

Design and Implementation of an Intelligent Wheelchair Controlled by Multifunctional Parameter

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ABSTRACT

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Physically challenged persons those who are suffering from different physical disabilities face many challenging problems in their day-to-day life for commutating from one place to another and even sometimes they need to have to be dependent on other people to move from one place to another. The purpose of this task is to make a Multi-Functional Wheelchair using Accelerometer ADXL335 and ESP32 as sensor to help physically disabled human beings in transferring from one region to any other simply by giving path from the hand, voice, Bluetooth. This Accelerometer ADXL335 and ESP32 primarily based totally challenge use Accelerometer ADXL335 and ESP32 for transferring backward path, ahead path, left path or proper path. We have advanced a Multi-useful wheelchair for medically disable human beings. We are working wheelchair by multi-feature 1) Bluetooth (Using Bluetooth device, ESP32), 2) Hand Gesture (Using Accelerometer ADXL335 MEMS), 3) Voice (ESP32). This makes challenge very powerful. The fundamental of this challenge is achieved retaining in thoughts to able the handicapped man or woman to transport round their domestic without any assist of different character.

Keywords : Disabled Patients, Wheelchair, Smartphone, Android, Microcontroller

I. INTRODUCTION

Handicapped man or woman that is physically ill or partly paralysis need to speak with regular human beings in natural way. Also, many handicapped people stricken by various difficulties, like they're not capable of do paintings individually, consequently it's far important to triumph over this situation. So, this

look at offers dependable manner and little bit help to keep away from those problems.

This project is predicated on wheelchair for physically disabled peoples. wheelchair is mechanically controlled by giving commands through hand movements of someone as per the requirement of disabled one.

In this device reset characteristic additionally available for resetting the task operations. And because of this critical characteristic, if any problem is created in the circuit or any harm is coming about in device at the walking time of wheelchair then this reset function is helping handicapped individual to resolve those troubles by pressing the reset button.

Most of the physically disabled person uses traditional wheelchairs. They are operated by hands or by a second person if patient is unable to drive it. This is very difficult for that person if another person is not there for support. In that case there is always requirement of a second person [9]. Thus the patients have to be dependent on another person. Most of the physically disabled person uses traditional wheelchairs. They are operated by hands or by a second person if patient is unable to drive it. This is very difficult for that person if another person is not there for support. In that case there is always requirement of a second person [9]. Thus the patients have to be dependent on another person. Most of the physically disabled person uses traditional wheelchairs. They are operated by hands or by a second person if patient is unable to drive it. This is very difficult for that person if another person is not there for support. In that case there is always requirement of a second person [9]. Thus the patients have to be dependent on another person. Most of the physically disabled person uses traditional wheelchairs. They are operated by hands or by a second person if patient is unable to drive it. This is very difficult for that person if another person is not there for support. In that case there is always requirement of a second person [9]. Thus the patients have to be dependent on another person.

A wheelchair is an electric powered wheelchair geared up. If there's any impediment in the manner of chair then this facilitates us to keep away from any sort of injuries and protects handicapped persons. The impediment sensor can assist the rider to manipulate the wheelchair for keeping off gadgets till she or he is

capable of deal with the job. Due to this excellent of lifestyles of handicapped individual is enhanced. This growth disables people's cap potential to stay independently, this is to experience identical choice, identical manage as well as equal freedom as different regular peoples. Here this machine looking to make automated wheelchair for handicapped peoples, which obeys path like circulate left aspect, proper aspect, ahead aspect or backward.

II. METHODOLOGY

In this hand gesture-managed wheelchair an ADXL335 accelerometer is used as a sensor in order to be giving an analog sign on shifting it in X, Y axis respectively. LM324 operational amplifier is used as a comparator to transform the analog sign to the virtual sign.

Radio frequency transmitter is used to transmit the sign wirelessly. Before sending, the information is encoded with an encoder IC HT12E with a secured cope with that allows you to keep away from its interference from any other device. After that, the sign is dispatched wirelessly.

Now, the receiver gets the sign after which it's miles processed via decoder in order to decode the sign in addition is exceeded via the receiver is being dispatched to ESP32 as an enter. On receiving the enter, the sign, the ESP32 compares the information that is preinstalled with inside the controller. If the enter information suits the preinstalled facts, then the sign need to receive to L293D IC.

The consumer units the wheelchair motion path through transferring his/her hand far from the impartial function. If the hand is moved to the left, the wheelchair rotates to the left. In the equal way, the wheelchair rotates to the proper while the hand is moved to the proper. Stretching the hand past the impartial function reasons ahead wheelchair motion, even as the bending of the arm and transferring the hand in the direction of the frame reasons an opposite motion.

This way, the wheelchair path may be managed without problems through converting the placement of the person's hand. The wheelchair stops while the person returns his/her hand into the impartial function. The gesture popularity mode may be grew to become off if the arm is moved outside.

III. Technology Used

Hardware

- ESP32 Micro-Controller
- HT12E (Encoder)
- HT12D (Decoder)
- DC Motors
- Battery 9v (Transmitter)
- Rechargeable Battery (Receiver)

Software

- ARDUINO Code Studio
- Proteus for Simulation
- Eagle for Circuit Design

For Gesture Controlled

- ADXL335 Accelerometer
- RF(Tx-Rx) 433Mhz

For Voice Controlled

- Google Assistant
- Mobile

For Bluetooth Controlled

- HC-05 (Bluetooth)

Hand Mounted Assistive Technology

The hand established assistive generation is advanced for such someone who's handicapped however has retained sure sort of hand and shoulder movements. This generation is specially used to make gadgets that imitate laptop mouse the usage of hand movement. In one of the dev deice tilt sensors are used to transport the cursor in vertical and horizontal path on laptop screen. To discover the lean from the gravity vector,

the lean sensor normally uses inertia. As the person pass the hand in a few path the attitude among a sensing axis will flow person in equal route.

Voice Controlled Assistive Technology

Voice managed mechanism also can be used to perform energy wheelchair through the person who can produce steady and distinguishable voice. This generation uses speech popularity device for taking voice of the person because the enter signal. The set of command spoken through the person may be stored through this machine. During operation the person speaks a command into the microphone; the speech popularity machine will evaluate the spoken command with the stored command and could transmit the laptop code related to it

IV. Block Diagram

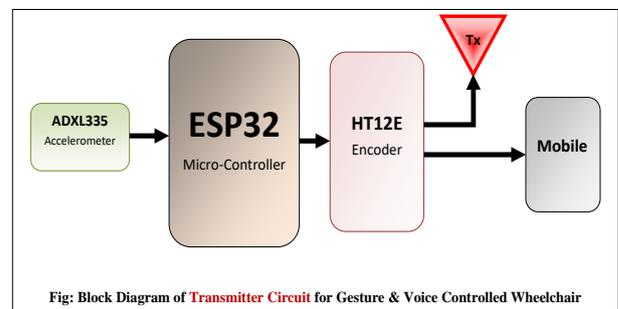


Fig: Block Diagram of Transmitter Circuit for Gesture & Voice Controlled Wheelchair

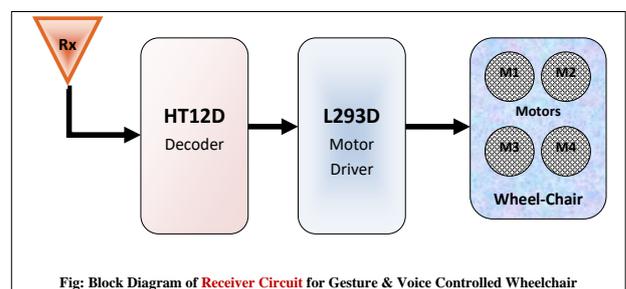
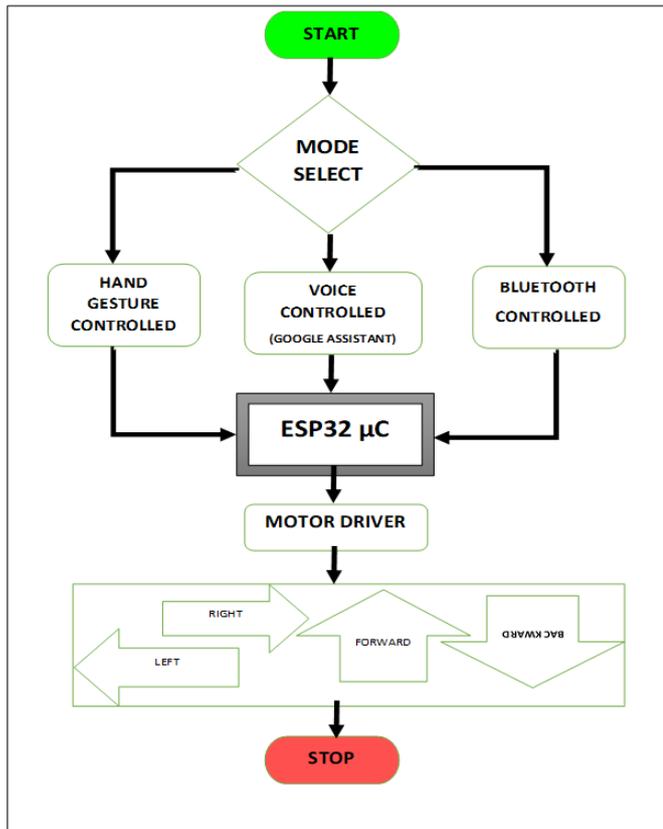


Fig: Block Diagram of Receiver Circuit for Gesture & Voice Controlled Wheelchair

V. Flowchart



VI. Applications

This chair advantages to people that are:

1. Paralytic person.
2. People who have lost the feeling within the lower a part of the body because of disfunction or alternative issues.
3. People who walk with the assistance of aid.
4. Those who have acute and permanent problems of joints/muscles.
5. People who have issue in motor cell and neurons coordination.
6. People who have twisted body elements and suffer from any quite deformity in the body.

VII. Future Scope

The hand gesture wheelchair has the capacity to bridge the distance among guy and machine. We can similarly enhance wheelchairs through making it with low value and excessive accuracy that are working through a Wi-Fi far off with numerous special sensors. An array of sensors may be used and integrating the inputs of more than one sensors after which processing them. Further protection functions may be brought into the wheelchair like implementation of ultrasonic sensor for the item detection. GPS device also can be carried out to recognize the precise area of the person that is in wheelchair and through the use of GSM module an SMS can be dispatched to predefined variety in case of emergency.

VIII. CONCLUSION

This paper provides a comprehensive overview of the design and validation of a new intelligent wheelchair platform. This mission of “Design and Implementation of an Intelligent Wheelchair Controlled through Multifunctional Parameter” is the wheelchair is completely able to wearing the weight as much as 60Kg, and shifting according to the gesture given through the person that is the use of the wheelchair. Certain improvisation and development may be carried out to make the wheelchair extra available to those whose complete frame is paralyzed. Certain Voice and Bluetooth command it is able to be imparted at the wheelchair device in order to make it better. By performing this evaluation, we can provide solid evidence on the potential impact of the robotic technology; this is an important step towards gaining acceptance in the clinical community.

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