Design and Development of Voice Controlled Automatic Wheel Chair

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A B S T R A C T

The voice controlled automatic wheelchair is mainly constructed for the people who are disabled and non-locomotive by their nature. Usually the disabled persons depend on some other for their daily life activities and for their routine works. This may reduce the self confidence in those persons. As the solution of all these problems the production of wheelchair is aroused. The voice controlled automatic wheelchair includes the Bluetooth module (HC-05) which is connected with the mobile phone of the wheelchair user. The paired Bluetooth and the voice-controlled application which includes the google voice assistant for recognizing the users voice are the main components of the voice controlled automatic wheelchair. The wheels of the wheelchair move according to the voice command of the wheelchair user. The motors connected to the wheels helps in the movement of the wheelchair. The Arduino Uno microcontroller is used in where the DC motors are connected to it. The DC motor consists of motor1 and motor2 helps in the motion of the wheels.

Keywords: Arduino uno, Bluetooth module (HC-05), DC motors, Android app

I. INTRODUCTION

The voice controlled automatic wheelchair is a result of enhancement in technology. The voice- controlled wheelchair is designed mainly for the people who are disabled or non-locomotive or paralyzed. The main objective of the VOICE CONTROLLED AUTOMATIC WHEEL CHAIR is to control the wheelchair by using speech recognition module. This system is designed to control a wheelchair by using the voice of person. The goal of this system will allow certain people to live a life with less dependence on others for their movement as a daily need. The objective of this project is to facilitate the movement of the elderly people who are not able to move well. The goal of this system will allow certain people to live a life with less dependence on others for their movement as a daily need. Speech recognition technology which will provide a new way of human interaction with machine or tools. This can be realized and optimized with use the smart phone as an intermediary or interface. In this project interfaces had been designed therefore to develop a program for recognize speech also controls the movement of chair and an application which can handle or manage the graphical commands. This project uses Arduino kit microcontroller circuit and DC motors to create the movement of wheelchair. Based on the human voice as an input there are five basic commands given to the wheelchair by the user 1)start, 2)Turn right, 3)Turn left, 4)Turn around, 5)stop.

II. BASIC CONCEPTS

Speech recognition technology is a key technology which will provide a new way of human interaction with machine or tools. Therefore the problems that they face can be solved by using speech recognition technology for the movement of wheel chair. This can be realized and optimized with use the smart phone device as an intermediary or interface. In this project interfaces has been designed therefore to develop a program for recognize speech also controls the movement of chair and an application which can handle or manage the graphical commands. This project uses Arduino kit Microcontroller circuit and DC motors to create the movement of wheel chair and Ultrasonic Sensors to detect the hurdles in between

wheelchair and the way of direction. In this project we are using Android Application and Voice Recognition System. But many of individuals with disabilities who need wheelchairs are satisfied with it, few members of the disabled community find it is difficult or impossible for operating a standard power wheelchair. This project is included in assistive technology. For handicapped and depended disable it is more independent, productive and enjoyable living. To perform functions a handicapped person with locomotive disabilities needs a wheelchair that require him or her to move around. They can do so manually by pushing the wheelchair with his/her hands. However many of us have weak upper limbs or find the manual mode of operating too tiring. Therefore it is desirable to provide them with a motorized wheelchair which is controlled by moving a voice commands. Since motorized wheelchair is important that it be able to avoid obstacles automatically in real time, it can move at a fair speed. Cost of this motorized wheelchair is affordable for many handicapped people as possible, as well as for organizations that support it. With these requirements in mind we propose an automated wheelchair with real-time Herald avoidance capability. The power wheelchair control interfaces currently still not enough to provide mobility for substantial number of person with disabilities. Through research and design wise, the wheelchair to control development along safe and effective use of the provision independence and self-use mobility. This project will provide disability weight innovative solutions to handle the wheel chairs to use voice interface. This describes a wheelchair which can be controlled only by using the android application and user's voice also. The main aim of this project is to facilitate the movement of the disabled people and elderly people who cannot move properly so with this we can enable them to lead better lives without any problem. Speech recognition is a key technology which can provide human interaction with machines for controlling a wheelchair. This project includes two parts which is software and hardware. It is realized that for input of human voice we are using Android phone as an intermediary. In this project, Ardiuno kit (Atmega 328) is used as controller to control the movement of wheelchair based on the human voice as an input. There are five basic movements of a wheelchair to be applied by the user.

III. WORKING PRINCIPLE

Bluetooth module, motors, microcontroller, and android app to control the wheelchair. The connection between android application and the wheel chair is done using Bluetooth. Firstly, power Supply is given to all the components. Secondly, the user gives the voice commands from the android app to the microcontroller through the Bluetooth module by paring with the device. Bluetooth module converts the voice command to binary format and sends to the microcontroller which acts as a master. Then microcontroller executes the commands received from the Bluetooth and sends the ... driver and finally the DC motor starts moving the wheelchair. In this project Android application is ... r connection the HC-05 module is used inside Microcontroller. This shows the system architecture which ... use two features provided in application at Voice mode and these commands will be forwarded to the ... Bluetooth. We have used battery as power supply which helps to accommodate large distance. In this ... of commands and match that commands with user input and perform action like moving Left, Right, ... s Connection of application to Microcontroller. In this Module Android application is started first and ... the Bluetooth. After starting the HC05 module we will get the list of devices near available and need to ... connecting it becomes ready to perform action on wheel chair. And third module is Connection of ... le describes the working of microcontroller and actual connection with Device Driver and wheel chair. ... crocontroller initializes the connection with device driver (left and right Motor) and after taking the input ... of bits to the Device driver. The movements of the wheelchair are controlled with the help of an Android ... veloped for this purpose. The android mobile is connected to microcontroller fitted inside wheelchair via ... application gives simple user-interface to the user for voice recognition to control the direction of motion ... corresponding signal is sent via a Bluetooth controller to the microcontroller, which takes actions as a

Fig.1 Android app used for the voice recognition

IV. BLOCK DIAGRAM
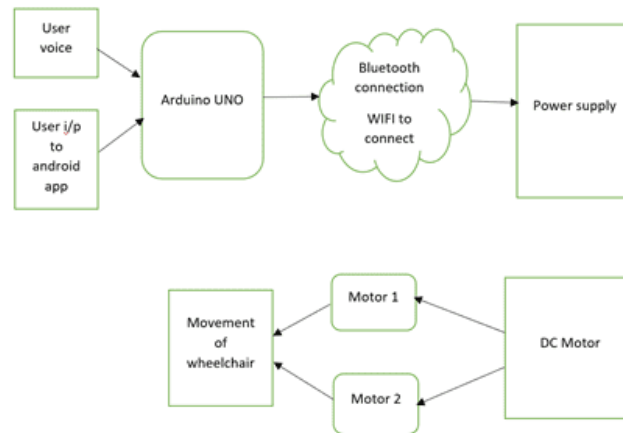
Fig.2 Block diagram of voice controlled automatic wheelchair

V. BLOCK DIAGRAM DESCRIPTION

The voice controlled automatic wheelchair comprises the following units. They are,

1. Arduino
2. HC05 Bluetooth module
3. Battery User voice User input to android app Android phone WIFI and Bluetooth connection   Power control + Microcontroller circuit DC motor circuit Motor 1 Motor 2 Motion of   wheelchair
4. Driver motors
5. Android Phone
6. Keypad (in additional) connected to the motors for movement.

The voice-controlled circuit mainly controlled on the basis of the human voice.

This circuit consists of the android phone where the input to the circuit is give through the user's voice.

For connecting the Bluetooth to the device WIFI (data) connection is necessary.

When the Bluetooth is connected then the users voice is identified and reacts according to the user's command.

The command is identified and the two motors (motor1 & motor2) connected to the microcontroller and the wheels helps in the motion of the wheelchair.

VI. SIMULATION RESULTS

Fig.3 circuit diagram of voice-controlled wheelchair

Fig.4 Bluetooth interfacing microcontroller

Fig.5 The Voice controlled wheelchair using with the help of android app

VII. CONCLUSION

- The design and implementation of a voice-controlled wheelchair for disabled people using Arduino for controlling the motion of a wheelchair is designed. The direction of the wheelchair now can be selected using the specified voice commands.
- A system that can directly enhanced the lifestyle of a physically disabled person in the community is implemented. This project has many advantages like safety, comfort, energy saving, full automation etc.
- The technology can also enhanced safely for users who use ordinary joystick-controlled wheelchair. These all the drawbacks of the Joystick controlled wheelchair are overcome by this "voice controlled wheelchair".

VIII. FUTURE ENHANCEMENT

- Voice recognition module is used to develop the voice recognition system.
- Voice recognition issues a command to control the movement of wheelchair.
- For movement of wheelchair microcontroller Atmega328 and DC motor circuits were built
- Home appliance control circuit can be interfaced along with the wheelchair.

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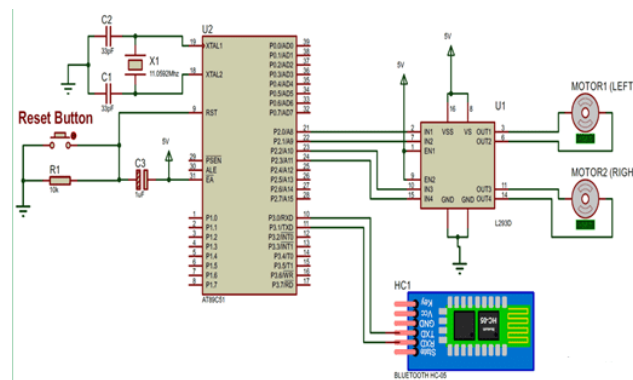[2] Dhawan S. Thakur1 and Aditi Sharma2, Eternal University, Himachal Pradesh, India. (IOSRJECE) EISSN: 2278-2834, p-ISSN: 22278-8735. Volume6. Issue 1 (May- June. 2013), PP 65-75. www.iosrjournals .org.

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