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ijirset@gmail.com



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Raspberry Pi-Powered Smart Wheelchair with Security and Tracking Capabilities

Mrs. S.B. Gaikwad¹, Shivam Zaware², Saloni Darji³, Radhika Raut⁴

Professor, Department of E & TC Engineering, Sinhgad Institute of Technology & Science, Narhe, Pune, India¹

Student, Department of E & TC Engineering, Sinhgad Institute of Technology & Science, Narhe, Pune, India²⁻⁴

ABSTRACT: Everybody in the world aspires to live a normal life, but circumstances such as disease, ageing, and auto accidents make this impossible. People with physical disabilities play an important role in our community. In many of them, wheelchairs are manually operated. For the person with a chronic impairment, a wheelchair should have two or more control systems. The focus of this study is on voice-activated wheelchairs with integrated security systems for people with disabilities. With this enhancement, voice command can be used to operate the wheelchair in many positions.

KEYWORDS: Disabled People, Wheelchair, Control System, Voice controlled, Security

I. INTRODUCTION

The wheelchair's movements and home automation may be controlled by voice activated technology, demonstrating the potential of this creative idea to distinguish itself from less eye-catching designs. For those who are totally immobilized in their arms and legs, or who are quadriplegics, this can be quite helpful. They find it simpler to manoeuvre their wheelchair when oral instructions are the only ones supplied. The goal of this project is to use word recognition technology with a restricted vocabulary to develop an engage applications.

The best way to gain time design, according to tests, is to modify a voice recognition kit for a particular use. Engineers face difficulty in providing safe and effective transportation in a changing environment. Power wheelchairs will evolve along safe and efficient pathways towards enabling users' independence and self-guided mobility with rigorous research and design.

II. LITERATURE SURVEY

SR. No	Paper Name & Author	Methodology
1	"Smart Wheelchair" Kedar Sukerkar, Anil Saravade, Jairaj Patil, 2018	In this method the wheelchair is based of Electric power with consist of ultrasonic sensors, infrared sensor, and camera, etc
2	"Intelligent Wheelchair Using Voice, Touch and Gesture Control by Smart phone" Pavan Chand, Sowmika s.	In this method the wheelchair is controlled by the touch and gesture where it controlled using the phone input. Where it uses the Bluetooth device and microcontroller.
3	"WIRELESS SMART WHEELCHAIR" Ratna Meghana, P Sirisha	In this method the wheelchair is mechanically controlled. The operation of this wheelchair is based on pairing the Bluetooth of mobile to the Bluetooth placed in the wheelchair.
4	"AI based smart and intelligent wheelchair" V. Divya, M.Atchaiya	In the manual mode, the wheel is controlled using joystick whereas in the automated mode, MPU6050 sensor and accelerometer is used to control the direction by gesture.
5	"Development of an autonomous driving smart wheelchair for the physically weak." Hye-Yeon Ryu,Jeong-Hak Lim.	In this method the wheelchair is self-controlled and an electric wheelchair with a control unit designed to enable autonomous driving was used to test the basic performance of autonomous driving.

6	“Smart Wheelchair for Physically Disabled” Ninad Joshi, Shubham Talekar.	In this method the wheelchair is operated on home automation system. It also uses ultrasonic sensor and uses artificial intelligence.
7	“EEG based smart wheelchair using Raspberry pi for elderly and paralysed patients” Shashidhar R, Sanjay Tippannavar	In this method the wheelchair is operated using an EEG headset made by Brain sense for this project to record brain activity and operate the wheelchair.
8	“Embedded system based Smart Wheelchair for Physically Challenged People” A. Sanjana,J. Sridevi.	In this method the wheelchair is controlled by Bluetooth command. The project is with the control of Raspberry Pi 3 UNO.

III. PROPOSED METHODOLOGY

There is no longer a need for any large, complicated auxiliary computing devices thanks to the integrated voice processing module of the suggested architecture. When compared to earlier methods, voice instructions are the most user-friendly way for wheelchair users to operate the gadget. They use sophisticated voice recognition techniques. A straightforward hands-free driving experience. This control scheme is easy to use and enhances accessibility. People with limited motor abilities or dexterity can navigate their environment on their own thanks to its simplicity of usage.

Averting Collisions:

Wheelchair users are frequently at danger of crashes and mishaps in busy or unknown areas. To solve this problem, the voice-activated wheelchair has crash avoidance technology. This system will use a combination of sensors and machine learning algorithms to identify possible obstructions and take swift action. The wheelchair's autonomous detection system can avoid objects like walls, furniture, and people by using environmental analysis, which improves safety and lowers the likelihood of accidents.

Voice Recognition:

A headset for voice is the main piece of equipment. A single mono or double mono earpiece (mono to both ears) may also be used in its construction. Noise cancelling is a feature that many external headphones have in mind. Background noise will be muffled by the microphone. If headphones are not worn, wheelchairs may react to background noise and suddenly become audible. There is no resistance when using the headphones. It is employed for phone-intensive jobs such as music listening and call centers. Thus, there are several justifications for using headphones. There will be video footage of the distinctive voice. To record exact voice coding for wheelchair movement, the headphones are worn as double earpieces in our project.

IV. EXPECTED SYSTEM DESIGN

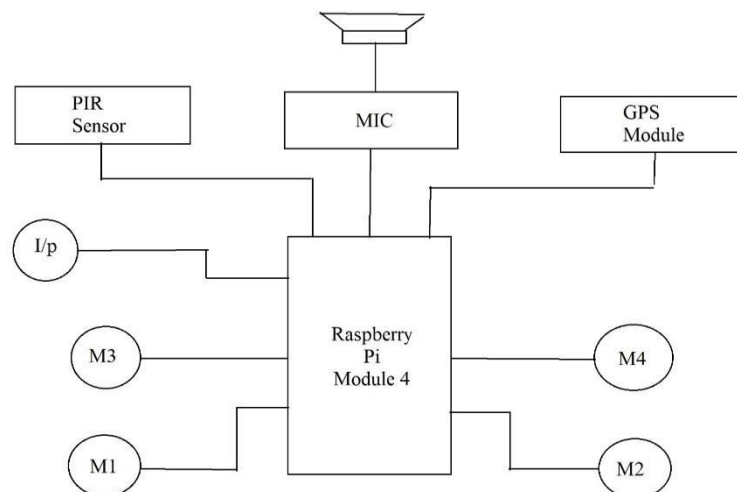


Fig. 1: Expected System Design

The Raspberry Pi interprets the voice commands and sends signals to the motor controllers, which in turn control the motors that move the wheelchair. The Speech API is a cloud-based service that provides real-time transcription of speech to text. The Raspberry Pi can send the voice recordings to the Speech API, which will then return the transcribed text. This text is then used by the Raspberry Pi to interpret the voice commands Google™ API is used to wake up the voice recognition module. When the user says, "OK Google", the voice recognition module will start listening for voice commands.

V. COMPONENTS

1. Raspberry Pi



Dig 1: Raspberry Pi

The Raspberry Pi is a cheap single-board computer. A keyboard, mouse, and display can be connected to the Raspberry Pi to use it as a miniature PC. Real-time image and video processing, robotics, and the Internet of Things are some of the most common applications for Raspberry Pi. Even though it operates more slowly than a laptop or desktop, the Raspberry Pi is a computer that can perform all usual tasks. It consumes less electricity as well.

2. MIC:

Microphone will be used as to give voice input to the system.

3. Power Supply

4. DC Motors:

Electric motors power almost all the mechanical actions we see around us. Electric equipment's main function is energy conversion. Electrical energy is transformed into mechanical energy by motors. Many of the everyday objects we use are powered by motors. The two elements of electric motors are direct current (DC) and alternating current (AC). The armature, or rotating field, and the stator, or stationary field, are a motor's two main components. Rotational torque and speed are produced by the combination of these two components.

5. PIR Sensor:

A PIR sensor is an electronic sensor used in motion detectors such as automatically triggered lighting devices and protection systems that measure devices emitting infrared light in their field of view. Each body with a temperature above zero releases heat energy, which is in the form of radiation. PIR sensors detect infrared radiation that is reflected or released from the target instead of measuring or sensing heat. If the sensor detects an animal, insect, or a person, the temperature at that point in the sensor's field of view increases to the body temperature of the intruder from the ambient temperature and then back accordingly. The resulting change in the received infrared radiation is translated by the sensor into a change in the output voltage, which activates detection.

6. GPS Module:

It's a Global Positioning System module which is built to track the location. Which continuously sends the data to the receiver and gives the information about the location of system.

VI. SOFTWARE

1. Voice Recognition Module
2. Python
3. Google API

VII. EXPECTED RESULT

As per the ideal component specification the taking the factor of accuracy the module will run over the voice command also sensors will help them to have security measures. The main heart of the system will be Raspberry Pi will have speed in operation and accurate indication of commands.

As per voice instruction the Wheelchair will run from Backward, forward, Left and Right direction. Object Detection

The sensor will always try to detect the obstacles that will come in front of the chair. So, as a security purpose the system will turn off the movement of the chair.

VIII. CONCLUSION

This ideology's main purpose is to help the physically disabled people and the patient who needs wheelchair. Because of this module the use of a wheelchair will be easy and handy to use. With the increased safety, autonomy, accessibility, and customization provided by this state-of-the-art technology, users may move around with ease and confidence.

This project will be helpful to handicapped people for their day-to-day work life. The simple mechanism of the model makes it easy to use and user friendly to who are going first time to use of it.

REFERENCES

- [1] "Smart Wheelchair" Kedar Sukerkar, Anil Saravade, Jairaj Patil, 2018: https://www.researchgate.net/publication/332541278_Smart_Wheelchair_A_Literature_Review
- [2] "Intelligent Wheelchair Using Voice, Touch and Gesture Control by Smart phone" Pavan Chand, Sowmika s.
- [3] "WIRELESS SMART WHEELCHAIR" Ratna Meghana, P Sirisha
- [4] "AI based smart and intelligent wheelchair" V. Divya, M.Atchaya
- [5] "Development of an autonomous driving smart wheelchair for the physically weak." Hye-Yeon Ryu,Jeong-Hak Lim.
- [6] "Smart Wheelchair for Physically Disabled" Ninad Joshi, Shubham Talekar.
- [7] "EEG based smart wheelchair using Raspberry pi for elderly and paralysed patients" Shashidhar R, Sanjay Tippannavar
- [8] "Embedded system based Smart Wheelchair for Physically Challenged People" A. Sanjana,J. Sridevi.



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