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Voice and Gesture based Wheelchair using AVR

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***Abstract*—Wheelchairs are useful for people for whom walking is difficult or impossible because of some illness, injury or disabil- ity. There are differing kinds of wheelchairs. Manual wheelchairs are pushed using their handles. Motorised wheelchairs, are driven by joystick. Voice-controlled wheelchairs are the most recent development. These is driven just by giving voice commands. A more advanced and intelligent version of the wheelchair is controlled directly through human mind, like the one utilized by renowned scientist physicist. The special needs of the elderly may differ from that of a physically challenged person or an outsized individual but all of them have "special needs" and sometimes require some assistance to perform their daily routine. The physically challenged people, who use a standard wheelchair for navigation, usually require an external person to maneuver around. during this busy world, the elderly people could also be left alone reception and also might not find an apt person for external help. Here comes the necessity of an automatic home navigation system, which consists of a wheelchair which might be utilized by the elderly and also the physically challenged people without the assistance of an external person. The proposed system may be operated using voices and therefore the gestures of the provided android movable. a very important feature is that the private security of the one that is using the wheelchair is additionally taken care. If the person feels uncomfortable or insecure, he can send a message to a predefined number using the speech to text function within the itinerant.**

Keywords: Automatic wheelchair ,Safety, ATMEGA328

I. INTRODUCTION

Smart robotic wheelchair features a great significance in lifetime of a disabled person. With several merits, a wheelchair becomes a dilemma for a disabled person when involves self- propulsion. This project describes a cost-effective solution of robot control systems. The presented wheelchair system are often used for various sophisticated robotic applications. The system comprises of two major units. the primary unit could be a simple user's of hand gesture unit. The second unit is Voice command unit.so we use both application in our project.one can control movement of chair using Voice command or Gesture movement. Also emergency feature add in our project for any emergency happen user can press switch so authorise received notification on mobile using Internet of thing technology. for that we is blynk server for receive notification.

II. MOTIVATION

The aim of this Project is to design an automatic wheelchair for those people who have Physical disabilities in both de- veloped and developing countries .This style also makes it easier for users to vertically adapt the wheelchair seat totheir needs. While several automatic wheelchair prototypes are published in various research works, they are not so available in the current market that they can bebought and used by Normal people for their personal purposes. For this purpose, an integrated device based on a microcontroller and AVR is designed to comfortably control the motion of the wheelchair along with the seat's vertical .

Objective

The overarching goal of this project is to help chronically disabled people regain their independence by teaching them how to use a power wheelchair on their own with taking care of all safety Majors.

System Implementation

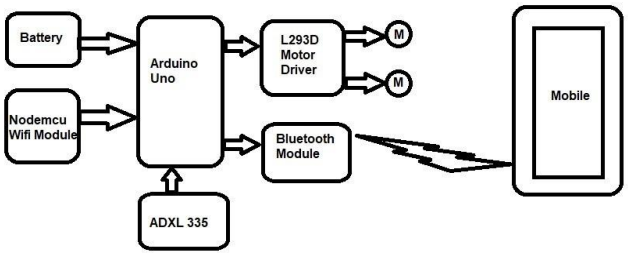

Fig. 1. BLOCK DIAGRAM

- In our Project ,Arduino Uno is main part our project. ADxl335, L293D motor driver, Bluetooth Module interface with Arduino Uno. Depending upon signal coming from ADXL335 Arduino Uno process these signal and send sig- nal to motor driver for motor move direction like Forward, Reverse, Left Right.
- We also Bluetooth module connect via Bluetooth to android mobile for voice command. Using voice, we able change direction of wheelchair so both method we used in our project depend upon requirement of wheelchair user. For voice command we use Android app with the help of android app like Bluetooth terminal we able to send voice command to bluetooth module .Bluetooth module receive signal command from android mobile send signal to Arduino Uno board for process received data then signal send to motor driver for change direction.
- We also used Nodemcu Wifi module for send notification to authorise person if wheel chair person happen any emer- gency. Then press emergency switch then notification send to authorise person with the help of nodemcu wifi module using internet of thing technology. For that we use blynk server for received notification.

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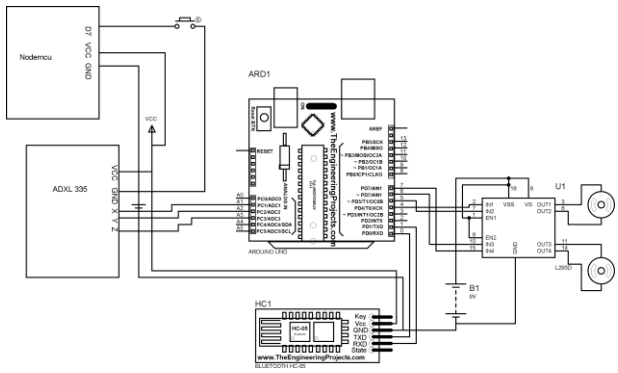

Fig. 2. CIRCUIT DIAGRAM

III. METHODOLOGY

In this proposed method, we presented a Automatic wheelchair model for the Handicap and those patient who are disabled in some body parts. We found it difficult to Manage their own work Therefore, the purpose of the project is to build a Automatic wheelchair for the people to complete their own work independently with caring all safey measures.

Automatic wheel chair

- In this system we are going to build Wheel chair.
- The main component of this project is Arduino uno as a ATEMGA 328 .
- The wheelchair Performed the action using the voice controlled or through the hand gestures .
- We declared the command as a Move forward, Move Backward,left and Right snd stop . By using this command the patient operate the wheelchair
- If the patient was disabled by their voice then he operate the chair using the hand gestures .

SAFETY MEASURES :

- In this system we are going to build the safety factors for the wheelchair
- By using the Nodemcu ,Bluetooth module and wifi module we track the location and give the emergency message to the patients Relative.

Input 1 = HIGH(5v)	Output 1 = HIGH	Motor 1 rotates in Clock wise Direction
Input 2 = LOW(0v)	Output 2 = LOW	
Input 3 = HIGH(5v)	Output 1 = HIGH	Motor 2 rotates in Clock wise Direction
Input 4 = LOW(0v)	Output 2 = LOW	

Input 1 = LOW(0v)	Output 1 = LOW	Motor 1 rotates in Anti-Clock wise Direction
Input 2 = HIGH(5v)	Output 2 = HIGH	
Input 3 = LOW(0v)	Output 1 = LOW	Motor 2 rotates in Anti -Clock wise Direction
Input 4 = HIGH(5v)	Output 2 = HIGH	

Input 1 = HIGH(5v)	Output 1 = HIGH	Motor 1 stays still
Input 2 = HIGH(5v)	Output 2 = HIGH	

Fig. 3. COMMAND FOR MOTORS

IV. SOFTWARE

REQUIRED 1.**ARDUINO IDE**

The Smart Wheelchair is simple to make and basically eco- nomical. We wanted to make it cost effective and we develop the basic sensor and easy constructed. Code is very under- standable and even people having very basic programming knowledge could fix it.The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board.

2. BLYNK APP

In our venture we utilized Blynk App make notice when somebody before robot at that point notice send on client portable. At that point we open camera server connected on robot see what happen on robot location. For this working we require Web at both site.so we web of things include included in our project.

3. ARDUINO VOICE CONTROL

Arduino voice control app uses android mobiles inside voice acknowledgment to pass voice commands to your smart wheelchair with Bluetooth Serial Modules and sends within the recognized voice . Using voice control app , we able change direction of wheelchair .Bluetooth module receive signal command from android mobile send signal to Arduino Uno board for process received data then signal send to motor driver for change direction.

V. ADVANTAGES

- Reduce Manpower
- Independent
- User Friendly
- Less Hardware Requirement

VI. RESULT

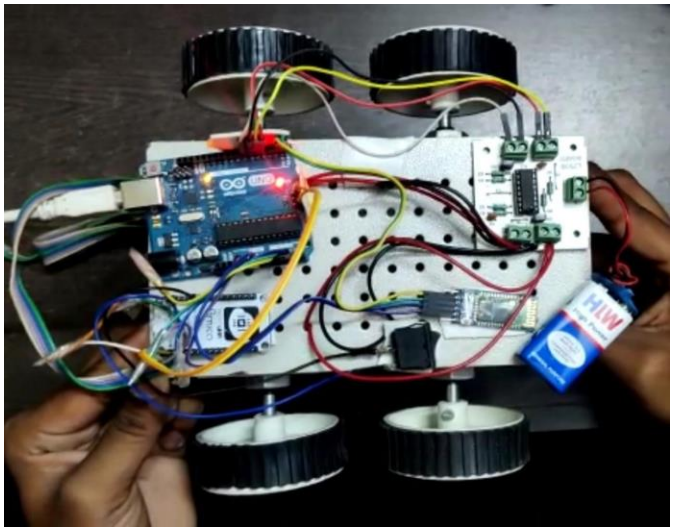

Fig. 4. HARDWARE SYSTEM FOR AUTOMATIC WHEELCHAIR

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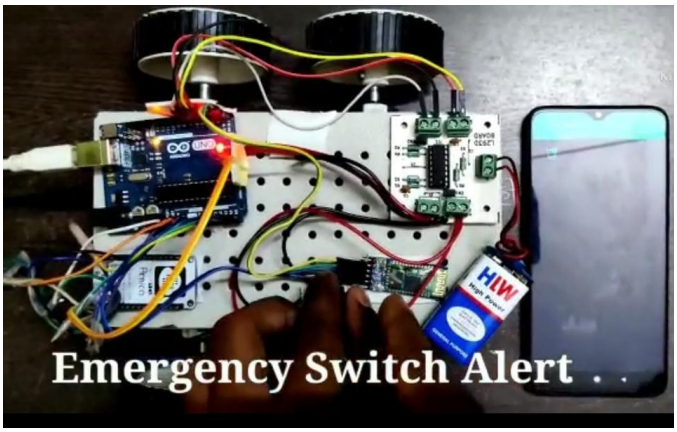

Fig. 5. EMERGENCY SWITCH ALERT THROUGH BLYNK APP

VII. CONCLUSION

Here we've rendered a wheelchair for both elderly and also the physically challenged with a varied physical disability. people who can't speak, but have their hands in working condition they can move using their hand gesture system. people who can't see on the screen of portable, but another time, have their hands in working condition, can use the gesture controlled input where just by tilting the handset also they operate or perform their action using the voice controlled system .

VIII. REFERENCES

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