IoT Based
Smart Wheelchair

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Abstract:- Main goal of the SMART WHEELCHAIR project is to control a wheelchair using a voice recognition module (HC-05). This system is designed to control the wheelchair with a human voice. The aim of this project is to facilitate the mobility of people with disabilities and disabilities, as well as elderly people with mobility difficulties. The goal of this system is to allow certain people to live their lives less dependent on others for their daily movements. Speech recognition technology is a key technology that gives new ways of human interaction with machines and tools. So, using voice recognition technology in the movement of the wheelchair can solve the problem they are facing. This can be achieved and optimized by using a smartphone device as an intermediary or interface. This project uses an Arduino UNO microcontroller circuit and four of his TT DC motors to generate movement of the wheelchair and an ultrasonic sensor to control the movement of his hurdles between the wheelchair and the direction detect. The results and analysis of this innovations are explained in this paper. This result indicates that the module can be used in future research work and develop excellent innovations to meet market demands and public interest.

Keywords:- Android Application, Wheel Chair, Physically Challenged, Ultrasonic Sensor, Voice Command, HC05 Bluetooth Module, DC Motors, Arduino UNO Microcontroller BO(Battery Operator).

I. INTRODUCTION

This project uses an Android application and a speech recognition system. Although many of the disabled people who require wheelchairs can move around comfortably, some members of the disabled community find it difficult or impossible to maneuver a standard power wheelchair and very few people do. This project is assistive technology. This can be done manually by pushing wheelchair manually. However, many of us have weak upper limbs or find manual operation cumbersome. It is therefore recommended to provide an electric wheelchair controlled by movements and voice commands. To move at a suitable speed, it is important that the power wheelchair can avoid obstacles automatically and in real time. The price of his Electric Chair is affordable for many people with disabilities and the organizations that help them.

With these needs in mind, we propose the wheelchair with real-time herald avoidance. The power wheelchair control interface is not yet sufficient to provide mobility for a significant number of people with disabilities. Through research and design, the wheelchair aims to be developed for safe and effective use. This project offers an innovative solution for handicap weights to operate a wheelchair and use a voice interface.

II. LITERATURE REVIEW

According to a review posted by means of Mohammed Hayyan Alsibai[1], there are many technology for wheelchairs. It makes a speciality of two important features: human-device interface and navigation methods and devices. It also critiques other smart systems together with monitoring and safety systems.

Ghorbel et al. [2] explained the collaborative control of the smart wheelchair. Their implementation shows that a wheelchair seeks to enhance the lives of physically impaired humans as well as their households.

Deepak Kumar[3] explained the collaborative manage of the clever wheelchair. Their implementation suggests that the proposed day/season based machine is green in interacting with the living surroundings. thus, they may be capable of make a chair that acts as a moving chair and a wheelchair.

A. Sanjana, k. Sree Amrutha Valli[4] offers a Bluetooth-controlled wheelchair that gives a effectively available and one-of-a-kind varieties of features. They offered wheelchair which can be finished by using appending new advanced sensors, so as to make the wheelchair multiplied friendliness and to refrain from tragedy by using learning-self. Protection can be incorporated for retrieval with the assistance.

III. MOTIVATION

This research aims to provide an automated, safe and convenient assistive technology/advanced intelligent assistive technology solution that enables mobility impaired elderly and disabled individuals to move independently without assistance. It is intended to be Person's commands, in the form of voice, written information, or hand gestures, are captured by wheelchair's artificial brain and converted into control commands telling the wheelchair where to go. For an artificial brain to work properly, it needs to know the environment it is working in and the coordinates of the different locations a chair might occupy.

IV. OBJECTIVES

- Provision of facilities for people with physical disabilities, such as those with physical disabilities and the elderly.
- advanced a wheelchair that may be controlled
- through voice and Bluetooth.
- To relieve people pushing wheelchairs.
- Improve ease of movement from one location to another.

V. PROBLEM STATEMENT

Disabled people have difficulty moving in manual wheelchairs. Patients waste a lot of energy operating manual wheelchairs. Caretakers gets tried from constantly pushing the wheelchair with the patient. An elderly or disabled person always sits in a fixed position and he feels back pain. The patient cannot rest in a wheelchair and is easily injured while sleeping.

➢ *Cause of Problem:*

The motive of these issues is the dearth of mobility in manual wheelchair designs. In truth, a standard wheelchair includes a mass of approximately 30 kg or more. Doubles when affected person sits down. This makes it possible for disabled people and patients to transport wheelchair with luggage. similarly, the caregiver also receives worn-out while pushing the wheelchair with the affected person for a long time. Also, wheelchairs are designed for sitting only, not for resting. The seating position of wheelchair cannot be adjusted either. Therefore, the patient must be transported from the wheelchair to the bed.
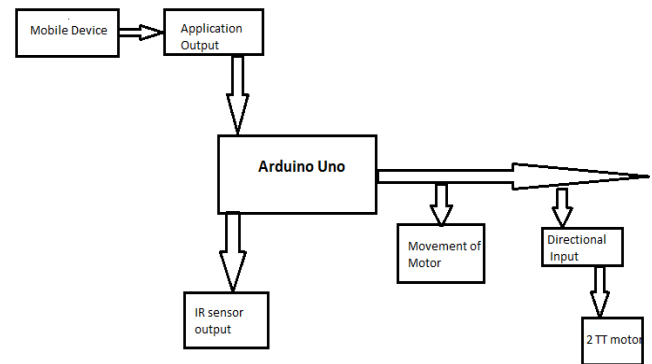
VI. PROPOSED SYSTEM

Fig 1. proposed system
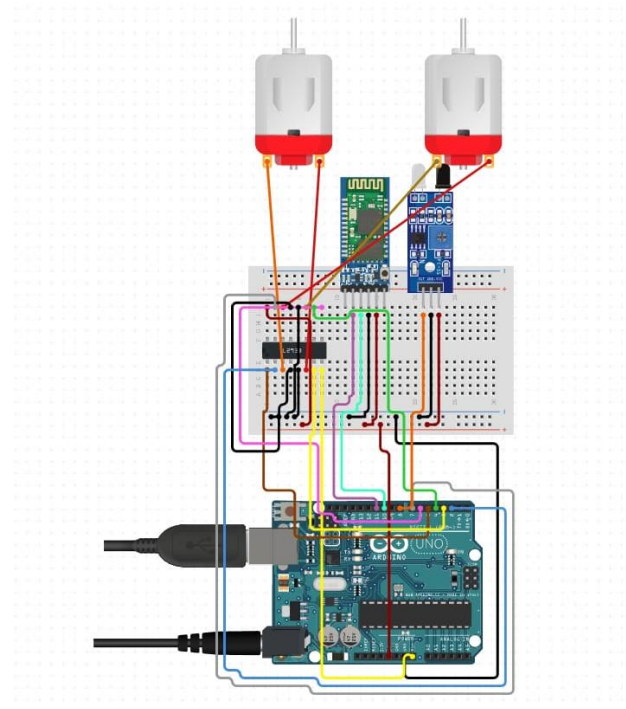
VII. BLOCK DIAGRAM

Fig 2 block diagram

VIII. WORKING

It has a combination of 2 back wheel with BO motors interfaced which operates according to the input received from the Arduino UNO. The data which is transferred to Arduino is from mobile application, which has a functionality to transfer data via Keypad, Voice and Mobile Gyro. The movement can be any command e.g. Forward, Backward, Right Turn, Left Turn etc. Which will be further explained. It has function like location tracking for family members to track the position of the patient and an emergency Stop Button to avoid any accidents.

Working

Case 1:- When we need to transfer data using Keypad on application:- For transferring data from mobile application to arduino using Keypad there are options available in keypad to switch in all the directions. The front key on keypad when pressed moves the wheelchair in forward direction and hence all the movement in wheel chair is obtained so on.

Case 2:- When we need to transfer data using voice activation:- For transferring data from mobile application to arduino using Voice there are options available in mobile to activate it after activation when we give a command of "Forward" the wheelchair will start to move in forward direction and hence rest commands like left, right and backward will be performed. We have tried to implement hindi and Marathi commands like "Aage" for front, "Pechey" for backward and similar for rest of the commands. Same way we have made efforts for implementing Marathi commands too.

Case 3:- When we need to transfer data using Mobile Gyro sensor :- For transferring data using Gyro sensor we need to activate it using mobile application where in we get the option to tilt our mobile device in either of 1 direction that can be right, Left and so on, so according to the tilt in gyro the wheel chair will move and will let us achieve the movement we are in need of.

Case 4:- Option for Tracking the wheelchair by family members from a long distance if required :- This is one of the advance feature of our project where in family members of the patient can locate the location of wheelchair if so required for monitoring their location.

Case 5:- Obstruction detection:- In our working project we have added feature of objects detection which can avoid any accidents that patients might face during operation.

Case 6:- Emergency Stop Button:- The project has an emergency Stop Button to Stop the whole project if so required for any injuries for the patient may occur. It has a switch which will directly cut off the connection between batteries and controller to avoid accidents.
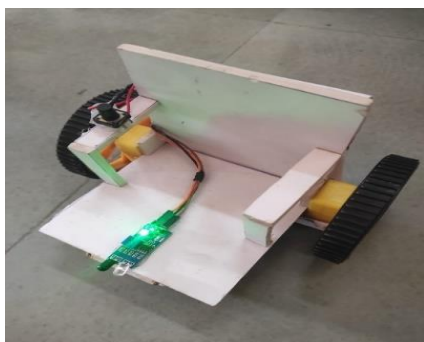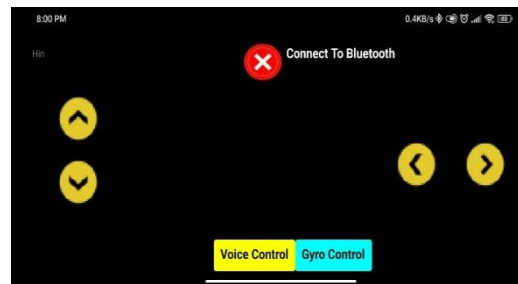
IX. OUTPUT

Fig 3 model output

Fig 4 Application output

X. COMPONENTS

- . Arduino Uno
- TT Motor
- L293d motor driver
- Hc05 module
- MIT app inventor app developer
- Arduino IDE

XI. CONCLUSION

So we will conclude that physically disabled and aged people circulate without any problem whilst use our smart wheelchair. They do now not want to rely to other's help anymore to move from one to some other location. In addition to this, they do not want to have any extra abilities to perform this smart wheelchair due to the fact it is able to be operated simply by means of voice command.

This wheelchair additionally reduces the electricity wasted by way of patient to perform the chair. They just can manage the wheelchair with patient with simply the smartphone in a selected distance the biggest undertaking is to lessen the cost to make the task more accessible for anyone.

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