technology was tested for the motion of the wheel chair and home automation using trained voice. This design is experimented based on two important aspects, firstly, on the accuracy of the system and secondly, wheelchair velocity & home automation control by means of on & off control commands. The proposed design was implemented using normal people. This would be implemented for disabled people after having the smoothly furnished design of the wheel chair.

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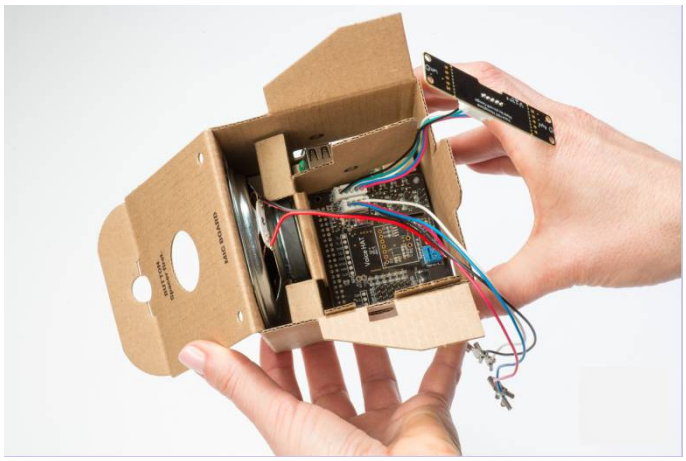

Fig a). Voice HAT

HAT stands for Hardware Attached on Top, which are devices you simply attach directly to your device. It has several GPIOs available on it, along with several soldered on connectors.

Fig. b): Completed Project Module

Above Figure shows the complete Voice controlled wheel chair.

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VII. CONCLUSION

This project pays to the self-dependency of physically challenged, handicapped and paralyzed and older people. In this project with voice control, speech synthesizer, news reading and Google voice search is developed. The wheelchair we developed is more useful for the patient who paralyzed from waist down and even can't move their finger. If any patient is unable to move head then voice commands can be used for the navigation of the wheelchair independently this wheelchair can be controlled in many languages with any prior training and there is not limitation of number of commands. Most interesting thing of this wheelchair is Google voice search. Aim behind this product is to develop a cost effective and user friendly wheelchair so maximum patient can use this and make their life easy.

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