INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact factor: 4.295
(Volume 4, Issue 2)
Available online at: www.ijariit.com

Intelligent Voice Controlled Robot using HMM Recognizer

Shubham Thakare
thakareshubham7@gmail.com
J. D College of Engineering and Management, Nagpur, Maharashtra

Swapnil Pathak
swappathak1997@gmail.com
J. D College of Engineering and Management, Nagpur, Maharashtra

Anmol M. Borkar
anmolb752@gmail.com
J. D College of Engineering and Management, Nagpur, Maharashtra

Shubham Meshram
sparshmeshram14049@gmail.com
J. D College of Engineering and Management, Nagpur, Maharashtra

Amar Gupta
amargupta99222@gmail.com
J. D College of Engineering and Management, Nagpur, Maharashtra

M. M. Baig
mirzammb@gmail.com
J. D College of Engineering and Management, Nagpur, Maharashtra

ABSTRACT

The Robots are used more commonly in all the fields. In this paper we are implementing a systematic way for the voice base robotic vehicle, which consists hardware as well as software interfacing with the clarity of voice commands spoken by a human being, these voice commands are recognized by an electronic circuit containing HM2007 voice recognition IC.

When we come to the recognition of speech, many recognizers are available for improvement of voice recognition. The main task is to find a sequence of commands given by human being. The purpose of this paper is to recognize voice commands given to the robotic vehicle with the combination of techniques to enhance control of the robotic vehicle.

Keywords: *Voice Command, HM2007 IC, Recognition of Speech.*

I. INTRODUCTION

The invention of creating the machine that works independently and operates autonomously. In today's world, every human is in seek of comfort and accuracy in the work. The field of robotics is the emerging technologies in which intelligence is embedded with physical machines. Normal human being cannot work constantly and accurately because of this electronic machines becoming more popular in every area of transport, medical research and development purpose and so on, the robotic field is becoming so popular because of efficiency, accuracy in work, effectiveness, and mobility [1].

The system is consists of the two parts:

- The first part includes the recognizing the voice commands with the help of voice recognition module.
- In the second part, the recognized commands are sent to control the robotic vehicle

The main focus is on providing accuracy and controlling the robot using voice. An overview of the existing system problems and the solution discussed below:

The problem of Existing System

The problem caused because of the existing technologies are not suitable for recognizing the human voice and not compatible to work with human voice instructions.

Solution

The solution for the above problems that are caused by the existing vehicles can be solved by the "voice-controlled robotic vehicle". By this voice-controlled robotic vehicle, we can reduce human efforts, complexity and by Provide security to the work[3].

2. SPEECH RECOGNITION

Voice controlled systems basically use the principal of speech recognition. Speech recognition is the process of proving input voice commands according to the capacity of hardware circuit some of the most important of the speech recognition systems are as follows:

- Voice recognition.
- Identifying commands.

It was proposed that speech recognition for achieving greater Performance for controlling the robotic vehicle using voice instructions [2].

The process of listening and identifying is known as the voice recognition. HM2007 is the speech recognition module is easy to use for speech recognition. First, we have to train this circuit by giving a number of commands that it is able to recognize. This IC allows us to process on speech recognition technique has 8-bit data out which can be interfaced with any microcontroller in the robot. Some of the applications are home automation appliances [3].

HM2007 is the single-chip CMOS which is able to recognize the voice commands. The circuit is built for accepting voice input through the external media, static RAM and other components. Following are some the features of Hm2007.

- Single chip voice recognition CMOS LSI.
- 64K SRAM can be connected on the chip.
- Maximum 20 commands can be recognized.
- Maximum 1.92 sec of the word can be recognized.
- It has a response time less than 300ms.
- 5v power supply.

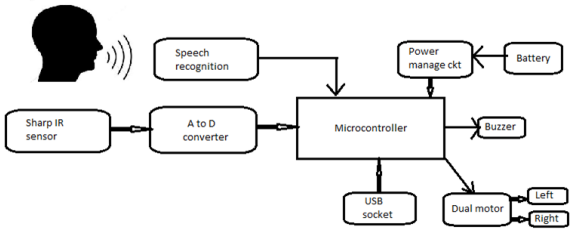

Figure 1: Block Diagram of Robotic Vehicle with Speech Recognition

Sharp IR Sensor

For accurate distance measurement, the robotic vehicle uses Sharp IR sensors, it is possible for IR sensor only when it is able to detect angel of reflection because can light varies according to the availability of it. In our robotic vehicle the purpose of using Sharp IR sensor to detect the object and according to that, it can able to handle event its depend in further.

Buzzer

It is used for indicating events like battery low and so on.

A to D Converter

It is used for converting analog signals to digital so that it is possible to process by the microcontroller.

Dual Motor

It consists left as well as right motors for the movement of the robotic vehicle.

USB Socket

It is using for lode the instructions into the robotic vehicle so that changes according to the instructions.

Power Management Circuit with Battery

Use of this circuit is to manage the power supply to components according to the need and capacity of the component.

Microcontroller

The microcontroller is the main component of the robotic vehicle in this paper of robotic vehicle it performs according to the give instruction of external input and provide appropriate output and so on.

Important
Give power supply to the motor drivers directly without going through the main board and make sure that Robot's ground and motor driver's ground are common.

PWM

Pulse Width Modulation is a process in which constant frequency Modulated to control power delivered to the load for the motor.

Position Encoders

The position encoders are responsible for forwarding the velocity requirement to the robotic vehicle. The position encoder is consists of the slotted discs that move in between the optical transmitter and receiver. When the slotted discs move in between the optical encoder it generates the signals whose pulse count indicates the position.

Directions	Left Backward	Left Forward	Right Forward	Right Backward	Pulse Width Modulation
Forward	0	1	1	0	As per velocity requirement
Left	1	0	1	0	As per velocity requirement
Right	0	1	0	1	As per velocity requirement
Backward	1	0	0	1	As per velocity requirement
Stop	0	0	0	0	As per velocity requirement

Table 1: Logic Table for Motor Direction Control

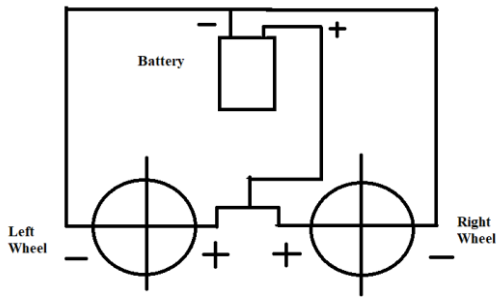

Figure: 2 Basic Connections for Forward Movement

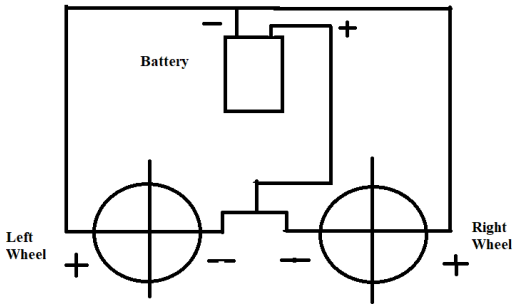

Figure: 3 Basic Connections for Backward Movement

As shown in above Figure no. 2 and Figure no. 3 it showed simple connections for wheels of a robotic vehicle according to which it can perform the function like the movement of Forward, Backward, Right, Left and stop and so on.

3. CONCLUSION

Voice base robotic vehicle able to recognize the speech. The voice recognition system has accuracy in identifying the voice instructions. But in noise, there may be the possibility of non-recognizing given instructions but it has more possibility of recognizing.

The voice-controlled robotic vehicle is used in the application of surveillance and transportation. It could be widely used in various automated control systems if continuing to improve its function.

4. REFERENCE

[1] Praveen Blessington1, B.T.P.Madhav1 M. SagarBabu, R .Rajiv Reddy, D. I. P. Mani Kumar, Naga Raju, N. Anil Babu "Acoustic Controlled Robotic Vehicle" (ISSN 2250-2459, Volume 2, Issue 4, April 2012).

[2] RongPhoophuangpairoj "Using Multiple HMM Recognizers and the Maximum Accuracy Method to Improve Voice-Controlled Robots" (ISPACS) December 7-9-2011.

[3] Mr. Sangmeshwar S. Kendre, Mrs. S. D. Apte - "Voice Controlled Robot using Open Source Hardware Platform Beagleboard" in the proceeding of IJRTET, Pune, India 2010.

[4] LX. L. Zhou, Z.Y. Sun, Z. Y. Liu, Y. Q. Chen, D. Y. Peng, F. M. Guo*, Z. Q. Zhu School of Information Science & Technology, East China Normal University Shanghai, "Embedded Vehicle Control System Based on Voice Processing Technologies" Proceedings of the 2008 IEEE/ASME International Conference on Advanced Intelligent Mechatronics July 2 - 5, 2008, Xi'an, China.

[5] Omair Babri, Saqlain Malik, Talal Ibrahim, and Zeeshan Ahmed, "Voice Controlled Motorized Wheelchair with Real-Time obstacle avoidance," ICCIT 2012.