

# Survey of Numerous Accessible Applications for Paralysis Patients

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**Abstract**—The recent survey of world health organization estimated approximately 5.6 million people were paralyzed representing 1.9 percent of the population roughly 1 among 50. Health surveillance of the paralyzed the hospitals reveal that, there are many exercises, stimulation to safeguard the paralyzed people. But there is not a particular monitoring system to monitor the daily activities of the paralyzed. Paralysis is one among the major neural disorder that causes loss of motion of one or more muscles of the body, wherein depending on the cause, it may affect a specific muscle group or region of the body, or a larger area may be involved.

**Keywords:** Paraplegic, paralysis, neural, plegia, paraparesis, paralysed.

## I. Introduction

Paralysis is the inability to move muscles on your own and with purpose. It can be temporary or permanent. The most common causes are stroke, spinal cord injury, and multiple sclerosis. Paralysis can be a complete loss of movement known as plegia, or a significant weakness called paresis. Paralysis is most often caused by damage in the nervous system, especially the spinal cord. Other major causes are stroke, trauma with nerve injury, poliomyelitis, cerebral palsy, peripheral neuropathy, Parkinson's disease, ALS, botulism, spina- bifida, multiple sclerosis, and Guillain-Barré syndrome. For example, monoplegia/monoparesis is complete loss of movement or weakness of one limb. Hemiplegia/hemiparesis is complete loss of movement or weakness of arm and leg on same side of the body. Paraplegia/paraparesis is complete loss or weakening of both legs [1].

Paraplegia is a medical condition involving impairment in motor or sensory function of the lower extremities, which is a classification of paralysis the universal term to describe the loss of movement. Paraplegia is the condition where the paralyzed person cannot move the part below the waist or cannot move the legs or trunk. Even though, there are innovative approaches for curing or treating paralysis patients, but the aim of treatment

is to help a person adapt to life with paralysis by making them as independent as possible [1].

## A. Types of Paralysis:

There are different types of paralysis depending on where the injury originates. Thus there are various areas of the body that are affected as damages in different portions of the spine suffer from injury or trauma. Below are among these types and key description of each:

### 1) Monoplegia:

The Monoplegia is a type of paralysis of a single limb. Usually patient having cannot regain their full-potential. Physical therapy is as easy for the treatment for monoplegia. But this physical therapy includes exercise which is more difficult to patients. Monoplegia result to damage to the brain that cause motor function to affect limb [8].

### 2) Hemiplegia:

Hemiplegia is defined as paralysis is caused by brain damage which affect only one side of the body. The main root is stroke, although a traumatic injury or tumour in brain may also led to hemiplegia [9].

### 3) Quadriplegia:

As mention in paper [11], Quadriplegia is also named as Tetraplegia where it is caused by illness or injury which result in total loss of all limbs. This loss is always sensory and motor, that means both sensory and control are not in control.



#### 4) Paraplegia:

Paraplegia is ruination in motor or sensory function of lower extradite. This diseases is caused by spinal cord or a congenital condition that damage the brain elements of the spinal canal [12].

#### B. Areas where people face problems:

- a) Activities of daily living/Instrumental ADL: self-care, meal preparation, shopping.
- b) Education/Work: education or work tasks.
- c) Play/Leisure : Leisure interest and activities
- d) Social Participation: Life roles and role performance.

#### C. Problem Faced by People:

Various problem faced by paralysis patients are due to the spinal cord injury and the damage to brain nervous system. The problem are as follows:

##### 1) Sensorimotor:

It may cause loss or experience decreased of one side of the body or one upper half. Due to sensorimotor person may experience shoulder pain during shoulder movement in flexion and abduction as result of subluxation, abnormal muscle tone, limitations in shoulder range of motion, capsular contractures, adhesive capsulitis, rotator cuff ear, brachial plexus injury, shoulder-hand syndrome, or pre-existing [9].

##### 2) Cognitive:

Person may loss the cognitive skills such as attention, learning, memorizing and executive functioning of sensory organs [9].

##### 3) Psychosocial:

Person may sense depression, anxiety, or loss of interest.

## II. Literature Survey

According to a survey, nearly 1 in every 5000 people are paralyzed. Fully paralyzed patients require 24 hour support. But in these days, it is not possible to constant monitor patient. So they need a person which takes care movement disabled or paralyzed patient. And appliances cannot be handled by them. So they need constant help and they cannot work

independently. The author in the paper [1] focuses on the automation system which is secure as well as serves as a reliable and efficient system for paralyzed people to control home devices more efficiently. It gives ability to operate devices and also to monitor the patient's health parameter.

The author in paper [3] proposed the system that makes use of mobile phone's inbuilt Bluetooth facility for automation without using Air Time. The author in paper [3] [1] [5] have described different hardware and software units that make complete application software design for paralyzed patients. The author in paper [3] has furnished a good paradigm for automation system based on Bluetooth. The author in paper [6] made sure that the system is much scalable and flexible comparing other commercially variable systems. There are various existing system whereas some of them are mention below:

The author of paper [4] had proposed a low cost, secure, accessible and remotely controlled home automation. The technologies used for the system are much easier and are specially targeted for people without technical background and also provide a great assistance for age old people. IR based wireless communication is used for controlling home appliances which includes Arduino, IR TV/DVD/MP3 remote. Infrared based systems receive signals from IR remote and this signal is carried forward to relay circuit via Arduino for switching ON/OFF home appliances through a relay driver. For controlling appliances through infrared, the author has used toggle method i.e. to get that whether the button is pressed even number of times or odd number of times.

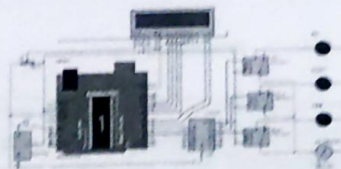


Fig. 1 Circuit diagram of IRCHAA

In this paper [2], the wi-fi module ESP8266 is used for controlling the devices. This wi-fi module is connected to Arduino UNO and both these circuits act as web server and will send control commands through a web browser like Google Chrome or Mozilla. As mentioned in the paper [2], ESP8266 module is one of the most popular and low cost available in market today. The ESP8266 which runs on 3.3V gets damaged if connected to the Arduino Uno chip which corresponds to run on 5V. To avoid this problem ESP8266 module is connected to Arduino through VCC and CH-PD. Lastly relay circuit is connected to the Arduino circuit. In this paper [2], the circuit mentioned clearly shows that the AC devices are always normally open (No) that is terminal of relay.

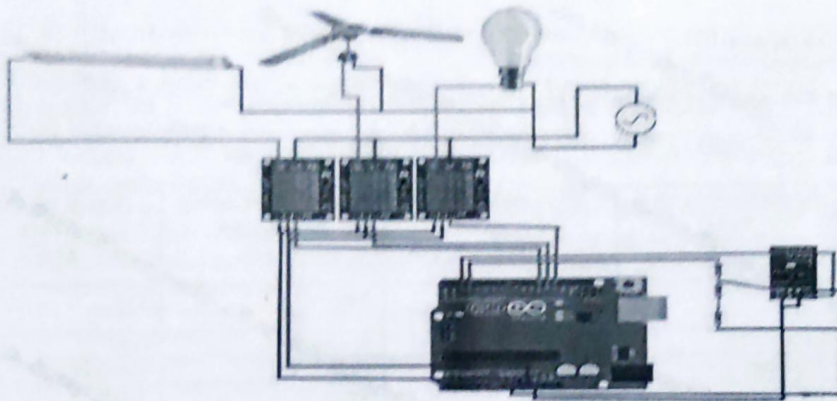


Fig. 2 Circuit Diagram of HAUWM

In this paper [3], the accelerometer of the smart phone has been used in the wheel chair. This paper [3] shows that an integrated system is made by the culmination of various components. The wheel chair is being controlled by a mobile. The heart of this system is the android application which shows the movement by the mobile that has its Bluetooth link with two external Bluetooth modules, which sends signals to the required circuit to the wheel chair.

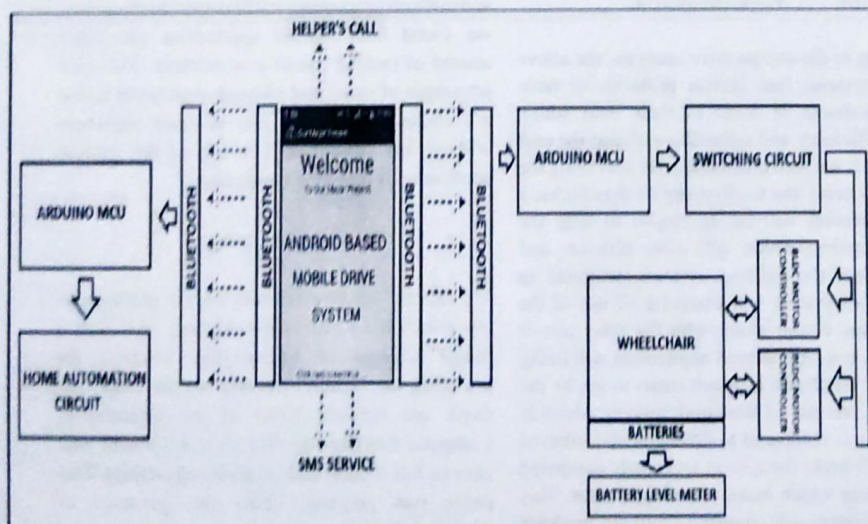


Fig. 3 Block Diagram of ABMD5



### A. Comparative analysis

The Comparative analysis between existing systems is done based on the parameter discussed in table.

TABLE 1. COMPARATIVE ANALYSIS of EXISTING SYSTEM

Parameters	Infrared based system Ref(1)	Wi-Fi module based system Ref(2)	Android based mobile drive system Ref(3)	EYE Blink based system Ref(7)
Use of Arduino	Yes	Yes	Yes	Yes
Efficiency	Low	High	Moderate	Low
Safety	Moderate	Moderate	High	Moderate
Costly	No	Yes	Yes	Yes
Dependency	Android phone with Ir remote controlled	Android phone with ESP8266	Android phone with wheelchair	Android phone,GSM module, Eye Blink Sensor
Software used	C/C++ Compiler, Android studio	AT Programming, Android studio	C/C++ Compiler, Android studio	C/C++ Compiler, Android studio
Reliability	Moderate	Less	High	High

### III. Proposed System:

According to the comparative analysis, the above existing systems face certain problems or have some drawbacks in some of their field which include efficiency and reliability and also the cost parameter is not well maintained. By surveying the existing systems and to eliminate its drawbacks, a new application will be developed to help the paralysis patient which will more efficient and reliable than the existing systems available in market. This system will comprise of use of the Arduino uno circuit along with the relay circuit connected to it. An android application will being developed which will be much easier to use by the patient. As the use of Bluetooth module which is low in cost as compared to ESP8266 and infrared chipset will make the system less costly compared to the system which make use of the sensor. This proposed system will comprise of all the facilities which provide all the feature of automation of home appliances and as various features.

### IV. Conclusion:

In the survey paper we try to briefly describe the problem to paralysis patient and the different techniques that can be used. Using the wheel chair as an alternative is simple but it's quite expensive

and difficult to maintain it efficiency. In the survey we found that android application can made instead of making use of a wheelchair. The main advantage of using and android application is that it's cheap in cost and can be used anywhere without any casualties. The use of the android application is less time consuming.

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