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Mobile Bluetooth Controlled Wheelchair

Gaikwad Sushama Mahadev
Department of Computer Engineering,
Marathwada Mitra Mandal's Polytechnic,
Thergoan, Pune-411033,

Khan Ayesha Amjad
Department of Computer Engineering,
Marathwada Mitra Mandal's Polytechnic,
Thergoan, Pune-411033

Raybole Riya Shankar
Department of Computer Engineering,
Marathwada Mitra Mandal's Polytechnic,
Thergoan, Pune-411033,

Arati P. Deshmukh
Department of Computer Department,
Marathwada Mitra Mandal's Polytechnic,
Thergoan, Pune-411033,

Abstract:- Scientists and socialists have put in a great deal of effort to assist the old and disabled in embracing techniques that will facilitate their mobility during daily activities and let them engage with society, as opposed to relying on others or utilizing more archaic devices, such as wheelchairs. However, there are some basic limitations to this technology, such as the inability of the crippled to access the wheelchair if it is placed far away from them. The purpose of this project is to present the "Mobile Bluetooth Controlled Wheelchair," an automated ambulation aid that assists users in locating the location of their wheelchairs and moving them to the desired location using a particular Android application. Additionally, this program gives the user control over the wheelchair even when they are seated in it. By using the Arduino Uno and Bluetooth module HC-06 to link the application.

Keywords:- *Android Applocation,HC-06 Bluetooth Module, Arduino Uno.*

I. INTRODUCTION

Ever since the dawn of human history, the human life has been the most precious and vital component. With so little time left to care for and assist the elderly or those with certain physical disabilities, life has become increasingly difficult and confusing. This has spurred scientists worldwide to develop additional technological tools to assist individuals, mostly those with certain disabilities, such as paralysis. The most common piece of equipment that specialists now give the disabled is an electric wheelchair [1]. Nonetheless, this technology has some basic limitations because the disabled person still needs assistance from someone and cannot reach the wheelchair if it is situated far away from them. The goal of this project is to develop a system that enables the disabled to find the location of their wheelchair and move it to a desired location using a particular Android application. Additionally, the application gives the user control over the wheelchair even when they are seated in it.

The motivation behind the development of the MBCW stems from the desire to address the limitations of traditional wheelchair control mechanisms, which often rely on cumbersome joystick interfaces or require assistance from caregivers. By harnessing the power of mobile technology, our solution aims to provide users with a more intuitive and user-friendly means of controlling their wheelchairs, thereby promoting greater autonomy and freedom of movement.

Furthermore, the scalability and adaptability of the MBCW make it well-suited for a wide range of users, from individuals with temporary injuries to those with permanent disabilities. Its modular design facilitates easy customization and integration with existing wheelchair models, ensuring compatibility with different user requirements and preferences. In summary, the development of the Mobile Bluetooth Controlled Wheelchair represents a significant step towards enhancing accessibility and independence for individuals with mobility impairments. By harnessing the power of mobile technology and Bluetooth connectivity, we aim to empower users to navigate their environments with confidence and dignity, ultimately improving their overall quality of life. This paper provides a comprehensive overview of the design and implementation of the MBCW, highlighting its key features, benefits, and potential impact on the field of assistive technology.

II. EASE OF USE

A. User-Centric Design:

During the design phase, give priority to controls that are easy to use and simple. Take into account the users' demands and capabilities, especially those who lack technical know-how or mobility.

B. Interface for Mobile App:

Create a mobile application with an easy-to-use, clear interface. For basic operations like moving left, right, forward, and backward, use big, obvious buttons. To suit a range of user preferences, incorporate functionality such as sliders for speed control or presets for different speeds.

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C. Bluetooth Connectivity:

Bluetooth connectivity in place between the wheelchair and the mobile device. Select a reliable Bluetooth module and make sure it works with widely used mobile operating systems (iOS and Android).Make it easier to couple the wheelchair with the smartphone; ideally, this should only need to be done once.

III. LITERATURE REVIEW

The development of technology has significantly impacted the field of assistive devices for individuals with motor disabilities. One such area that has seen substantial progress is the innovation of mobile Bluetooth controlled wheelchairs. This literature review aims to provide a comprehensive understanding of the state-of-the-art in this area, integrating and synthesizing relevant research findings while highlighting knowledge gaps and suggesting potential future research directions.

Eid et al. (2016) introduced a novel eye-gaze-controlled wheelchair system for navigating unknown environments. The system enables a person with motor disability to control a wheelchair via eye-gaze and provides continuous, real-time navigation. This research addresses the need for advanced navigation systems in the context of mobile Bluetooth controlled wheelchairs, offering a promising solution for individuals with motor disabilities.

In a similar vein, Permana et al. (2019) proposed a controlled wheelchair based on brain-computer interface (BCI) using Neurosky Mindwave Mobile 2. This system tracks the position of the user's eye pupil and moves the motor in the required direction, incorporating an ultrasonic sensor for safety and a central switch for emergency purposes. The integration of BCI technology in mobile Bluetooth controlled wheelchairs opens up new possibilities for enhancing user experience and safety.

Furthermore, a brainwave controlled wheelchair using Brain-computer Interface (BCI) and EEG signals transmitted wirelessly via Bluetooth to the PC was introduced by Swee et al. (2016). This research contributes to the exploration of innovative control mechanisms for mobile Bluetooth controlled wheelchairs, emphasizing the potential of BCI and EEG signals in improving user control and autonomy.

On the other hand, Megalingam et al. (2017) developed a voice-controlled wheelchair prototype using a commercially available manual wheelchair, with an Arduino microcontroller processing the voice command from the speech recognition module and controlling the motor movement of the wheelchair. This research highlights the importance of alternative control modalities in mobile Bluetooth controlled wheelchairs, catering to the diverse needs of individuals with motor disabilities.

Moreover, Noman et al. (2018) presented a robot controlled by a mobile app using Bluetooth communication to interface Arduino UNO and Android, with the capability of spying using a wireless camera. Although this research focuses on a different application, the utilization of Bluetooth communication for controlling a robotic device underscores the versatility and potential of Bluetooth technology in the context of assistive devices such as wheelchairs.

In another study, Maity et al. (2017) proposed a low-cost software and hardware method to steer a robotic wheelchair using an Android mobile app based on Flutter software, with voice recognition model and CNN-based network-in-network (NIN) structure approach. This research emphasizes the integration of advanced software and hardware technologies in mobile Bluetooth controlled wheelchairs, paving the way for enhanced control and functionality.

While the existing literature provides valuable insights into the development and application of mobile Bluetooth controlled wheelchairs, there are notable knowledge gaps that warrant further investigation. Firstly, there is a need for research focusing on the integration of multiple control modalities, such as eye-gaze, voice recognition, and BCI, to provide a comprehensive and customizable control system for individuals with diverse motor disabilities. Additionally, the safety and reliability of Bluetooth communication in real-time navigation and control of wheelchairs remain important areas for future research.

In conclusion, the literature review highlights the significant advancements in mobile Bluetooth controlled wheelchairs, showcasing the potential of innovative technologies such as eye-gaze control, BCI, voice recognition, and advanced software and hardware integration. The identified knowledge gaps underscore the need for further research to address the multifaceted challenges associated with the development and deployment of mobile Bluetooth controlled wheelchairs, ultimately contributing to the improvement of assistive devices for individuals with motor disabilities.

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IV. PROJECT OVERVIEW

The system has two parts, namely; hardware and software. The hardware architecture consists of an embedded system that is based on Arduino Uno board, a Bluetooth Module, Motor Driver and an Android phone. The Bluetooth Module provides the communication media between the user through the android phone and the system by means of voice command given to the android phone. The user has to install software from the Appstore to give commands software application installed in the android phone that is connected through Bluetooth with Bluetooth Module. Wheelchair accordingly via android application. Meanwhile, the ultrasonic sensor works while the circuit is on and makes

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sure the path has no obstacle and if any obstacle occurs it notifies the Arduino and stops wheelchair till further command is obtained from the user.

Moving around is tough for both the elderly and the crippled. In order to maneuver their wheelchair through their environment, people with disabilities mainly rely on their hand strength. Because older people use their weaker arms, new gadgets that are appropriate for their strength and endurance must be developed. Giving those in need a semblance of freedom is one of the key draws of the mobile controlled wheelchair, as it boosts their self-esteem and productivity. After undergoing rigorous testing, the system turned out to be fairly dependable. The suggested system used three different strategies. Putting a camera on the wheelchair; communicating with the user via an intuitive Android application; and adding a battery level indicator to the mobile application so that the user is informed if The wheelchair can be used for motorized mobility. The hardware and the software are the two main components of this project. The wheelchair itself, the motors, and the batteries make up the hardware. The software is an Android application that is loaded on the user's smartphone and allows direct user choice to be applied to the auto-movement process. The wheelchair was made with a particular design in mind. The important thing was to mount the wheelchair's motors so they wouldn't take up any space. The implementation of the project's component pieces came after the wheelchair design was completed. When the router and IP camera were tested, everything worked as it should. The motors, the Arduino board, and the relays were all connected and tested without a hitch. The Android only takes in a single input, which is the user's orders sent through the Android application.

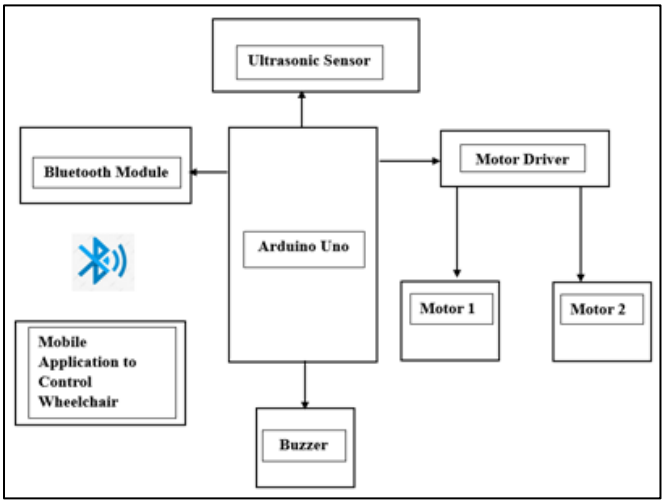

Fig 1: Block Diagram of Project

A. Mobile Bluetooth Controlled Wheelchair:

Fig 2: Wheelchair

B. Flow Chart:

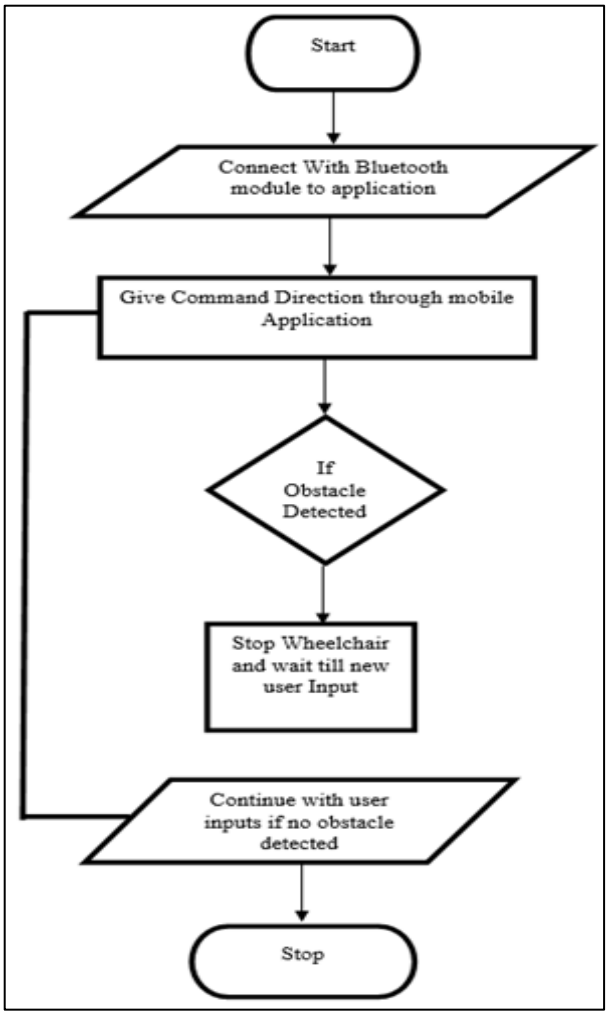

Fig 3: Flow Chart of Mobile Bluetooth Controlled Wheelchair

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V. CONCLUSION

Our initiative is regarded as an inventive concept that will improve the lives of the disabled in light of all these developments, particularly in the area of aiding the disabled. This simple invention is based on the idea of establishing a well-known link between hardware and communication to assist the disabled in becoming independent. By controlling the wheelchair with a particular Android application, the user will be able to explore larger areas and navigate independently with less effort, as they will have clear information about any obstacles in their path.

In summary, this project enabled us to create a connection between theory and practice that will undoubtedly be beneficial to us in our future careers. Through this assignment, we learned how to use useful tools. It taught us a number of key ideas about the operation of relays, the idea of internet protocol, DC motors and batteries, programming for Android devices, and the programming and use of microcontrollers. Every goal we had previously established was accomplished. We were able to collaborate on this project, and it has since served as a fantastic inspiration for other work.

REFRENCES

[1]. Disabled World. “Electric Wheelchairs- Types and Reviews of Power chairs ”http://www.disabled-world.com/ assistivedevices/mobility/wheelchairs/electric/#docs,[Dec.06,2014].
[2]. Cure Congenital Muscular Dystrophy. “Manual v. Power Wheelchairs”, http://curecmd.org/cmd-are/equipment /manual-v-power-wheelchairs,[Dec.07, 2014].
[3]. Lisa I. Iezzoni. “Wheeled Mobility,” in When Walking Fails: Mobility Problems of Adults with Chronic Conditions, 1st ed., California/Milbank Books on Health and the Public, 2003, pp.197-221. [Nov. 28, 2014].
[4]. Herman, Stephen. Industrial Motor Control. 6th ed. Delmar, Cengage Learning, 2010, pp.191-251. [Dec. 07, 2014].
[5]. Anonymous. “Arduino.”, http://arduino.cc/, [Dec. 10, 2014].
[6]. X-Vision. “How IP Cameras Work.”, http://www.ipcctv.com/article.php?xArt=13, [Dec. 15, 2014].
[7]. Alex Swanson. “Opening Up IP Security Solutions.” http://www.indigovision.com/documents/public/articles/ ONVIF%20Article-UK.pdf, [Dec. 15, 2014].
[8]. Chris Woodford. “Relays.” http://www.explainthatstuff.com/howrelayswork.html, [Jan. 03, 2015].
[9]. V. Beal. “Router.” www.webopedia.com /DidYouKnow /Hardware_Software /2005/router.asp, [Jan. 5, 2015].
[10]. Tom Swanton. “Guide to Android Video Streaming.” http://ezinearticles.com/?Guide-to-Android-Video Streaming&id=6570341, [Jan. 10, 2014].
[11]. Torres, Gabriel. "Introduction and Lithium Battery:. Replacing the Motherboard Battery.” http://www.hardwaresecrets.com/article/81, [Feb. 7, 2014].
[12]. World Health Organization. “Top Ten Facts On Disability.” http://www.who.int/features/factfiles/disability/facts/en/ ,[Feb.9, 2014].