Smart Voice Controlled Wheel Chair for Covid19 Patients

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Abstract: *This paper presents a new way of helping the mobility of the Covid 19 patients with the aid of tech. We have developed a wheelchair which can be operated in manifold ways without the need for human force. This paper describes the way we achieved to implement voice control, button control, and gesture control and even mind control (in future iteration). This paper also describes the safety measures we implemented to ensure safe .safety and well-being of the individual by implementing obstruction 6detection, live streaming and emergency messaging system. This paper also describes our goal of being able to offer our tech to the most people possible and thus our aim of keeping the cost of production low and making an affordable product for the masses.*

Keywords — *Affordable, Arduino, Gesture Control, Obstruction Detection, Smart Wheelchair, Voice Control*

I. INTRODUCTION

The Covid 19 patients can't be touched by others

The wheelchairs, available in market, we need to carry another person to pull the chair, but always it not possible.

All disable person can't drive a wheelchair and faces many problem in their daily life.

A wheelchair basically provides help to those people, who are disabled and can't move one place to another place.

And our product SMART VOICE CONTROLLED WHEELCHAIR[1][2][3] is here to help those people who can't move, can't Speak, can't see or cant hear .

This product can help doctors and medical staffs who

Ease of Use

- VOICE CONTROLLING SYSTEM
- CONTROLLING BY REMOTE
- URGENT AND IMMEDIATE MESSAGING AND CALLING SYSTEM FOR EMERGENCY SITUATION
- SAFETY BELT
- AFFORDABLE PRICE
- LOCATION TRACKING SYSTEM
- CALL TRACKING SYSTEM

- VOICE CONTROLLING SYSTEM –

The voice controlling system based on some voice commands (discussed below) to move the chair one place to another place.

This feature is basically for those people, who can't walk, can't move without others help but can speak properly.

In this phase we used an android app for taking commands from user and the command passes through an ARDUINO UNO board followed by a Bluetooth module HC05 Controlling via Remote[5][6].

The Controlling via remote is basically a Remote controlling system, which will help the people, who are disabled and also can't speak. They can move the wheelchair by using the remote control. The remote control, consisting of four buttons.

Location tracking System :

The location tracking system is for taking care of the patient, if any unwanted situation occurred, family members can take the care.

UP for FORWARD
DOWN for BACKWARD
RIGHT for RIGHT
LEFT for LEFT

Using this remote control every disabled people (Deaf, Dumb, and Paralyzed) can move from one place to another.

URGENT AND IMMEDIATE MESSAGING AND CALLING SYSTEM FOR EMERGENCY SITUATION

The urgent and immediate messaging and calling system is for emergency purpose of the disabled person consisting of a navigation keypad, attached with the wheel chair.

II. FEATURES AND FUNCTIONS

A. Messaging System

The emergency messaging system contains a number of customized messages for emergency purpose. Like

The key 1 contains I NEED WATER
The key 2 contains I NEED MEDICINE
The key 3 contains I NEED TO GO TO TOILET

B. Emergency calling System

The emergency calling system is for make contact with family members for any emergency situations by Pressing the Button C is for make phone calls safety Belt : The safety belt is for the safety purpose of the disabled person.

Materials and method:

There are two key components involved in making the Smart Voice Controlled Wheelchair: Hardware design and control. A substantial work[7][8][9] needs to be done in each of these areas in order to develop a real wheelchair. The sections below describes the challenges involved in these areas.

Hardware Design

A good hardware design can increase the performance of a wheelchair, and often can make each of the other fundamental issues easier to deal with. Motored wheel have been used to traverse plain[10]. D4e motors of high power supply have been used for the movement.
The motors are connected to a motor shield that allows you to use Arduino to control the working speed and direction of the motor. Based on the dual Full-Bridge Drive chip L298, it is able to drive four motors
The Bluetooth module[14][15] REES52 HC-05, connected with the Arduino UNO module for receive the voice commands wirelessly through the Arduino Voice controller App.

There is a Navigation keypad, connected with the arduino module to receive the emergency message or emergency call from the disabled person. Each key of the keypad contains emergence messages (Like: 1 contains “I want to go to toilet”, 2 contains “ I need water”, C contains “call”) to connect with family members.

An ultrasonic sensor[11][12][13] connected the Arduino module which is used to detect the on road obstacle and make the wheelchair stop to save the patient from accident.

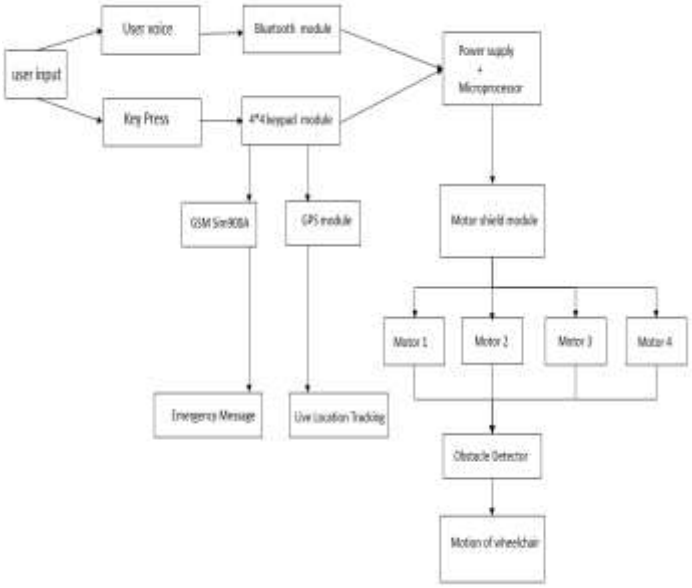

Fig 1: Block Diagram of Smart Voice Controlled Wheelchair

Fig 2: Arduino voice control app

TYPE OF WHEELCHAIR	PRICE
Voice control wheelchair	47,000
Gesture control wheelchair	46,000
Standing powered wheelchair	2,00,000
Electronic Wheelchair	45,000
SMART VOICE CONTROLLED WHEELCHAIR	**25,000**

Tables and Figures can be single or double column. For double column use section breaks.

Fig 3 : navigation Keypad

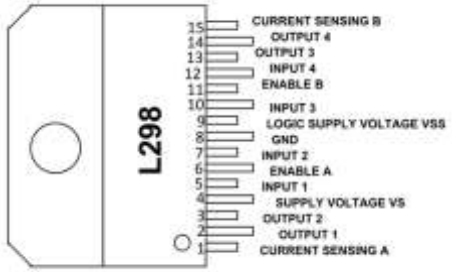

Fig 4: L298 Pin Diagram

ACCURACY GRAPH	
Effectiveness	Existing System
0 to 10	60
10 to 20	56
30 to 40	50
40 to 50	50

Table 1 Accuracy Graph

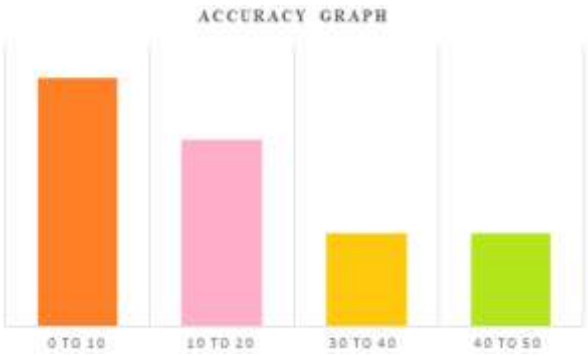

Fig 5: L298 Pin Diagram

We are working on gesture controlling system by thinking about the people who are deaf, dumb and blind.

3) Weight lifting capacity

Weight lifting capacity[17][18] can be increased for fatty people and we are working on it.

Benefits of the Wheelchair

- **Lightweight**
- **Affordable price**
- **Advanced and automated useful features are added**

A. Recognizing commands

The following commands are used to move the Smart Voice Controlled wheelchair

- **Go** for going forward
- **Back** for going backward
- **Right** for going right
- **Left** for going left
- **Stop** for Stop

B. Locomotion control

The results of the commands are imported from the voice in the arduino and accordingly to motion is calibrated. For example, the command right is calibrated to rightward movement of the Wheelchair.

Result and Discussion

After long study, research and survey we came to a final decision and started making our first prototype. After doing all the primary work, development we published our first prototype containing voice controlling system[19][20][21] and navigation keypad for smart and emergency messaging and calling system.

After the Second development we made an Industrial project prototype and added a new feature i.e. obstacle clearing system which is added to save a disable person from accident.

Our smart voice controlled wheelchair is available in very affordable cost which is lesser than all automatic wheelchair available in market. This wheelchair can be used by any disabled person.

After the third phase of our development we added a live streaming and location tracking system which is 1st time in any wheelchair, which is make the process easy to taking care of a disabled person

A price comparison with all kind of automatic wheelchair available is here:-

This low cost smart voice controlled wheelchair with smart messaging[19], calling and obstacle clearing system also having live streaming and location tracking system is can be popular for medical industry.

This wheelchair can be mostly used in orthopaedic centres, old age homes, mental asylum, pathology labs and household.

As the wheelchair is avialable in very affordable price ‘ any disabled person can buy this for their assistance. Some of the achievements related to the application is shown in Fig. 7 and Fig. 8.

Fig 6 : Screenshot of Email of SELECTED FOR TATA STEEL INNOVATION PROGRAME

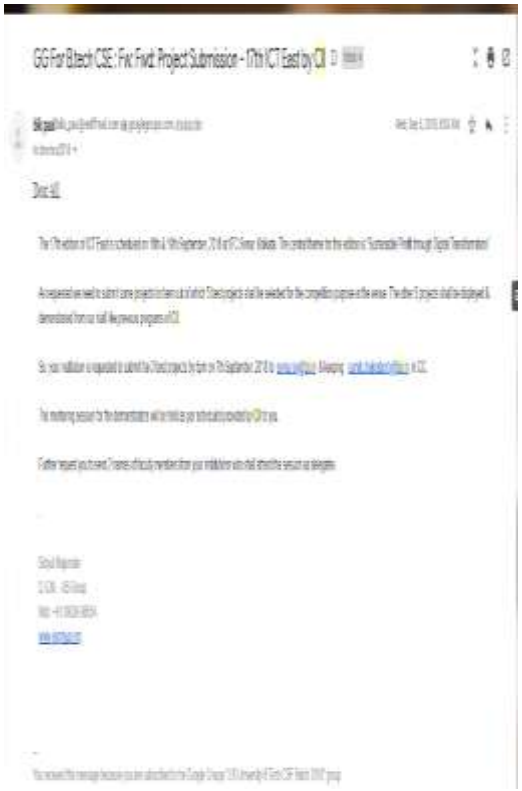

Fig 7: Selection for CII ICT EAST FOR THE PROJECT

III. CONCLUSION

This paper described the successful implementation of a motorized wheelchair controlled by voice. The voice reorganization system works for most of the commands. Only when a word was not properly vocalized, the system did not recognize it.

The project provides the following learning’s:’

1. Control a robot using voice command
2. DC motor working and need for motor driver
3. Working with Bluetooth module

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