IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

VOICE CONTROLLED WHEEL CHAIR USING ARDUINO UNO

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ABSTRACT

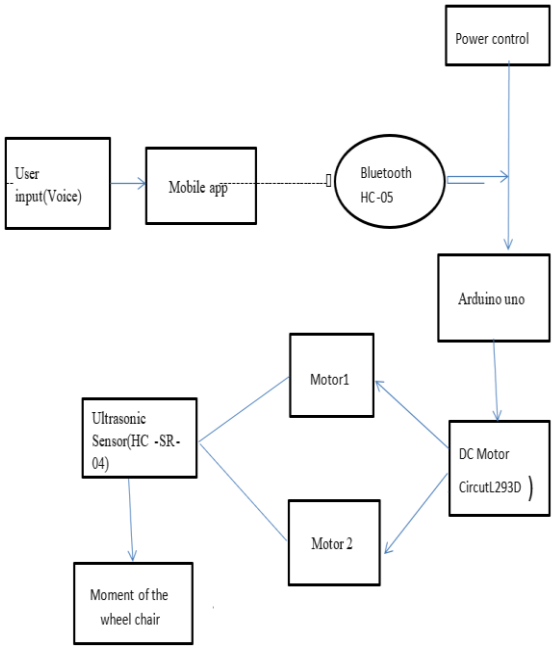
The main objective of VOICE CONTROLLED WHEEL CHAIR SYSTEM project is recommended to control a wheel chair by using speech recognition module. The system is designed to control a wheel chair using the voice of person. The objective of this project is fascilate the movement of people who are disable or handicapped and 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 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.

Keywords: Speech recognition, Robot, Bluetooth

1.INTRODUCTION

In the past ten years, there have been considerable efforts to achieve the hand-free control of computer. There are actually two ways to control computer and robots on a hands free basis as voice commands and gesture commands these hand-free input methods have been considered as an alternative to the traditional keyboard inputs. The main objective of this paper is to be implementing a voice recognition system onto a Robot (Wheel chair) for controlling its movement with a high degree of accuracy and robustness. The user will be able to control the Robot (wheel chair) by speaking instructions to android mobile which is considered to a computer (Microcontroller in the person section through the voice recognition system), which extract the command and pass it to Robot (Wheel Chair) through Bluetooth network and internet connections.

2.BLOCKDIAGRAM:



3.EXISTING SYSTEM AND PROPOSED SYSTEM:

People have disabilities with their hands, foot and lower extremities because of which they are unable to perform regular tasks. Many technologies are available to overcome this problem. To overcome this problem, there are several applications in the market which help handicapped people to perform their tasks. [1] Proposed design supports voice activation system for physically disabled persons incorporating manual operation. If a person is handicapped, they are dependent upon others for their day to day operations such as orientation etc.

PROPOSED SYSTEM

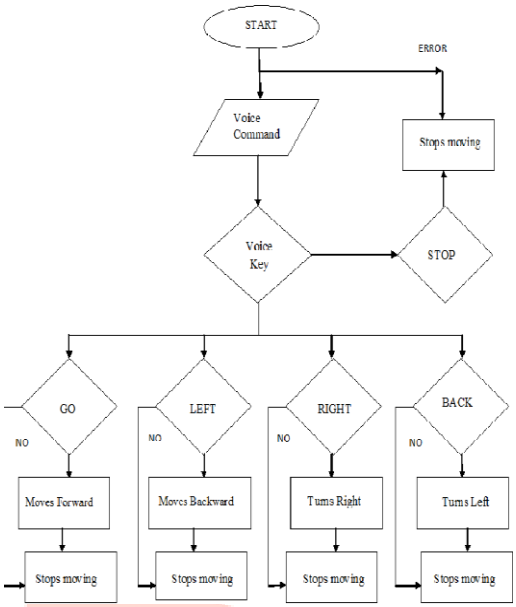
The purpose of this paper is to develop a wheelchair which will move as per the user's commands. This system works on voice commands given by the wheelchair user. The system is fully independent as the user do not need any other person to help him to move the wheelchair. There are basically five commands, which command is given by the user, accordingly the wheelchair will move. The voice commands of the user is recognized in the first step. Once it is recognized, the commands are converted into its equivalent instructions which drive the system. This system consists of two major modules namely Voice recognition module and motor driving module. The voice recognition is done through voice recognition module. The output of this module is directed to Arduino which uses a motor driver IC to drive the motors. The voice controlled wheelchair works using unilateral mic, voice recognition module, Arduino and motors. The input to the system is the unilateral mic. It's capable to take user's voice commands and not bother about other noises. The mic will be placed as per the user's comfort. The output is in the form of voice signals and is transferred to the voice recognition module which acts as an interface between mic and Arduino. The Arduino then receive the output from voice recognition module thus converting it into binary code. The system is unable to understand any language other than binary code. Thus, the generated voice command is converted into machine understandable form. This system uses the Arduino uno R3. It is connected with motors to drive the wheelchair anywhere. Motors are responsible for the movement of wheelchair. Hence, motors receives input from the Arduino and depending upon the instruction type, motors moves accordingly. This system uses two motors connected with motor driver. There are five different instructions that can be given to the motors, they are forward, backward, left, right and stop. The movement of wheelchair depends only upon these five commands The wheelchair responds to the voice command from its user to perform any

movement's functions. The basic movement functions include forward direction, left and right turns and stop. In order to recognize the spoken words, the voice recognition processor must be trained with the word spoken out by the user who is going to operate the wheelchair.

4. METHODOLOGY

The voice recognition module is the key feature of this project that is used to setup the desired voice command and output. It consists of three phases, which is voice customization, voice capture and voice recognition. Voice customization is the process of matching the desired voice recorded to the desired output signal. Voice capture is the phase that records the desired person's voice command and saves the voice based on the customization configuration. The voice recognition phase is the final phase where when voice command has been recognized, this module will send a specific signal to the microcontroller for the necessary operation. The voice instructions are recorded via serial communication with the PC using Access Point communication software with baud rate of 9600. After the connection of the voice recognition module to the PC is successfully implemented, the existing voice instructions are deleted by sending hex command AA 01. The recording is started with the desired voice command in group 1 by sending the hex command AA 11. After this command has been sent, user is required to record a total of five voice commands in order to complete the group recording. On completion of the voice capturing phase, verification is required by sending the hex command AA 21 to import group 1 into the voice recognition module. The recorded voice command is verified again by repeating the five commands that has been recorded earlier. Figure 3 shows the returning result of the voice verification after each command has been verified successfully by the module. The five voice commands used are: Forward, Backward, Turn Left, Turn Right and Stop. The HC-05 Bluetooth module is used as the wireless transmission medium between the microcontroller and the voice recognition module in controlling the wheelchair movement. This will eliminate the need for long and messy wiring.

5.FLOWCHART



6.ADVANTAGES

- The patients like quadriplegic and cerebral palsy, lack of force, can easily handle this voice controlled system.
- The use of Arduino make the programming of the system easy and thus, reduced the software and hardware interfacing problems.
- The system can be operated by giving synthetic voice commands.
- The system is fully automated because of the use of Arduino and motor drivers.

7.RESULT

The project was tested for the movement of the wheel chair using trained voice after the design and development of the self-automated wheel chair with its various interfacing units.
velocity by means of control commands this design is experimented. This would be implemented for disabled people.
Every word was correctly recognized number of times the system had enough examples and properly determined what pronunciation the user speak of the word.

Correctly recognizing the words when the music was light but the recognizer found it difficult to recognize the user‟s voice when we turned the volume high and often took commands from what it heard in the song.

8.APPLICATIONS

- Health Sector
- Home
- In day-to-day life

9.CONCLUSION

i. The design and implementation of a voice controlled wheelchair for disabled people using arduino and voice recognition module for controlling the motion of a wheelchair is designed. The direction of the wheelchair now can be selected using the specified voice commands.

ii. The design not only reduce the manufacture cost compared with present market but also will give great competitive with other types of electrical wheelchair. The only thing needed to ride the wheelchair is the synthetic voice commands of the person.

iii. 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.

iv. The technology can also enhanced safely for users who use ordinary joystick-controlled wheelchair, by preventing collision with walls, fixed objects, furniture and other people. Thus all the drawbacks of the joystickcontrolled wheelchair are overcome by this "voice controlled wheelchair".

10.FUTURE SCOPE

This system will be a Real-Time Voice controlled Wheelchair for the physically disabled person. This system will be designed to operate the wheelchair based on the voice of the user and control the movement according to the command given by the operating person. The voice would be given through a unilateral mic and would be converted into binary format by voice recognition kit. Thus this binary format would be checked with the binary code fed to the microcontroller, if true the command will be performed. More specifically, this system is designed to allow an admin and users to give the voice command to the wheelchair. These command would be performed within seconds. On the whole it's basic operation would be left, right, stop, go, back. Basically it's a wheelchair controlled by voice.

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