

Android Phone Controlled Voice and Gesture Smart Wheelchair.

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Abstract— *Wheelchairs are utilized by the general population who can't scroll because of physical sickness, damage or other incapacity. In the present day's advancement guarantees a wide degree in creating savvy wheelchair. This paper is to portray a wise wheelchair utilizing advanced mobile phone is creating to control the revolution of wheel seat in light of voice and signal development for the physically tested people. In construct voice and motion capacity are utilized to control the wheelchair and additionally by utilizing advanced mobile phone perusing SMS, E-mail, News. The sensors utilized are 8 in which 2 of them are IR sensors the remaining are for temperature, smoke identification and light recognition sensors. This framework that enables the client to heartily interface with the wheelchair at various levels of the control and detecting. The framework is partitioned into 3 primary units are Voice acknowledgment through Android, Gesture acknowledgment through Android, Motor control through flag moulding. The framework depends on gathering an android phone with an AVR small scale controller and sensors.*

Keywords— *Embedded C, Voice Bot, Bluetooth Terminal HC-05, Arduino 1.0.3*

I. INTRODUCTION

In our fast moving materialistic world, individuals need to modernize and gain ground in their lives. The total populace is raising step by step which builds number of seniority and physically tested individuals. These individuals confront bunches of issue to try and explore inside the house without help of outside guides. The wheelchairs are among the most mainstream assistive gadget in therapeutic zone. Along these lines, the interest for wheelchairs has been perpetually ascending in market. The utility rate of individuals with wheelchairs is almost 3.3 million in this world. The current move in mechanical computerized reasoning gives tremendous extension for outlining a mechanized wheelchair. These days the elderly individuals are changing from customary wheelchairs to robotized wheelchairs simple methods for headway Several Researchers are as of now attempting to create mechanical wheelchairs which are more adaptable and can defeat constraints of the conventional wheelchairs. A wheelchair is fitted with an obstruction sensors, temperature sensor, Gas sensor, smoke sensor, engine and advanced mobile phone to help driver to accomplish some autonomous versatility. By simply tilting advanced mobile phone which is with the wheelchair (client) can be moved

in 4 bearings. The hindrance sensor can help the rider control the wheelchair by taking over a portion of the obligation regarding controlling and maintaining a strategic distance from articles until the client can deal with the employment. The approach enables the client to utilize human voice, signal development PDA and synchronize with the development of wheelchair so they can utilize it with solace.

The unpredictability is decreased by making utilization of advanced cell so that size of the framework is extremely minimal. The wheelchair coordinated with voice, motion developments and advanced mobile phone. So impeded individual who can't walk, can drive seat by motion developments utilizing advanced mobile phone.

II. MOTIVATION

In our society we have people who are differently abled. Physically disabled people can move from one place to another with the help of wheelchair, stick or by the help of other human. The technology is developing day by day but no significant developments are undertaken for the betterment of these disabled people. About 70 million people in the world are physically disabled and this disability have always been a challenging task. Wheelchairs are usually used by the physically disabled people to move with someone's help. In order to overcome these problems, we are undergoing the Android phone-controlled voice gesture smart wheelchairs.

III. BACKGROUND AND RELATED WORK

In this paper to propose a new system-prototype in an effort to move the wheelchair on their own. The goal in developing the Automated wheelchair is to try to provide the user to move the wheelchair independently. The thought of realizing Automated wheelchair at low cost lead us to study various papers related to automated wheelchair. Some of the points which caught the sight from referred materials are listed below. The Assisting Wheelchair Navigation System [1] The Wheelchair has application to the development and testing of shared control systems where a human and machine share control of a system and the machine can automatically adapt to human behaviors. The Wheelchair shares vehicle information with the wheelchair operator regarding obstacle avoidance, safe object approach, maintenance of a straight path, and other navigational issues, to reduce the motor and cognitive requirements for operating a power wheelchair. Touch Screen Based Direction and Speed Control of Wheel Chair for Physically disabled [2]. This paper describes an intelligent motorized wheel chair for handicapped person using touch screen technology. It enables a physically disabled person to move around independently using a touch screen application which is interfaced with motors through micro-controller. When we want to change the direction, the touch screen sensor is modeled to direct the user to required destination using direction keys on the screen and that values are given to micro-controller. Depending on the direction selected on the touch screen, micro-

controller controls the wheel chair directions.

IV. SYSTEM ARCHITECTURE

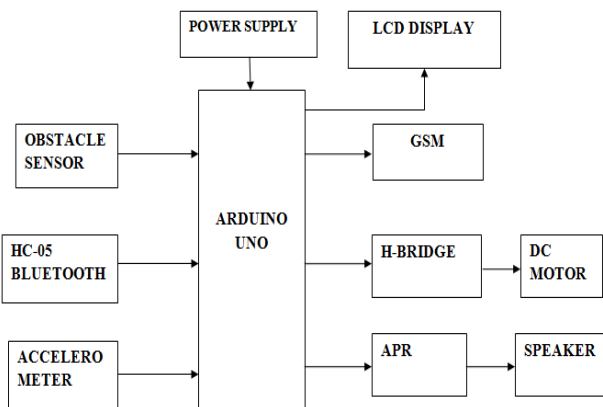


Figure 4.1: Architecture of the system

A system architecture is a comprehensive solution based on principles, concepts and properties logically related and consistent with each other. And it is a conceptual, global, and focused to achieve the mission and life cycle concepts of the system.

The figure 4.1 shows a general block diagram describing the activities performed by this project.

V. IMPLEMENTATION

In the project, made utilization of voice and signal operation utilizing android phone to control the area of wheelchair. The framework is controlled by AVR microcontroller (AT Mega 32). The Panic catch, SMS perusing is controlled by advanced mobile phone. DC engines are connected to the wheels of the wheelchair thus in view of pivot of engine course of wheelchair will be effectively controlled. Engines are interfaced to microcontroller by utilizing engine

drivers. The AVR microcontroller is interfaced with Android phone through Bluetooth Terminal HC-05 App. Depending upon the client, the voice operation or signal operation is finished. In the event that any crisis issue occurred with the wheelchair client by utilizing alarm catch the message (SMS) will be sent to the overseer or almost healing center and in addition ringer will blow. In this venture AVR microcontroller and Bluetooth module are conveying over UART 9600bps. The module comes in SMD bundle and deals with 3.3V power supply. In this profile the information sends and get to module specifically goes ahead the RX stick of microcontroller. It turns out to be very simple to make your gadget Bluetooth perfect. Bluetooth HC-05 has just 4 pins: 5V, GND, TX and RX. The 5V stick and the Ground stick (GND) are utilized for power and the Transmitter (TX) and Receiver (RX) stick execute a serial interface. The transmitter stick (TX) is utilized by the module to send data and the receiver stick (RX) is utilized to get data. To test the module, we initially associated it to the Android Mobile. This makes it less demanding to see whether the module is accepting characters or not. By essentially utilizing a terminal program like hyper terminal to imagine what the module is sending from its serial interface.

VI. RESULTS AND DISCUSSION

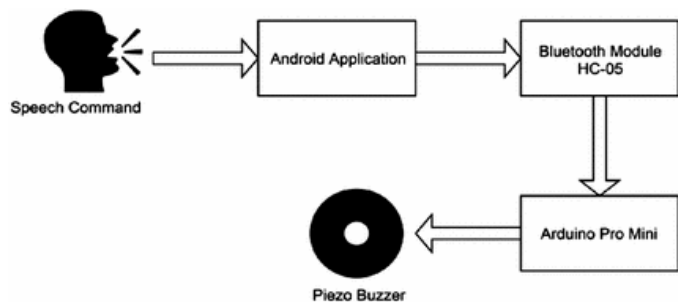


Figure 6.1: Voice based movements

Voice based movements takes human voice as the input through an android application named voice bolt. The Bluetooth has transmitter and a receiver which it receives input from the android application and sends that input to the Arduino which makes the dc motor work and hence the wheelchair moves based on the given input.

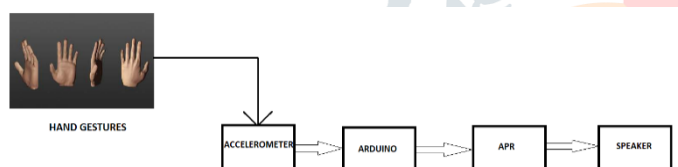


Figure 6.2: Hand Gesture based movements

The Hand Gesture based movements works based on the direction of the accelerometer. The input is given by rotating the accelerometer. This input is forwarded to Arduino then it senses the direction of the accelerometer and moves the wheelchair accordingly. If any obstacle occurs in the way of the wheelchair IR Sensor senses, it and produces a voice message through the speakers then it moves a slight left and stops. In the case of emergency APR and GSM will send the message and call to the concerned people.

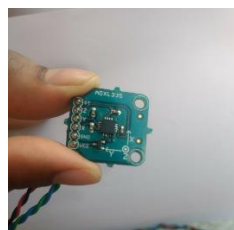


Figure 6.3(a)

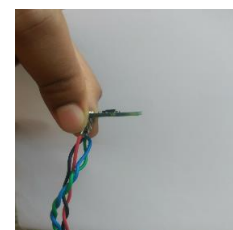


Figure 6.3(b)

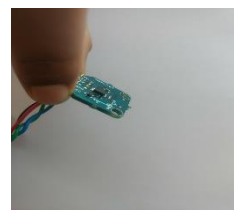


Figure 6.3(c)

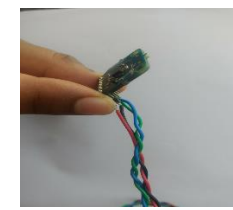


Figure 6.3(d)

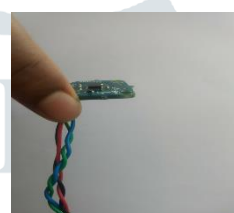


Figure 6.3(e)

Figure 6.3(a) represents the forward movement of the wheelchair.

Figure 6.3(b) represents the backward movement of the wheelchair.

Figure 6.3(c) represents the movement of the wheelchair in right direction.

Figure 6.3(d) represents the movement of the wheelchair in left direction.

Figure 6.3(e) represents the halt of the wheelchair.

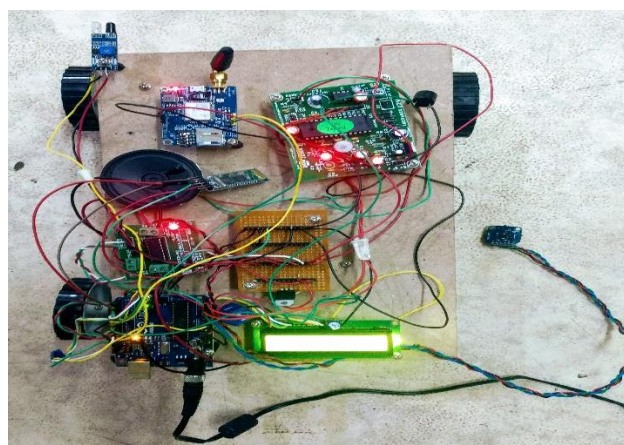


Figure 6.4: The proposed system

By utilizing the technology equipment setup is done in fig. (4.1) Demonstrates the interfacing of Android Smart phone voice and gesture wheelchair. Menstruating the position and the yield as depiction. The above done application is completely in light of Android framework. Android is a working framework in view of the Linux portion. The venture in charge of building up the Android framework is known as the Android Open Source Project (AOSP) and is basically lead by Google. Components of Android: Open source Media Support, Huge memory, Fast processor, Built in I/O gadgets, Native support for more sensors, Improved battery proficiency or the Adapter, Multitasking and have open source programming improvement.

VII. CONCLUSION AND FUTURE WORK

By utilizing this technology physically crippled individuals find simple approach to explore inside the house without the outer assistance. This gives simplicity of operation. As the framework utilizes Smart phone so that the precision is expanded. The Reading of SMS, E-mail and News can be conceivable. The IR sensor is utilized for deterrent shirk and used to detect the obstacle. In the event if any emergency occurs then the Panic catch is there (HELP) it blows ringer. Wheel chair can be used in hospitals, sports and for physically crippled people. **Future Work:** There can be number of future advancements that can be associated with this project work in some of which are described below:

- The productivity of voice-based wheelchair can be foreign made by neural based calculation.
- Instead of utilizing motion acknowledgment we can utilize eye retina using optical sensor to move wheelchair in various headings.
- Tongue worked assistive innovation is acceptable to access to android phone applications using Bluetooth connects.

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