Android based Automated Smart Wheel Chair

Varsha Pathak[1], Mrinmayi Pimple[2], Samiksha Jagtap[3], Rohan Awate[4]

1,2,3,4Student, Dept of Computer Engineering, Thakur Polytechnic, Maharashtra, India

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Abstract - *Our project is specifically related to the Smart Android phone handling the wheel chair system using application. The wheelchair System is recommended to control a wheel chair by using the android application in the mobile device and system. The system is designed to control a wheelchair by using an android device. The objective of this project is to facilitate the movement of disable people or handicapped and also the senior people who are not able to move well. The result of this design will allow the special people to live a life with less dependence on others. Android technology is a key which may provide a new approach of human interaction with machines or tools. Thus, their problem can be solved by using android technology to control the movement of a wheelchair.*

Keywords: *Android Application, Wheel chair, physically Challenged, IR Sensors, Voice Command, Bluetooth, Arduino Micro-controller*

1. INTRODUCTION

In this project we are using Android Application. But many of individuals with disabilities who need wheelchairs are satisfied with it, few members of the disabled community find it is difficult for handling a standard power wheelchair. This project is been designed 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 perform movements He/she needs to move the wheelchair manually by pushing the wheelchair. Many of the peoples find tiring to operate the wheelchair manually. So, we can provide them a motorised wheelchair which is controlled by Bluetooth device and android phone. Since motorized wheelchair is important that it be able to avoid obstacles automatically.

2. RELATED WORK

Several studies have concluded that the independent mobility or movement which is included powered wheel chair, manual wheelchair and walker access the benefit to all the disabled human beings. Independent mobility increases vocational and educational opportunities, reduces dependence on other members, and promotes feelings of self-reliance and in dependability. The lack of exploration and control often results into a cycle of deprivation. For aged people, independent movement is an important aspect of self-esteem and plays a vital role in "aging in place." Mobility difficulties led to the problem of activities of daily living (ADL). Which leads to mental and social isolation, and many mental problems. The needs of disable people can be satisfied by manual or self-automated wheelchairs, a segment of the disabled community finds it difficult or impossible to use wheelchairs independently. The disabled population includes people with low vision, visual field reduction, spasticity, tremors, or cognitive deficits. For accommodating this population, many researchers have used technologies to developed power wheelchairs. Which have been designed in different ways, such as assuring collision free travel, aiding the performance of specific tasks (e.g., passing through rooms), and independently transporting the user between locations. The use of this new technology in associated with a mechanical system in order to make everyone's life simple and independent which would spark interest in the developing modern society.

3. PROPOSED MODEL

The main aim of this project or application is to facilitate and increase the ability of disable people who can not fuction or move well. Using this wheel chair will allow handicapped people to move freely and independently without depending on others for their movementas adaily routine.This can be realized and optimized with use the smart phone device as an intermediary or interface. In this project GUI has been designed for interaction with the disable person. This project uses arduino kit Microcontroller circuit and DC motors to create the movement of wheel chair and IR Sensors to detect the obstacles in between wheelchair and the way of direction.
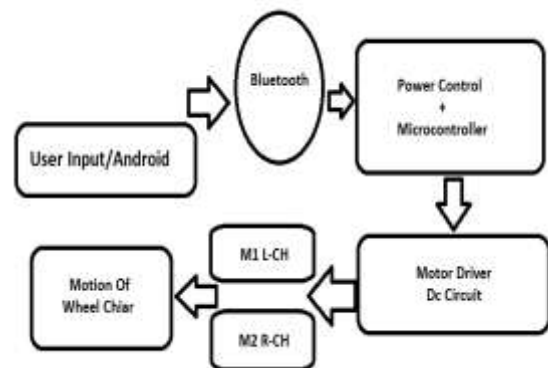
4. WORKING OF PROPOSED MODEL

Fig.1: Block Diagram of Android based Wheelchair.

This project will provide disability weight innovative solutions to handle the wheel chairs to use voice interface. . This project describes a wheelchair which can be controlled only by using the android application and user's voice also. The main focus of this project is to simplify the movement of the disabled people and old or young people who cannot move properly so with this we can facility them to lead them live freely without any problem. This project includes two parts which is software and hardware. It is realized that for input of human action we are using Android phone as an intermediary. In this project, Arduino kit (ATmega328p) is used as controller to control the movement of wheelchair based on the human voice as an input. The five basic movements of a wheelchair to be utilized by the user. The Five operations perform by the wheelchair are described as following:

1) Moving forward

2) Moving backward

3) Turning to the right

4) Turning to the left

5) Stop condition

5. COMPONENTS REQUIRED

5.1 Wheelchair battery: The battery is used in this work is wet type. To create electrical energy, we required chemical reaction between lead and sulphuric acid which use wet batteries. It has higher maintenance rate but are lighter than AGM (Absorbed Glass Mat) or Gel batteries.

Fig.2: Battery.

5.2 Wheels: Wheelchair has two rear wheels. Universal wheel is fixated in wheelchair base in front both wheels have the same diameter. The two rear wheels are drive using two DC motor connected to each wheel. The instructions are passed through micro-controller to the motor, the wheels rotated in the specific direction.

Fig.3: Wheels.

5.3 Motors: Motors are arguably one of the most important parts of a mobile robotics platform. Excessive use of motors can cause waste of electricity from the on-board batteries. At critical times undersized motors could be short on torque. There are various shape and size of motors Figure shows the 12V DC motor use in wheelchair. The 12VDC motor is connected to the wheels and driver of the microcontroller ATmega328p. One Driver is sufficient to control two motors simultaneously.

Fig.4: Motor.

5.4 Bluetooth Device: Bluetooth device is a main component from which the connection is to be made. It provides security as one device is connected at a time. Frequency is of 2. 4GHz.It is much more cost effective. Used for serial communication between android device and the wheelchair

Fig.5: Bluetooth Module

5.5 Motor Driver: It is an interface between the DC motor and the microcontroller ATmega328p. The commands are processed further to ATmega328p towards driver and executed by DC motor to rotate the wheels in specific direction or to stop. VI) IR Sensors: Sensors is used to detect the obstacle from specific distances and alert the user about it. They are highly effective and efficient.

Fig.6: Motor Driver

5.6 Solar Panel: Solar panel is used for charging battery.

Fig.7: Solar Panel

6. ADVANTAGES

This project describes the design and develop. We are providing GUI for a wheelchair application which is based on android app. A Scope of Project.

- To develop wheelchair system by using Visual Basic for wheelchair control.

- To design and develop an android app through which we can operate a movement of wheel chair Using android device.

- To implement and use the system so that users voice as an input to control the mobility of wheelchair.

- Helps to implement movement for disabled people and aged people who can't move properly.

- Less Complexity and Hardware to mount.

- Can be mounted on the existing wheelchair.

- Wireless control helps to monitor the wheelchair.

- Reduces manpower and dependency on other human drive.

- Wheelchair is compact and economical.

- It provides smooth movement for physically challenged people.

- Low power consuming and easy to operate the wheelchair.

7. RESULT

It is a overall implementation of hardware system. The main components are Bluetooth, Arduino kit, Bluetooth, Microcontroller, l23D9 Motor Drivers, wheels, Universal wheel, sensors, alarm etc. there are particular devices used for interfacing every device with each other perfectly. So that the wheels of the chair move as per the user's requirement.

This is the downside view of the wheelchair we implemented. Two wheels are used which gives the moment to the chair as per the D.C. Motor gets instruction from the driver. The universal wheel moves as per the force and movement of the motor connected wheels.

Fig.8: Android based Wheelchair

8. CONCLUSIONS

By using an Android app, we have successfully designed and implemented a motorized wheelchair. For most of the commands (over 95%).

However, for a fool proof backup in this case the joystick can always be used.

This project will help all the disable people who are dependent on wheelchair for their mobility.

All the common man can reach out for this smart wheelchair to become independent for mobility if they hold a smart phone.

Wheelchair is simple to operate and does not need any external help.

9. FUTURE SCOPE

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 circuit were built. For not to occur disorder during recognize the user voice, this system works in a quiet environment. Furthermore, the pronunciations accuracy must be ensured and the word-related (voice) the users voice must clear in short distance on microphone was essential in this innovation.

• Using gear box we can produce high speed moving wheelchair.

• PWM modulation can also increase speed.

• Solar Panel can also be used to charge the battery for power supply to the components required to drive the wheelchair.

• The wheelchair can also include the gesture feature to operate the wheelchair.

• Wheelchair only can function properly when the weight of the load for this system must be below 50 kilogram. Obstacle avoidance sensors are used.

10. REFERENCES

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