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Mobile Or Voice Controlled Whell Chair Using Ardiuno Uno

Y. Sri Umadevi[1], D. Tej Kumar[2], D. Praveen Kumar[3], D. Ganesh Vara Prasad[4], A. L. S. Pavan[5]

[1]Associate professors, VSM College of Engineering Ramachandrapuram
[2,3,4,5]Assistant professors VSM College of Engineering Ramachandrapuram

Abstract
Wheelchairs are used by the people who cannot walk due to physical illness, injury or other disability. Now-a-days development promises a wide scope in developing smart wheelchair. Wheelchair now comes in diverse selection of styles which makes it exceedingly difficult for a person to select one that properly fits their lifestyle. Our project is to implement a home navigation system, which comprises of a wheelchair which will be monitored using an android phone. Android phones being easily accessible to every household, our project will focus to operate the wheelchair that works on the inputs such as voice, touch and gesture via an android phone and navigates according to the commands provided. It is common that the elders and physically challenged people find it hard to move the wheelchair without external aid.

Keywords: Wheel Chair, DC Motors, ESP8266 Node MCU, Bluetooth Module, Android Mobile, Battery.

INTRODUCTION

The physically handicapped person who uses traditional wheelchair is facing many problems. They need a permanent assistant while they are moving from one place to another for their day-to-day work. In market joystick wheelchairs exists but what if person is handicapped also with hand, then what should happen!! So, we developed a voice and gesture-controlled wheelchair to navigate from one place to another without any need of assistance. The old system of wheelchair is not worthy for old age people as well as handicapped people. So, voice and gesture play a vital role regarding this problem and our system is more preferable and cost effective regarding the situation of the elderly and handicapped people.

The system of hand gesture recognition need only one hand. In this system the accelerometer is present which gives the orientation in x, y and z direction according to that the microcontroller gives command to the motor driver IC which rotates the motor. In voice system we use recognition commands from mobile phone and at the ver side the Bluetooth Module (HC05) receives the signal.

These signals are fed to the microcontroller which operates the motor accordingly. The old system of wheelchair is not worthy for old age people as well as handicapped people. So, voice and gesture play a vital role regarding this problem and our system is more preferable and cost effective regarding the situation of the elderly and handicapped people. It is common that the elders and physically challenged

people find it hard to move the wheelchair without external aid.

Fig.1: Whell Chair

Microcontroller are widely used in Embedded Systems products. An Embedded product uses the microprocessor (or microcontroller) to done task & one task only. A printer is an example of Embedded system since the processor inside it perform one task only namely getting the data and printing it. Although microcontroller is preferred choice for many Embedded systems, there are times that a microcontroller is inadequate for the task. For this reason, in recent years many manufactures of general-purpose microprocessors such as INTEL, Motorola, AMD & Cyrix have targeted their microprocessors for the high end of Embedded.

PROPOSED SYSTEM

The suggested system's emphasis on user empowerment through automation and wireless connectivity is one of its main features. The wheelchair may now be remotely controlled by users via a mobile application thanks to the integration of the HC-05 Bluetooth module. Users may now traverse their environment with simplicity and convenience thanks to this wireless interface, which grants them increased freedom and independence.

Furthermore, the wheelchair's usefulness and safety are improved by the incorporation of clever features like obstacle detection and avoidance methods. The wheelchair's autonomous trajectory-adjusting technology can identify obstructions in its route with strategically positioned sensors, reducing the likelihood of accidents and boosting user trust

BLOCK DIAGRAM OF PROPOSED SYSTEM

The Arduino Uno microcontroller functions as the system's central processing unit, coordinating communication between its different parts. The Arduino receives commands from the mobile application, converts them into motor control signals, and then uses specially designed algorithms to carry out exact motions in order to accomplish the intended navigation.

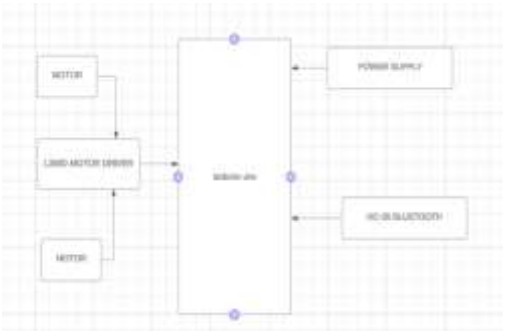


Fig: 2Block Diagram of Proposed System

COMPONENTS

- ESP8266 NODE MCU MODULE
- HC-05 BLUETOOTH
- 4-CHANNEL RELAY MODULE
- MOTORS
- EXTERNAL BATTERY
- POWER SUPPLY

INTRODUCTION TO ESP 8266 NODE MCU

ESP8266 Chip:

The heart of the Node MCU module is the ESP8266 chip, developed by Express if Systems. This chip integrates a Ten silica L106 32-bit microcontroller with a full Wi-Fi stack, making it capable of connecting to Wi- Fi networks and executing user applications.

Node MCU Development Board:

The Node MCU board is designed to facilitate programming and interfacing with the ESP8266 chip. It features an ESP-12E module (which houses the ESP8266 chip), USB-to-Serial converter (for programming), voltage regulator, and various GPIO (General Purpose Input/Output) pins.

Fig: 3 ESP8266 NODE MCU PIN OUT

The ESP8266 Node MCU module has several GPIO (General Purpose Input/Output) pins that can be used for interfacing with external components such as sensors, LEDs, displays, and more. Here is a description of the pinout for the commonly used Node MCU development board (ESP12E module).

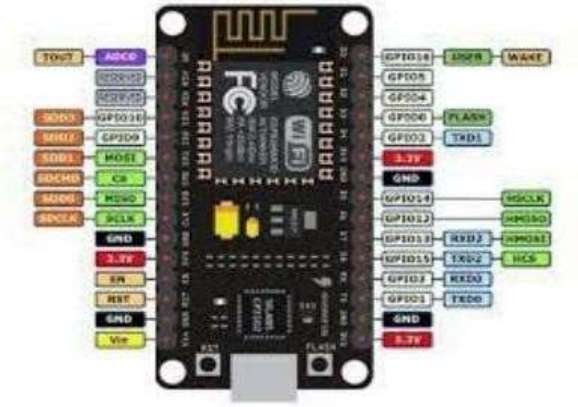


Fig: 4 ESP8266 Node MCU

HC-05 BLUETOOTH MODULE

The HC-05 Bluetooth module is a popular and versatile Bluetooth module used for wireless communication in electronics projects. It is based on the Bluetooth version 2.0 (EDR) specification and is widely used for establishing wireless serial communication between microcontrollers, computers, smartphones, and other devices

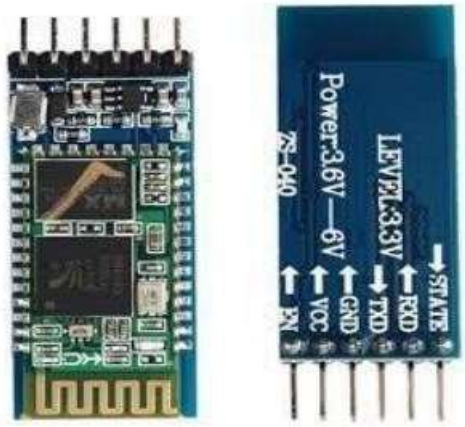


Fig: 5 HC-05 BLUETOOTH MODULE

4-CHANNEL RELAY MODULE

A 4-channel relay module is an electronic module that integrates multiple relay switches into a single board, allowing control of multiple electrical circuits using digital signals from a microcontroller or other control devices. Each relay on the module can independently control a high-power load (such as lights, motors, or appliances) based on the state of the control signal.

AC motors operate on alternating current (AC) electricity and include various types such as induction motors, synchronous motors, and brushed and brushless AC motors.

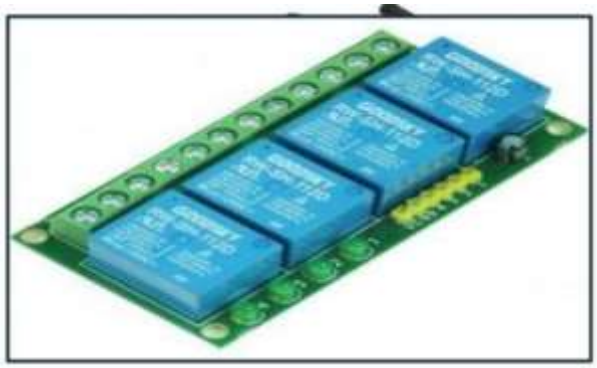


Fig: 6 4-channel relay module

RELAY CONTACT TYPES

As we have seen that relay is a switch. The terminology “Poles and throws” is also applicable for relay. Depending on the number of contacts and number of circuits it switches relays can be classified. Before we know about this classification of contacts, we have to know the poles and throws of a relay switch. Poles and Throws Relays can switch one or more circuits. Each switch in relay is referred as pole. Number of circuits a relay connects is indicated by throws.

MOTORS

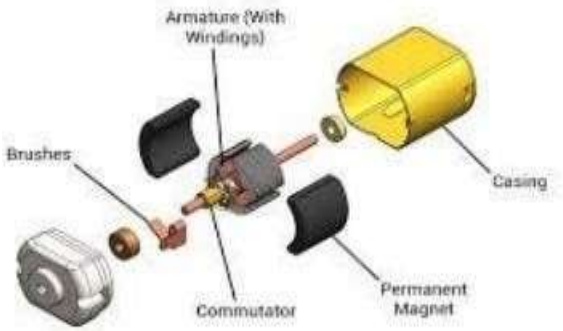
A motor is a device that converts electrical energy into mechanical energy, producing motion or rotation. Motors are used in a wide range of applications, from powering industrial machinery to driving household appliances and vehicles. There are various types of motors, each suited for different purposes, including DC motors, AC motors, stepper motors, and servo motors. Here's an overview of these types:

DC Motor (Direct Current Motor)

DC motors operate on direct current (DC) electricity and consist of a stator (stationary part) and a rotor (rotating part). When current flows through the stator windings, it generates a magnetic field that interacts with the magnetic field produced by the rotor, causing the rotor to rotate. DC motors are widely used in applications such as electric vehicles, robotics, and household appliances.

AC Motor (Alternating Current Motor)

AC motors operate on alternating current electricity and include various types such as induction motors, synchronous motors, and brushed and brushless AC motors. These motors rely on the changing magnetic fields produced by alternating current to induce rotation in the rotor. AC motors are commonly used in industrial machinery, HVAC systems, and pumps.



EXTERNAL SUPPLY

In a real-time project like a wheelchair project, the external supply refers to the power source that provides electrical energy to operate the wheelchair's motors, control systems, and other electronic components. Here's an explanation of the external supply in the context of a wheelchair the external supply in a wheelchair project plays a crucial role in powering the wheelchair's electronic systems, including motors and control systems. Choosing the right type of power source and implementing effective monitoring and maintenance practices are essential for ensuring the performance, safety, and reliability of the wheelchair in real-time applications.

Fig: 7 External Battery with Terminals POWER SUPPLY

In this project we have power supplies with +5V & -5V option normally +5V is enough for total circuit. Another (- 5V) supply is used in case of OP amp circuit. Transformer primary side has 230/50HZ AC voltage whereas at the secondary winding the voltage is step downed to 12/50 Hs and this voltage is rectified using two full wave rectifiers the rectified output is given to a filter circuit to fitter the unwanted ac in the signal. After that the output is again applied to are gulator LM7805 (toprovide+5v) regulator. WhereasLM7905 is for providing –5Vregulation. Z (+12V circuit is used for stepper motors, Fan and Relay by using LM7812 regulator same process like above supplies.

Testing the Connection

Open Serial Monitor (Arduino IDE):

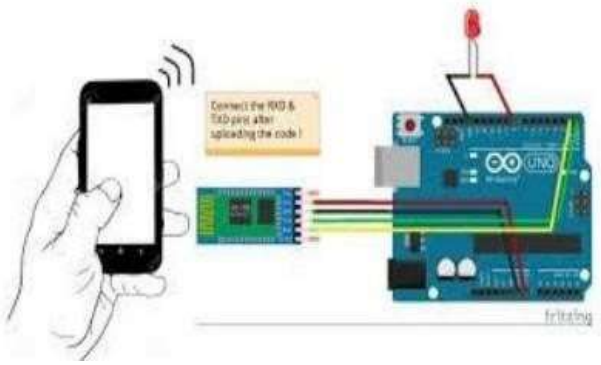
Once your Arduino is connected to the Bluetooth module and powered on, open the Serial Monitor in the Arduino IDE.

You should see debug information printed when data is received from the Bluetooth module.

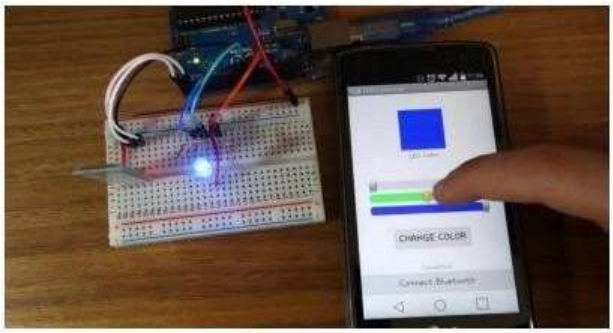
Send Data from Mobile Device:

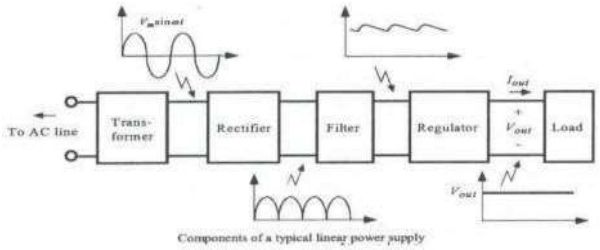
Use your mobile app or Bluetooth settings to send data to the Arduino.

Verify that the Arduino receives and responds to the data accordingly.



LED bulb is controlled by mobile through Bluetooth module





Controlling the brightness of LED bulb using mobile

RESULT

The Result Describes the Wheel chair is to controlled by Android Mobile through Bluetooth, there is a application is to install in android mobile that is Arduino Bluetooth application then we control the wheel chair by different ways like voice, gestures, and arrows.

CONCLUSION

In conclusion, the smart wheelchair system represents a major advancement in assistive technology with the effective integration of the HC-05 Bluetooth module, L293D motor driver, Arduino microcontroller, and DC motors. By utilizing these components, the project has shown that it is both feasible and effective to improve wheelchair systems' user control, mobility, and communication for people with impairments.

The project has verified the functioning and performance of the smart wheelchair system through extensive testing and evaluation, demonstrating its capacity to prioritize user enjoyment and safety while by the Arduino controller encouraging independence and raising standard of living. Its user-friendly interface, wireless communication capabilities, and customization choices further contribute this.

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