

Automated Wheelchair For Paralysed Patient Using Map Generation Algorithm

R.KishoreKanna¹, Dr.R.Vasuki², N.Kripa³

^{1,3}Research Scholar, School Of Bio Engineering, Department Of Biomedical Engineering,
Bharath Institute Of Higher Education And Research, Chennai

²Professor, School Of Bio Engineering, Department Of Biomedical Engineering,
Bharath Institute Of Higher Education And Research, Chennai

Email : Kishorekanna007@gmail.com¹, rkaran02@gmail.com²,
kripa.dd2@gmail.com²

ABSTRACT : *Physically handicap people depend upon a wheelchair for navigation which restricts their mobility to a short-range mostly within indoors. The system must be manually controlled else map must be created and stored by the developers for navigation in an indoor location autonomously. All the user needed indoor maps difficult to create by a developer where the system can generate a storable map based on which the user can navigate autonomously in the store map location. Way discovering calculation Algorithm is utilized to discover the way between the current position and objective and the way is utilized to explore to the objective self-sufficiently.*

KEYWORDS: *Automated Wheel chair, Human Assist Device, Indoor location, algorithm, short-range, Navigation, autonomous, map location.*

1. INTRODUCTION

In Recent days, more people are getting affected due to paralysis. It may be occur in accidents or any injuries or other medical issues. It will affect the muscle activation. The paralysis is classified into different types.

1. Monoplegia, it will affect only one arm or leg in the body.
2. Hemiplegia, it will affect the same side of arm and leg in the body
3. Paraplegia, it will affect both legs
4. Quadriplegic, it will affect both two arms and two legs.

So, the paralyzed patients can't able to walk from one place to another place. They can't even do their own works. They need the help from another person.

Manual Wheelchair is there for paralyzed patients. But they have to move the wheelchair by using hands [1]. That will cause pain to the patients. So, we are trying to ready the smart Automated Wheelchair. In this Wheelchair, the paralyzed patient can easily move one place to another place with simply using the buttons.

Handicapped individual or individual with decreased portability implies any individual whose portability when utilizing transport is diminished because of any actual handicap (tactile or locomotor, lasting or transitory), scholarly inability or weakness, or some other reason for incapacity, or age, and whose circumstance needs proper consideration and the variation to their specific requirements of the help made accessible to all travelers.



FIG.1.VIEW OF PARALYZED PATIENT

2. MATERIALS AND METHODS

- we are utilizing hc-sr04 ultrasonic sensor. its activity isn't influenced by daylight or dark material like. it comes total with ultrasonic transmitter and beneficiary module.
- for coding reason, we are utilizing arduinouno. it has 14 advanced sources of info/yields pins, 6 analog sources of info, 16 MHZ precious stone oscillator, a USB link or force it with an ac to dc connector or battery to begin.
- in this venture, bluetooth is utilized for think about wheelchair moves and distinguish the wheelchair area.

HARDWARE REQUIREMENTS

Arduino UNO
Ultrasonic sensor
Battery
Keypad

SOFTWARE REQUIREMENTS

Arduino IDE

Arduino UNO

Arduino UNO is used for coding purpose. In this project, we stored a map setting with help of Arduino Uno coding. Parameters includes USB connection, crystal oscillator, power jack, ICSP header and reset button.

Ultrasonic sensor

Ultrasonic sensor is used for measuring the distance in between the obstacles and device. Here, we are using ultrasonic sensor HC-SR04 in this project. Ultrasonic sensor HC-SR04 is mainly protect the device from sunlight or black light.

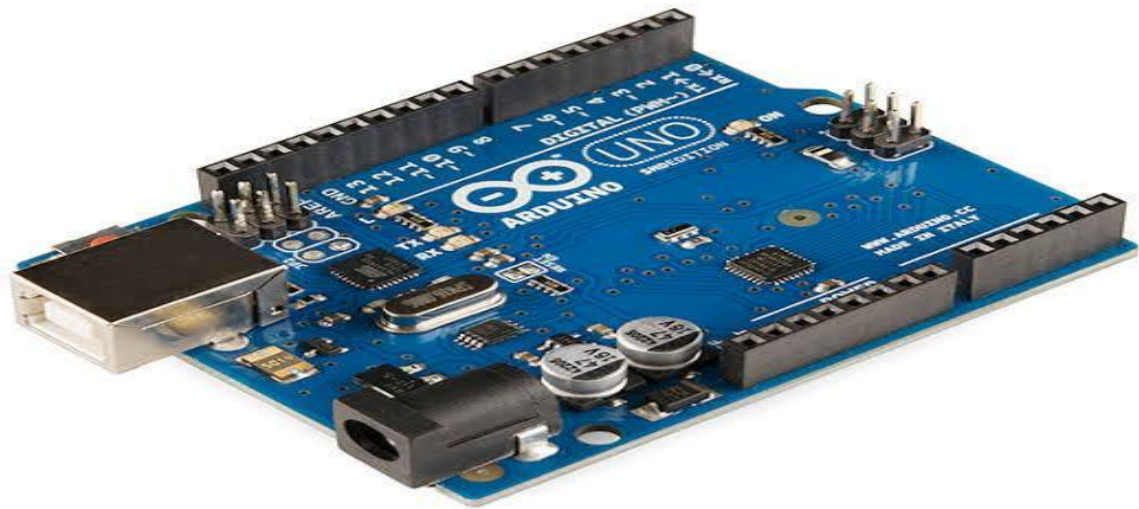


FIG.2.AURDINO UNO

FIG.3.ULTRASONIC SENSOR

BATTERY

In this project, we are using lithium-ion battery, that gives portable electricity in electronic



gadgets includes laptops, mobile phones, etc. It supplies energy to medical equipment and electric vehicles.



FIG.4.BATTERY Keypad

Keypads are aligned in a set of buttons like block or pad, symbols or alphabetical letters, etc. Pads consists of numbers that are used in computers or numeric keypads.

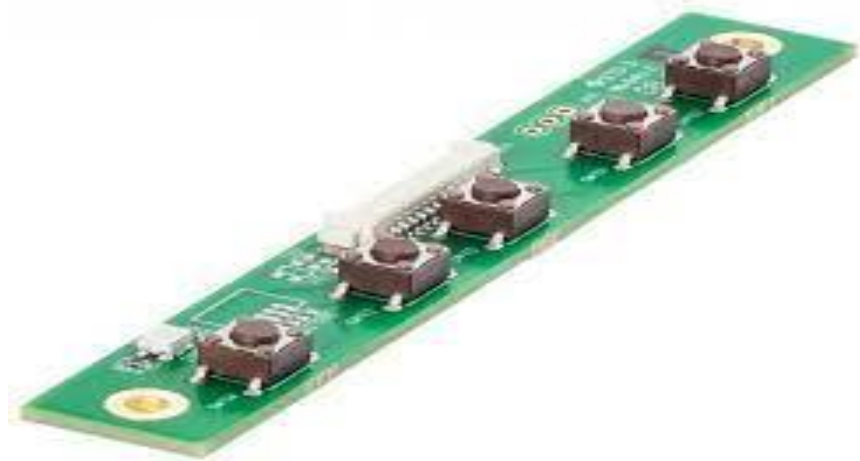


FIG.5.KEY PAD

WORKING

The circuit is connected as per the block diagram. The automatic Wheelchair gets input from the user through the keyboard and traverses through the path and detects obstacles through ultrasonic while navigating [2]. While moving sensor data is transferred to map generation system via Bluetooth. The generated map can be used to navigate autonomously without manual instruction once saved. Obstacle detection system can detect both static and dynamic obstacles. Obstacles are detected through the data perceived from an ultrasonic sensor mounted at the front. While right and left turn the obstacle is detected using the side-mounted sensors.

3. RESULT

The system generates a storable map based on the path tracked by the system, thus indoor navigation can be made autonomous and improved by using the map generated by the system at minimum cost and time [3].

Furthermore, navigation can be made more accurate by generating a 3D map and adding computer vision to the system whereas our system cannot detect doors, tables, and chairs which can be detected by including computer vision [4].

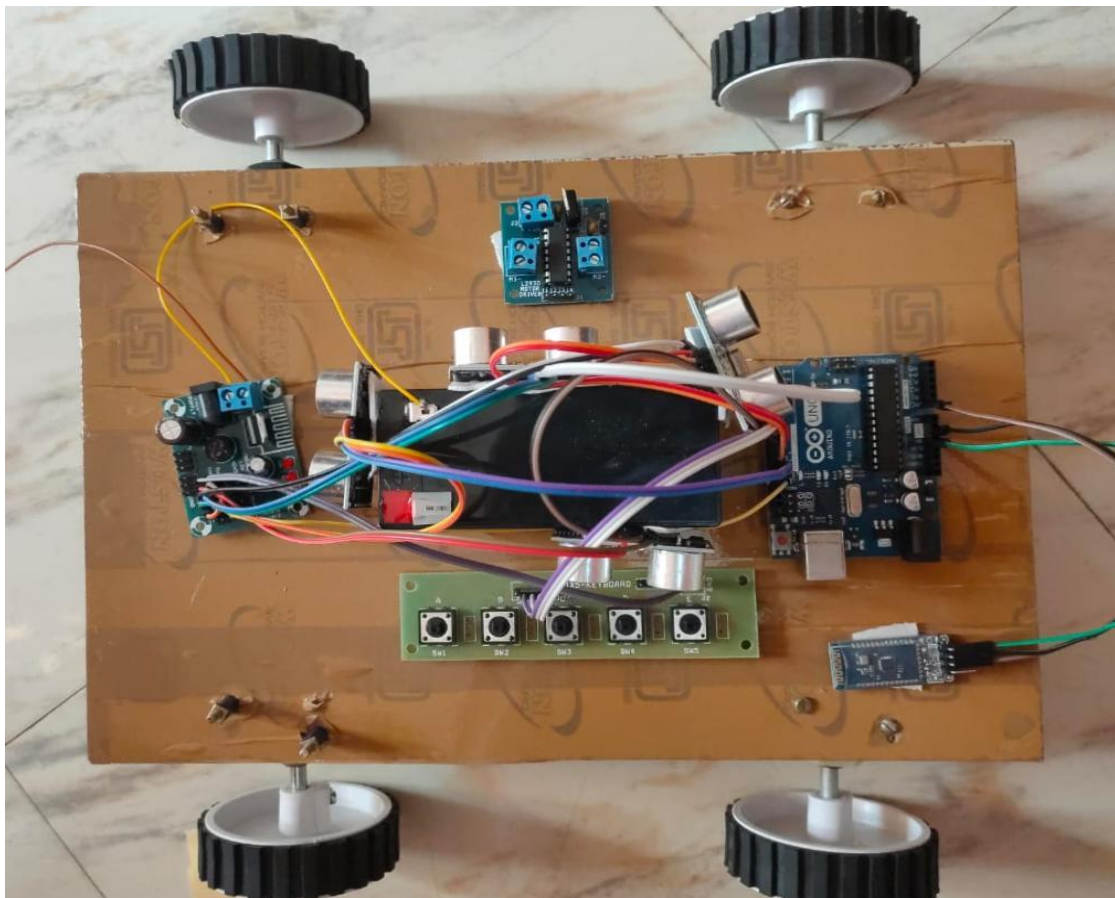


FIG.6.PROJECT KIT

4. DISCUSSION

Here the main discussion is for the navigation of paralyzed patient. Here, we studied more articles and research paper in this our idea is to do an mapping algorithm in indoor for easy navigation for handicap and paralysed patients in this project we are using reliable and low cost model to establish all over the needed people[5]. Here we have a future advancement is to 3D mapping form.

5. CONCLUSION

Our project is mainly for paralyzed patient. Now a days, more people are get paralyzed, so we created a smart Automated Wheelchair. It will be move automatically from one place to another place[6]. So, the paralyzed patient can easily move to according to their own wish without others help. They easily make the destination just clicking the buttons. So, it is very useful device for not abled patients.

6. REFERENCE

- [1] Triwiyanto T, Putra MP, Nugraha PC, Irianto BG, Ariswati HG, Pratama LB. Design of Hand Exoskeleton for Paralysis with Voice Pattern Recognition Control. InJournal

- of Biomimetics, Biomaterials and Biomedical Engineering 2021 (Vol. 50, pp. 51-58). Trans Tech Publications Ltd.
- [2] R.KishoreKanna ,R. Vasuki . Modern Study in Eye Sensor for Automated Wheelchair for Disabled Patients.TEST Engineering & Management 2020. (Volume82, Issue-Jan/Feb,Pages13426 – 13429).
 - [3] Stanley PK, Sonavane AK, David S, Anand RS, Sagayam KM, Daniel PV, Elngar AA. Electromyogram Based Bot-assistive Device for Paralyzed People. In2021 International Conference on Emerging Smart Computing and Informatics (ESCI) 2021 Mar 5 (pp. 623-626). IEEE.
 - [4] Kanna RK, Vasuki R. Classification of Brain Signals Using Classifiers for Automated Wheelchair Application. International Journal of Modern Agriculture. 2021 Apr 30;10(2):2426-31.
 - [5] Digiovine CP, Berner TF, Kim DJ, Schmeler M, Cooper R, Cooper RA. Wheelchairs and seating systems. InBraddom's Physical Medicine and Rehabilitation 2021 Jan 1 (pp. 261-290). Elsevier.
 - [6] Yulianto E, Munawaroh NR, Triwiyanto T, Nugraha PC, Setioningsih ED, Indrato T, Kholiq A. Obstacles and Areas Detection Based on Pulse Width Modulation Method for Electric Wheelchair Safety Using Ultrasound Sensors. InJournal of Biomimetics, Biomaterials and Biomedical Engineering 2021 (Vol. 50, pp. 73-88). Trans Tech Publications Ltd.