BLUETOOTH CONTROL WHEELCHAIR FOR PHYSICALL CHALLENGED PERSON

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ABSTRACT

The research project's objective is to develop a hand gesture-controlled wheelchair for individuals with physical disabilities who experience difficulty moving from one place to another in their daily lives, using an accelerometer as a sensor to detect movements in six axis directions, but only the X and Y axis directions are considered for this project, with the data wirelessly transmitted through an encoder and received by a microcontroller to send signals to relays to move the wheelchair forward, backward, left or right based on the accelerometer data received, with MEMS being used as the accelerometer in this study and offering gesture recognition and robustness, and the experiments presented in the study demonstrate the wheelchair's ability to move and avoid obstacles automatically while being controlled by the user via hand gestures, and advances in control software using a webcam and distance and presence sensors that are controlled by a PIC microcontroller and communicate with a Lab view program.

Keyword: - *Microcontroller, gesture recognitive, Intelligent wheelchair, hands free control, acceleration sensor, Wi-Fi module, mobile robot.*

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1. INTRODUCTION

This study is to develop a new method for physically challenged individuals to control their wheelchair using physical gestures. According to the 2001-2011 census data, over 21 million people in India suffer from some form of disability, accounting for 2.1% of the population. Disabled individuals are primarily found in rural and urban areas, with Tamil Nadu having the highest percentage (1.75%) of disabled people in the country. To improve the status of disabled individuals, the Indian government has implemented various programs, including educational allowances, financial assistance, travel concessions, and employment opportunities. The provision of proper equipment for reliable movement can significantly enhance the quality of life of disabled individuals.

1.1 Proposed System

In this paper, the methodology of Bluetooth control wheelchair for physically challenged persons involves the integration of various technologies and processes to create a system that is both efficient and sustainable. The methodology of Bluetooth control wheelchair for physically challenged persons is constantly evolving as new technologies are developed and implemented. The goal is to create a system that is sustainable, efficient, and capable of meeting the increasing demand for user welfare.

1.2 Objective

The primary goal of the project is to expand the efficiency of the mobility of physically challenged and aged persons as well as with amount. It comprises of two primary parts: ThingSpeak and IoT

2. METHODOLOGY

The purpose of this section is to provide a detailed account of the methodology employed in completing the project. The methodology is crucial in accomplishing the project's objective, which is to produce an excellent outcome. To assess the project, the methodology follows the System Development Life Cycle (SDLC), which consists of five primary stages: planning, design, implementation, analysis and testing. In the planning phase, the project's goals, objectives, and scope are established, and the available resources and limitations are evaluated. During the analysis phase, the existing system is examined, problems and requirements are identified, and potential solutions are proposed. The design phase involves developing a system design that meets the project requirements based on the proposed solutions. In the implementation phase, the system is constructed, while in the testing phase, the system's compliance with the specified requirements and freedom from defects are verified.

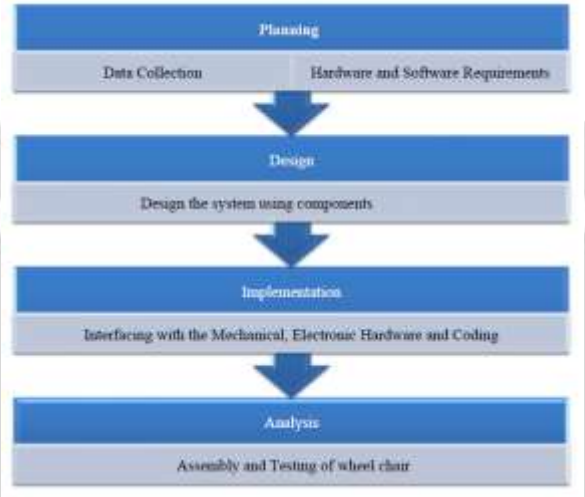

Figure -1: Steps of the methodology

Interfacing with controlled DC Motors to regulate the movement of the wheelchair is made easy by utilizing Bluetooth Module HC-05 and Arduino UNO. This enables individuals with disabilities to use Bluetooth devices such as mobile phones or Bluetooth watches to move the motor at a low cost, while also monitoring body parameters like temperature and heart rate. The wheelchair system is easily accessible to everyone.

2.1 BLOCK DIAGRAM

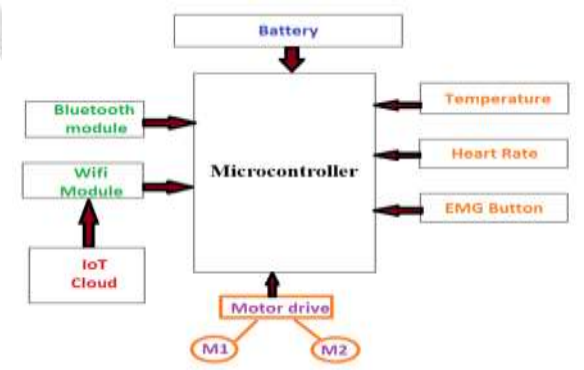

Figure -2: Block diagram

2.2 REQUIREMENTS

I. Arduino UNO Board

Arduino, an open-source platform that can be used for IoT products and student projects, is discussed in this section. Arduino platform is made up of a physical programmable circuit board (microcontroller) and a piece of software (IDE) that allows for the creation and uploading of computer code to the board.

Figure -3: Arduino UNO Board

II. Battery

The operations and characteristics of batteries will be discussed in this section. Batteries are devices that convert chemical energy into electrical energy. Voltaic cells are the basic components of a battery, and each cell contains two half-cells that are connected in series by an electrolyte that contains anions and cations.

Figure -4: Battery

III. Direct Current Motor

The figure demonstrates a circuit setup designed to regulate the movement of a DC motor in forward as well in reverse directions. It encompasses two relays, identified as m1 and m2, that are triggered by a pair of switching transistors.

Figure -5: DC motor

IV. Bluetooth Module

Bluetooth module is a communication technology that enables individuals to communicate with each other using portable devices without requiring their intervention. This article will explore how the Bluetooth module has rapidly progressed to the point where it can control the movement of a wheelchair through a Bluetooth-enabled device such as a mobile phone or a Bluetooth watch.

Figure -6: Bluetooth module

V. Wheels

Figure -7: Wheels

VI. ESP-8266 Wi-Fi module

Figure -8: ESP-8266 Wi-Fi module

VII. Temperature Sensors

: Temperature sensing is an essential aspect of this project, and this section will discuss various temperature sensors on the market, including Thermocouples, RTDs, Thermistors, Infrared, and Semiconductor Sensors. Temperature can be measured through direct contact with the heating source or remotely using radiated energy instead.

Figure -9: Temperature Sensors

VIII. Heart Beat Sensors

The heart beat sensor, also known as a heart rate monitor (HRM), is discussed in this section. Heart rate can be monitored and recorded in real-time by a personal monitoring device, which is frequently used during exercise to capture data for analysis later.

Figure -10: Heart Beat Sensors

IX. Emergency Button

This section will discuss the importance of an emergency button or panic button in a wheelchair. It is mainly used during critical situations to save the person's life.

Figure -11: Emergency Button

4. CONCLUSIONS

The design and construction of a Bluetooth module-based wheelchair are detailed in this model. The circuit operates correctly to move the wheelchair based on commands given by the user. People with physical disabilities can use an Android application on their smartphones to control their wheelchairs, and the circuit will be designed, tested, and validated. A microcontroller can be used to effectively manage obstacle detection. When the circuit is turned on and the person starts moving, any obstacles within 4 meters will be detected by the sensors. This proposed system contributes to the self-sufficiency of differently abled and older people. If the distance between the Android mobile phone and the wheelchair exceeds 10 meters, the controller will not be accessible.

5. REFERENCES

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