International Academic Institute for Science and Technology

International Academic Journal of Innovative Research
Vol. 9, No. 2, 2022, pp. 22-24.

ISSN 2454-390X

International Academic Journal of Innovative Research

www.iaiest.com

Wheelchair Assistance and Guidance Using IOT

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Abstract

A Smart Wheelchair is a Power Wheelchair with numerous sensors, assistive technology, and computers built in that allow a disabled person to travel around freely and safely. People with disabilities, such as impairments, handicaps, and life-altering injuries, are the users. The conventional wheelchairs are being increasingly replaced by these new models. Only 5 to 15% of the 70 million disabled individuals worldwide, according to the World Health Organization (WHO), have access to wheelchairs. As a result, we must supply a cost-effective Smart that uses cutting-edge components and technology while keeping costs to a minimum. They have embraced a number of technologies, including artificial intelligence, where they created an autonomous wheelchair that used machine learning principles to travel. Some of them have also used the Internet of Things to manage the wheelchair using a voice recognition system. This report will outline an inexpensive Smart Wheelchair-based Arduino Nano microcontroller and Internet of Things (IoT) technology that has a number of features to help disabled people, particularly poor people who cannot afford an expensive Smart Wheelchair, get the assistance they need to complete daily tasks without help. As a result of this project, a variety of disabled people will be able to afford smart wheelchairs. It will be powered by Arduino Nano, ESP-12e module for Wi-Fi access, MPU6050 for fall detection with voice message notification using IFTTT platform, obstacle detection with buzzer and LED for hazard detection, voice recognition system, and joysticks for wheelchair control.

Keywords: Sensors, Assistive Technology, Internet of Thing.

DOI:10.9756/IAJIR/V9I2/IAJIR0913
Received: 14 March 2022/Revised: 26 April 2022/Accepted: 10 May 2022/Published: 29 June 2022

Introduction

Those who struggle to walk due to disease or handicap use wheelchairs as a mode of transportation. It may be moved by rotating the wheels or the handles. Wheelchairs come in a wide variety of alternatives today, including transport wheelchairs, powered wheelchairs, and manual wheelchairs. The hand rims, armrests, footrests, castors, seat, and back up holster of a wheelchair are all mechanical parts.

However, the current wheelchair has flaws such inadequate ergonomics to suit user needs. The study of the human factor and its application to system design is known as ergonomics (Taylor & Francis, 2008). For King Phillip II of Spain, the first wheelchair was created.

Later, in 1655, Stephen Farfler, a handicapped watchmaker, made himself a three-wheeled chair to aid in mobility. When the "push rim" was created in 1881, wheelchair users could move the wheels with their push rim instead of their hands and avoid getting covered in mud.

Over the years, wheelchairs have continued to advance in this direction, gaining features like changeable seating, additional alternatives, lighter weight options, and ease of use.

Related Work

The process of design is creative and iterative in nature. It involves making decisions as well. Sometimes it is necessary to make decisions with insufficient information, on occasion with just the appropriate amount of knowledge, or on occasion with an abundance of somewhat contradictory information (Richard G. Budynas and J. Keith Nisbett, 2010). A communication-intensive endeavour, design makes use of both written and oral forms, words, and images. Engineers must collaborate with individuals from other disciplines and communicate well. The ability to imagine, plan, and create things that assist people in achieving any individual or group goal is known as design. Establishing the multifaceted properties of things, processes, services, and their systems across their entire life cycles is the goal of this creative endeavour. Design is therefore the core element of inventive humanization of technologies and a key component of cross-cultural and economic interchange.

Existing Work

The wheelchair is controlled by an android phone, which needed a specific programme to allow for wheelchair movement. The majority of wheelchairs are remote-controlled, thus an android phone and app are required.

- Android phones and applications are needed.
- Doesn't keep track of data.
- Hurts the operators by doing this.
- Remote controlled.

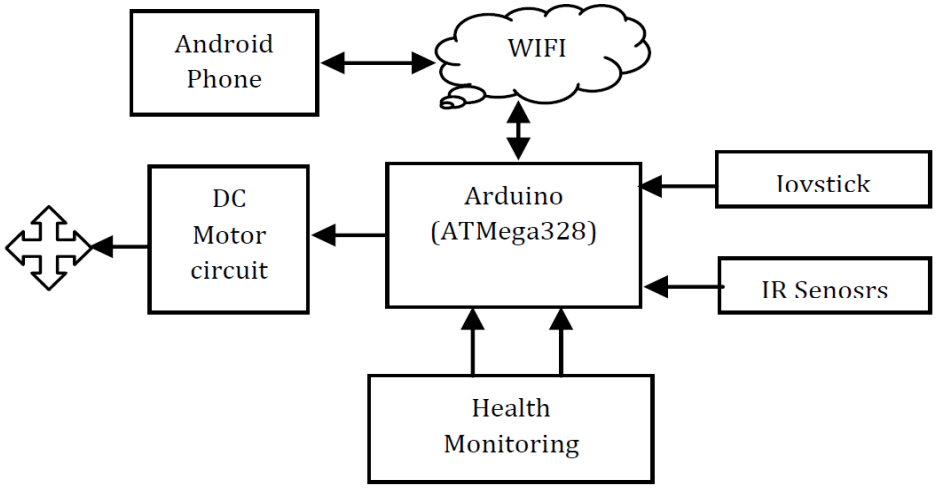
Drawbacks

- As opposed to a power wheelchair, a person does not have to worry about the terrain being uneven or bumpy.
- Having to keep the chair's body in line and fill the tyres are two additional drawbacks of a manual.
- The upper body is one of the biggest drawbacks of utilising manual wheelchairs.

Proposed Work

- Health Monitoring is possible.
- It controlled by hand using joystick module.
- It requires very less human intervention.
- It causes no injury to the operator.
- It produces less noise.
- Zero chances of breaking the wheelchair.

Proposed Diagram



Advantages

- Several people ignore the fact that manual wheelchairs have many advantages over powered ones.
- To begin with, manual wheelchairs are nearly never light weight.
- They are simpler to manoeuvre, despite the fact that power chairs do not require pushing.
- Unlike with a motorised wheelchair, the user does not have to worry about the terrain being bumpy or uneven.
- The possibility of the battery dying exists.

Conclusion

If this project is completed as planned, disabled persons will be able to walk around and interact with others with no effort on their part. Additionally, it is simple to use and control because the movement is only a touch away. The prototype module is small and reasonably priced; the addition of the health monitoring system and the numerous sensors makes it a significantly improved module that is very dependable and useful.

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