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Voice Controlled Robotic Vehicle

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Abstract: A robot is usually an electro-mechanical machine that is guided by computer and electronic programming. Many robots have been built for manufacturing purpose and can be found in factories around the world. Designing of the latest inverted ROBOT which can be controlling using an APP for android mobile. And in which we use Bluetooth communication to interface Arduino UNO and android. Arduino can be interfaced to the Bluetooth module though UART protocol. According to commands received from android the robot motion can be controlled. The consistent output of a robotic system along with quality and repeatability are unmatched.

Keywords: Arduino UNO, Servo Motors, Motor Driver, Bluetooth Module and Motors.

I. INTRODUCTION

These robots can be reprogrammable and can be interchanged to provide multiple applications. In this project, the system operates with the use of an android phone Bluetooth device which transmits voice commands to an Arduino UNO to achieve this functionality. An ARM series microcontroller is used together with an Android Application for the desired operation. The Android Application is connected to the Bluetooth module (HC-05) present on the Robot via Bluetooth. The commands are sent to the robot using push buttons or voice commands present on the android application. At the receiving end two dc servomotors are interfaced to the microcontroller where they are used for the movement of the vehicle. The RF transmitter of the Bluetooth can take either switch press or voice commands which are converted to encoded digital data for the advantage of adequate range (up to 100 meters) from the robot. The receiver decodes the data before feeding it to another microcontroller to drive DC motors via motor driver IC for necessary work.

In today's era, smart phones are becoming more powerful with reinforced processors, larger storage capacities, richer entertainment function and more communication methods. When we say voice control, the first term to be considered is Speech Recognition i.e. making the system to understand human voice. Speech recognition is a technology where the system understands the words (not its meaning) given through speech. In other words, Speech recognition technology is a great aid to admit the challenge and it is a prominent technology for Human-Computer Interaction (HCI) and Human-Robot Inter- action (HRI) for the future. Speech is an ideal method for robotic control and communication. The speech recognition circuit we will outline, function sin dependently from the robot's main intelligence.

To control and command an appliance (computer, VCR, TV security system, etc.) by speaking to it, will make it easier, while increasing the efficiency and effectiveness of working with that device. At its most basic level speech recognition allows the user to perform parallel tasks, (i.e. hands and eyes are busy elsewhere) while continuing to work with the computer or appliance. Speech is an ideal method for robotic control and communication. The main objective is to minimize the cost involving in the project and power consumption satisfying the need of the day at the same time.

II. LITERATURE SURVEY

Mrumal. K. Pathak [1], the purpose of this paper is to provide powerful computational android platforms with simpler robots hardware architecture. This paper describes how to control a robot using mobile through Bluetooth communication, some features about Bluetooth technology, components of the mobile and robot. It present are view of robots controlled by mobile phone via moving the robot upward, backward, left and right side by the android application such as Arduino, Bluetooth.

Aniket R. Yeole [2], have designed a robot that can be controlled using an application running on an android phone. It sends control command via Bluetooth which has certain features like controlling the speed of the motor, sensing and sharing the information with phone about the direction and distance of the robot from the nearest obstacle.

Ritika Pahuja [3], a robot is usually an electro-mechanical machine that is guided by computer and

electronic programming. Many robots have been built for manufacturing purpose and can be found in factories around the world. This paper develop the remote buttons in the android app which control the robot motion with them. And in which Bluetooth communication is use to interface controller and android. Controller is interfaced to the Bluetooth module though UART protocol.

S R Madkar [4], deliberate how to control robot controlled vehicle using Wi-Fi modulethroughandroidapplicationofanandroidmobilephone.Itisalsoshowthattheappliancescanbe controlled even in the absence of an android phone by sending a normal SMS. This project can be modified quite easily to include a spy camera as well that can stream the videos to the user over Wi-Fi. Solar cells are instead of the regular lithium ion battery for the project.

K.Kannan [5], defines the modes of speaking Robot. There are generally three modes of speaking, including: Isolated word mode: In which the user speaks individual words (or phrases) drawn from a specified vocabulary. Connected word mode: In which the user speaks fluent speech consisting entirely of words from specified vocabulary.

R. M. Narayana [6], defines how to recognize voice of Robot. Speaker independent systems which work on broad populations of talkers, most of which the system has never encountered or adapted to Speaker adaptive systems which customize their knowledge to each individual user overtime while the system is in use.

III. OBJECTIVES AND METHODOLOGY

3.1 Objectives

Speech and voice recognition security system. Telephonic assistance system. The voice controlled robotic vehicle can be easily drive by unskilled driver by voice commands with the help of android application in smart phone.

3.2 Methodology

Android smartphone with app. Android speech-recognition app (voicecontrol.apk) used here was developed using MIT App Inventor. When the app is running in the smartphone, the microphone present in the phone Commands are processed detects user's voice commands, and speech-to-text conversion is done within the app using Google's speech-recognition technology. Text is then sent to the receiver side (that is, robotic car) via Bluetooth. Arduino Uno R3. Arduino Uno is an AVR ATmega328P microcontroller (MCU)-based development board with six analogue input pins and 14 digital I/O pins. The MCU has 32kB ISP flash memory, 2kB RAM and 1kB EEPROM. The board provides the capability of serial communication via UART, SPI and I2C. The MCU can operate at a clock frequency of 16MHz. In this project, digital I/O pins 2, 3, 4 and 5 of Arduino are configured as output pins. Pins 0 and 1 of Arduino are used for serial communication with HC-05 Bluetooth module. Text received via Bluetooth is forwarded to Arduino Uno board using UART serial communication protocol. Arduino program voice control checks the text received and, if it is a matching string, Arduino controls the movements of the robot accordingly. HC-05 Bluetooth module. HC-05 module is an easy-to-use Bluetooth Serial Port Protocol (SPP) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module has a fully qualified Bluetooth V2.0+EDR (enhanced data rate) 3Mbps modulation with complete 2.4GHz radio transceiver and baseband.

IV. WORKING PRINCIPLE

Android Smartphone with app. Android speech-recognition app (voicecontrol.apk) used here was developed using MIT App Inventor. When the app is running in the Smartphone, the microphone present in the phone Commands are processed detects user's voice commands, and speech-to-text conversion is done within the app using Google's speech-recognition technology. Text is then sent to the receiver side (that is, robotic vehicle) via Bluetooth. Arduino Uno R3. Arduino Uno is an AVR ATmega328P microcontroller (MCU)-based development board with six analogue in put pins and 14 digital I/O pins. The MCU has 32kB ISP flash memory, 2kB RAM and 1kB EEPROM. The board pro-vides the capability of serial communication via UART, SPI and I2C. The MCU can operate at a clock frequency of 16MHz. In this project, digital I/O pins 2, 3, 4 and 5 of Arduino are configured as output pins. Pins 0 and 1 of Arduino are used for serial communication with HC-05 Bluetooth module. Text received via Bluetooth is forwarded to Arduino Uno board using UART serial communication protocol. Arduino program voice control checks the text received and, if it is a matching string, Arduino controls the movements of the robot accordingly. HC-05 Bluetooth module. HC-05 module is an easy to use Bluetooth Serial Port Protocol (SPP) module, designed for transparent wireless serialconnectionsetup.SerialportBluetoothmodulehasafullyqualifiedBluetoothV2.0+EDR (enhanced data rate) 3Mbps modulation with complete 2.4GHz radio transceiver and baseband.

V. FIGURES

Fig. 1 Arduino UNO Fig. 2 Motor driver Fig. 3 Bluetooth Module

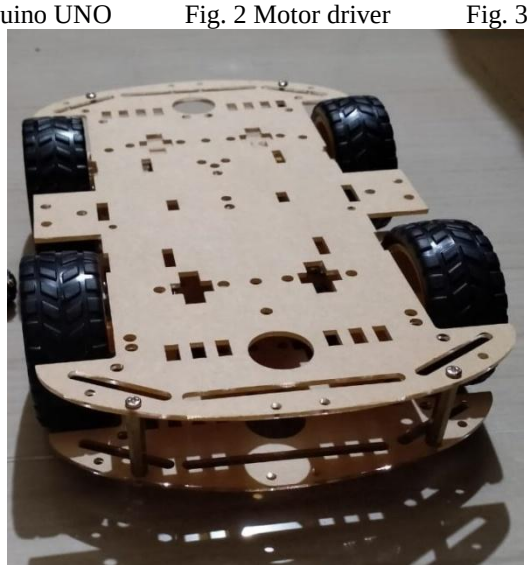

Fig. 4 Completed Project Model

VI. CONCLUSION AND FUTURE SCOPE OF WORK

6.1 Conclusion

A highly reliable and easy system to accomplish a purpose design specific task such as distribution of medicine and food to the bed ridden patients specially in infected & inaccessible areas of the hospitals and medical Centre have been reported. The on-board intelligence helps providing situational awareness a basic requirement of the system to be operated by voice/tele confined for ascertaining a majority of other tasks in open loop environment. The operation by voice command could best be used for handicapped. The outcome of the thesis is a simple robot which is controlled by a smart android phone & also receives the voice commands. This thesis aims to provide simple guidelines for people interested in building robots. As mentioned earlier, the project has been carried out several times and the aim of this thesis is to familiarize the students with fundamentals of Arduino and Android to build anything possible. Although the thesis projects very little about the robot's use in real world, but with the help of guidelines and the abundance of resources the outcome could be very beneficial for many people in the world. People with physical limitations such as handicapped people could use the feature to their wheel chair from this thesis to compensate their abilities.

6.2 Future Scope of Work

We believe such a system would find wide variety of applications. Menu driven systems such As e-mail readers, household appliances like washing machines, microwave ovens, and pagers and Mobiles etc. will become voice controlled in future.

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