

## **Embedded Systems Based Automated Vehicle System for paralyzed person**

Ms. A.Gayathri<sup>1</sup>, Ms.S.Ashadevi<sup>2</sup>, Ms.V.Manimegalai<sup>3</sup>, Ms. A.Little Judy<sup>4</sup>

<sup>1,2,3,4</sup>Assistant Professor, Sri Krishna College of Technology

<sup>1</sup>a.gayathri@skct.edu.in, <sup>2</sup>s.ashadevi@skct.edu.in, <sup>3</sup>Manimegalai.v@skct.edu.in,

<sup>4</sup>judy.a@skct.edu.in

### **Abstract**

*The proposed system is a user-friendly computerized vehicle which has distinctive traits of reminiscence mapping with dynamic character which aid patients to carry on their locomotion in order that those types of people lead their life with hope. This Vehicle is characterized in such a way that it can examine the continuous status of the patient and transfers the data continuously during the critical circumstances. The proposed system is equipped with the motor driving circuit for movement of the vehicle, Ultrasonic sensor for the purpose of barrier detection and RF module which acts as interface device between user and the vehicle. These components were interfaced with the PIC microcontroller for performing their respective tasks. The Main theme of the system is embedding the web server with the vehicle to update the continuous health information of the patient at the web server which alerts the doctor. Thus, the proposed system emerges with various aspects that provide powerful mobility to the crippled person and acts as an effective tracking system.*

**Keywords:** Motor driving circuit, PIC microcontroller, Ultra sonic sensor, RF module

### **1. Introduction**

Independent Living is one of the ultimate aims in each and every one of our life. Likewise, it is same as in the case of abnormal persons who wish to live their life independently. The theme of proposed system is to design the embedded automated vehicle for the crippled persons to carry out the movement of the vehicle to the desired location using interfacing device between the user and the vehicle.

Another important aspect of the system is to have the regular monitoring of the patient health status and updating regularly through the web connectivity with the inclusive details of the patient's treatment and their document structures. The whole embedded system was literally controlled by the PIC microcontroller and this concept helps to get rid of the existing method (i.e.) by allocating a person to monitor the patient health condition and to carry their locomotion in the manual wheel chair movement.

Dynamic memory mapping technique was employed to help the vehicle to reacts upon to the present situation. (i.e.) so that Vehicles construction can be automated and adaptable to a specific situation/environment. Hence concept of automated vehicles construction mixed with embedded system technology for the differently able person would eliminate the conventional method of using wheel chair with the help of another person which makes a patient to depend on an individual to enable him carry out his locomotion.

### **2. Conventional Methods**

The Traditional Method which includes the wheel chair and stretcher for carrying the patient and the differently abled persons. The main drawback of the traditional method was the patient must be depending upon the others help (i.e.) It is the mechanism where the moving of the vehicle from one to another and the monitoring process is done by the help of manual operation.

The demerits of conventional medical transportation facilities are:

- There weren't any previous proposals regarding the countering of an impediment during the actual motion of the vehicle.
- There were no interaction between the patient and the concerned doctor through the web server regarding the various health condition of the patient.

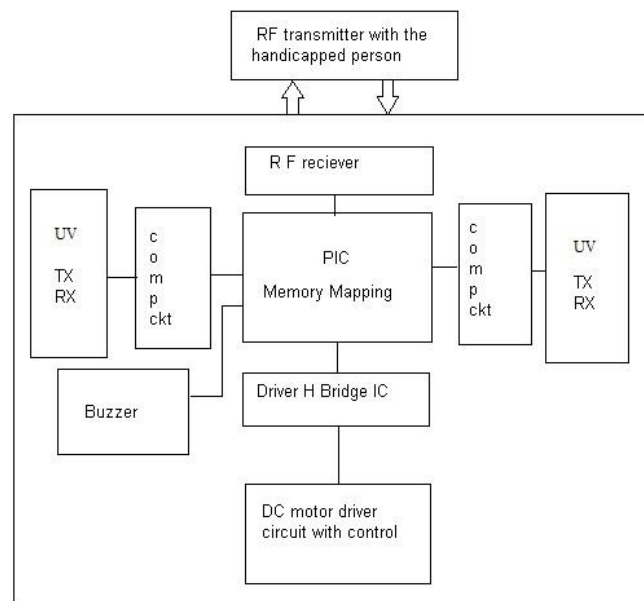
### 3. Proposed System

The Traditional Method which includes the wheel chair and stretcher for carrying the patient and the differently abled persons. The main drawback of the traditional method was the patient must be depending upon the others help (i.e.)

It is the mechanism where the moving of the vehicle from one to another and the monitoring process is done by the help of manual operation.

The demerits of conventional medical transportation facilities are:

- There weren't any previous proposals regarding the countering of an impediment during the actual motion of the vehicle.
- There were no interaction between the patient and the concerned doctor through the web server regarding the various health condition of the patient.

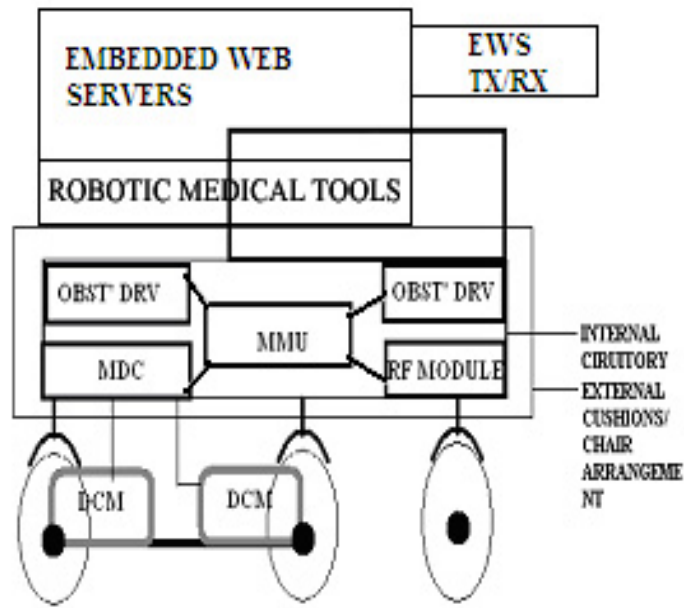


**Fig. 1 the Overall Block Diagram**

Switching circuit is used to control various directive movements with the help of memory management unit; the significant function of the vehicle is server connectivity which is embedded within the controller to transmit the information (or) data related to health condition of the patient to the web server.

### 4. Architecture

The proposed architecture diagram gives brief outline of the entire system. The specifications are as follows.



**Fig. 2 The proposed architecture.**

**DC Motor** – DC Motor which is a High Power and High Torque Motor capable of bearing the weight of the patient, and the motor were fitted along the rotating part of the vehicle to make a movement towards different directions based upon the control. The Various control of the vehicle was described below with their components in Table – I.

**Table 1. Vehicle Movement Table**

CONDITION OF RIGHT MOTOR	CONDITIO N OF LEFT MOTOR	DIRECTION OF MOTION
ON	ON	Movement is Straight
ON	OFF	Right side Movement
OFF	ON	Left side movement
OFF	OFF	Halt

**Motor Driving Circuit** – this circuit is captained by the Memory Management Unit. The Circuit reacts based upon command processed given by Memory Management system to run the motor in controlled manner.

**RF MODULE** – It is an interface device between the patient and the vehicle to perform the locomotors movement of the vehicle through the RF remote which is commanded by the user to move the vehicle from one to another place.

**OBSTACLE DETECTOR** - Ultrasonic Transmitter and Receiver module were employed to detect the objects or obstacles. This module was fixed in front of the vehicle to detect objects on the way and to avoid damage to the vehicle. Buzzer was introduced

to use as the alert signal with help of the beeps sound once the impediment were detected. This Obstacle Driving circuit is runs based upon the transmitting and receiving range of rays or signals from the object.

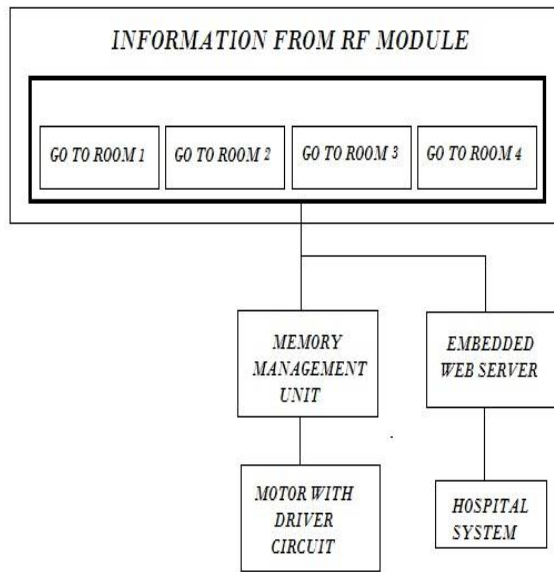
**MMU** - Memory Management Unit act as the Captain of the entire system which includes the PIC microcontroller which is programmed to interfaces the multiple components to this unit and this uses dynamic memory mapping technique to program itself to make the vehicle to be automated. This unit also known as the controller unit.

**EWS** (Embedded Web Server) - The Special functionality of this proposed system is embedding the web server with the vehicle to transfer the information, regarding the condition of the concerned persons to the web browser. This enables effective patient monitoring system.

**Dynamic Memory Mapping** - this Technique which has ability to segment memory address of the microcontroller which is input command to memory management system to perform a task according to the present situation, (i.e.) self-programming based upon the real time scenario. This technique makes the vehicle to be automated and the vehicle has the tracing ability to detect the path without hitting the obstacles present on the way, this traced memory was stored in the memory unit and reacts upon to it. The above discussed was the general concept of the dynamic memory mapping technique, (i.e.) the concept of “Train and Execute”. Another scheme called Static Memory Mapping Technique where they are preprogrammed to the microcontroller regarding the fixed scenario, this memory was stored and reacts upon to the preprogramming and this technique doesn’t traces the path. Just acts according to the users wish. For different functioning of mechanism, methods have to be reprogrammed again and again. Hence for the benefit of the user dynamic memory mapping technique is more effective than the previously discussed technique.

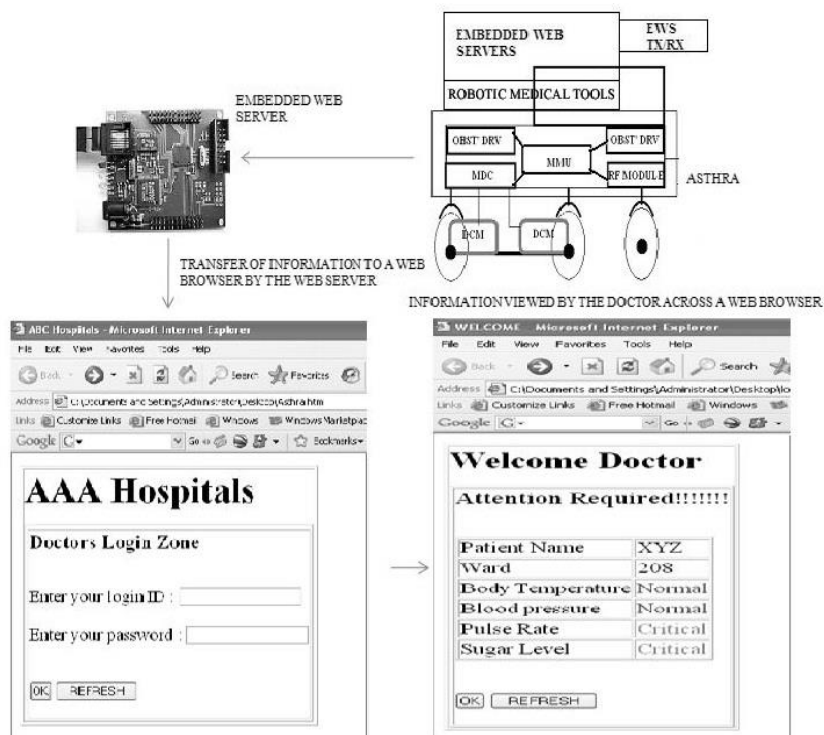
**RF Module** - the RF Module links the user and the vehicle with the help of transmitter and the receiver circuit. This module was connected with the controller circuit. The Transmitter circuit was controlled by the user and the transmitted radio frequency waves were received by the receiver circuit that is placed in the vehicle and process the various actions based upon the command provided by the user. The RF remote acts as an interface between the patient and the Vehicle

**Switching Circuit** - the First functioning of the entire system is the Switching Circuit. Once the circuit was switched over, entire components begin to perform their corresponding activities. RF module consists of series of switches where each switch consists of specific functions once the switch is pressed, they begin to perform. This circuit is directly attached with the memory management unit which in turns runs the motor when the circuit is switched.



**Fig.3 RF Module with its switches.**

**Embedded Web Servers** - One of important concepts of the proposed system is embedding web server with the vehicle which conveys necessary information about the condition of the patient through the web browser. The functioning of the browser are as follows; It has various Sensors and Robotic Arms which capture the critical details of the patient such as sugar level, Heart beat count, Blood pressure, Body temperature.



**Fig. 4 Information Transfer by means of Embedded Web Servers.**

Any change from pre-saved values are detected and dispatched to a centrally maintained Web Site. Alerting Mechanisms which include Emergency Popup are added, which alert the doctor regarding situations of patients below chronic conditions. Thus, usage of this concept the doctor could get the overall medical status of all his patients at his fingertip,

which enables improved Medical Treatment. Vehicle has sensors which transfer information to the embedded Web servers which maintain a local Intranet to display the captured Information's.

## 5. Conclusion

Overall view of this developed system brings the innovation in the area of technological concept as well as in the area of medical field. The Automated Vehicle helps the patient to be independent and plays a significant role in the field of effective monitoring system. Hence, we believe that our project will fulfill the needs in many ways for the disabled persons. If it happens so, then that was our real achievement.

## References

- [1] Y. Zhang and Z. Ji, "Towards An Automated Wheelchair Control Strategy Based On Enzymatic Numerical P-Systems (ENPS)," *2019 IEEE 2nd International Conference on Automation, Electronics and Electrical Engineering (AUTEEE)*, Shenyang, China, 2019, pp. 643-648.
- [2] M. Thomas, A. Bhatkar, A. Nair, B. Biju and A. Shetty, "Design and Analysis of the Frame of Smart Wheelchair," *2019 International Conference on Nascent Technologies in Engineering (ICNTE)*, Navi Mumbai, India, 2019, pp. 1-6.
- [3] M. R. Ruman, A. Barua, S. Mohajan, D. Paul, A. K. Sarker and M. R. Rabby, "An Implementation of Motorized Wheelchair for Handicapped Persons," *2019 International Conference on Computing, Communication, and Intelligent Systems (ICCCIS)*, Greater Noida, India, 2019, pp. 301-305.
- [4] J. Gupta, R. Tiwari, Y. Patel and G. Saha, "Self Propelled Wheelchair Design for Hemiplegia Patient using CREO 3.0," *2019 Innovations in Power and Advanced Computing Technologies (i-PACT)*, Vellore, India, 2019, pp. 1-6. G. O. Young, "Synthetic structure of industrial plastics (Book style with paper title and editor)," in *Plastics*, 2nd ed. vol. 3, J. Peters, Ed. New York: McGraw-Hill, 1964, pp. 15–64.
- [5] N. Hasan, M. M. Hasan and M. A. Alim, "Design of EEG Based Wheel Chair by Using Color Stimuli and Rhythm Analysis," *2019 1st International Conference on Advances in Science, Engineering and Robotics Technology (ICASERT)*, Dhaka, Bangladesh, 2019, pp. 1-4.
- [6] Z. Raiyan, M. S. Nawaz, A. K. M. A. Adnan and M. H. Imam, "Design of an arduino based voice-controlled automated wheelchair," *2017 IEEE Region 10 Humanitarian Technology Conference (R10-HTC)*, Dhaka, 2017, pp. 267-270.
- [7] S. Bharali, S. Mathi, P. Dash, S. Chandra and B. Chavan, "A Self-Governing Wheelchair for Severely Disabled Patients in an Indoor Environment Utilizing EEG and Laser Technologies," *2018 International Conference on Emerging Trends and Innovations In Engineering And Technological Research (ICETIETR)*, Ernakulam, 2018, pp. 1-5.
- [8] M. R. Chowdhury et al., "Simplistic Approach to Design a Prototype of an Automated Wheelchair Based on Electrooculography," *2018 International Conference on Computer, Communication, Chemical, Material and Electronic Engineering (IC4ME2)*, Rajshahi, 2018, pp. 1-4.
- [9] W.-K. Chen, *Linear Networks and Systems* (Book style). Belmont, CA: Wadsworth, 1993, pp. 123–135.
- [10] H. Poor, *An Introduction to Signal Detection and Estimation*. New York: Springer-Verlag, 1985, ch. 4.
- [11] B. Smith, "An approach to graphs of linear forms (Unpublished work style)," unpublished.
- [12] E. H. Miller, "A note on reflector arrays (Periodical style—Accepted for publication)," *IEEE Trans. Antennas Propagat.*, to be published.
- [13] J. Wang, "Fundamentals of erbium-doped fiber amplifiers arrays (Periodical style—Submitted for publication)," *IEEE J. Quantum Electron.*, submitted for publication.
- [14] C. J. Kaufman, Rocky Mountain Research Lab., Boulder, CO, private communication, May 1995.
- [15] Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, "Electron spectroscopy studies on magneto-optical media and plastic substrate interfaces (Translation Journals style)," *IEEE Transl. J. Magn.Jpn.*, vol. 2, Aug. 1987, pp. 740–741 [Dig. 9th Annu. Conf. Magnetism Japan, 1982, p. 301].

- [16] M. Young, The Technical Writers Handbook. Mill Valley, CA: University Science, 1989.
- [17] Poornaselvan K.J., Gireesh Kumar T., Vijayan V.P,” Agent based ground flight control using type-2 fuzzy logic and hybrid ant colony optimization to a dynamic environment”, Proceedings - 1st International Conference on Emerging Trends in Engineering and Technology, ICETET 2008, 4579922,pg: 343-348,2008
- [18] Bhuvanewari K., Rauf H.A,” Edgelet based human detection and tracking by combined segmentation and soft decision, 2009 International Conference on Control Automation, Communication and Energy Conservation, INCACEC 2009, 5204487.
- [19] M. R. Chowdhury, M. N. Mollah, M. Raihan, A. S. Ahmed, M. A. Halim and M. S. Hossain, "Designing a Cost Effective Prototype of an Automated Wheelchair Based on EOG (Electrooculography)," 2018 21st International Conference of Computer and Information Technology (ICCIT), Dhaka, Bangladesh, 2018, pp. 1-4.
- [20] P.Ponmurugan, Dr.N.Rengarajan, “Machine Learning Perspective Gene Optimization for Efficient Induction Machine Design”, Journal of Electrical Engineering and Technology, Vol.13, No.3, May 2018, pp. 1202-1211. (SCI Indexed, IF: 0.579).

### Authors

	<p><b>Ms.A.Gayathri</b>, received the B.E degree in Electrical and Electronics Engineering in 2011 and ME degree in VLSI Design in 2014 and currently working as an Assistant Professor in Department of EEE at Sri Krishna College of Technology, Coimbatore. And she has 1 International Journal Publications and 2 International conferences and 3 National Conference.</p>
	<p><b>Ms.S.Ashadevi</b>, received the BE degree in Electrical and Electronics Engineering in 2012 and ME degree in Power Electronics and Drives in 2014 and currently working as an Assistant Professor in Department of EEE at Sri Krishna College of Technology, Coimbatore. and she have 3 International Journal Publications and 4 International conference and 5 National Conference</p>
	<p><b>Ms.V.Manimegalai</b>, received the B.E degree in Electrical and Electronics Engineering in 2014 and ME degree in Applied Electronics in 2017and currently working as an Assistant Professor in Department of EEE at Sri Krishna College of Technology, Coimbatore. And she have 4 International Journal Publications and 5 International conference and 3 National Conference and 1 patent.</p>
	<p><b>Ms.A.Little Judy</b>, received the B.E degree in Electrical and Electronics Engineering in 2014 and ME degree in Power Electronics and Drives in 2016 and currently working as an Assistant Professor in Department of EEE at Sri Krishna College of Technology, Coimbatore. And she has 5 International conferences.</p>