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PARALYSIS PATIENTS HEALTHCARE MONITORING SYSTEM

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ABSTRACT

We all know that the paralysis condition is a loss of muscle function in the body parts. It can affect any part of your body at any time, then probably you may feel pain in the affected area. Technical and Therapeutic innovations are there to improve the quality of life Our goal is to develop a device that should be easy to use and should be affordable which consists of a basic health care system with nursing care. We know that these people can't able to convey their messages or needs. To overcome this, we come up with a system that helps these patients to display messages in a very simple motion. The user needs to just tilt the device to convey the message. Here we use the accelerometer in order to measure statistics of motion. If then the data passes to the microcontroller. The microcontroller processes the data and displays the respective message on LCD. If there is no one to attain them then they can send messages through IOT which is Wi-Fi by tilting the accelerometer to another direction.

Keywords: Accelerometer, Wi-Fi, Microcontroller, IOT.

I. INTRODUCTION

According to a recent World Health Organization survey, over 5.6 million people are paralyzed, accounting for 1.9 percent of the population, or roughly 1 in every 50 people. Paraplegic health surveillance in hospitals indicates that a variety of exercises, stimulation, and medications are available to safeguard the paralyzed[4]. However, there is no specialized monitoring system in place to follow the health of paralyzed persons. To deal with these problems, a monitoring system is put in place, which is used to keep track of the patient's health. Patient who had paralytic attack have their whole or partial bodies disabled. This paralytic patient can neither speak nor express their demands or wishes. These patients cannot have a quick reflex system, hence there is no or less coordination between vocal systems, limbs, and the brain. In such a situation, this proposed project can come to the rescue. our proposed system helps the disabled person in displaying a message over the LCD by the simple motion of their hand. The proposed system works by reading the various tilt directions of the hand. The transmitter is attached to a glove that is worn by the patient. The user just needs to tilt the device in different directions to convey different messages. An accelerometer is used to measure the statistics of motion. It then passes on this data to the microcontroller which processes the data and displays the particular message as per the input obtained. It sounds a buzzer along with the message as soon as it receives a motion signal from the accelerometer. The patient can communicate by displaying the message on the LCD screen through the simple motion of their functioning body parts. The particular aspect of this device is that if no one is near the patient, he can send a message in the form of an SMS to the family members or their caretaker through the developed mechanism[11]. Though there are innovative approaches for curing or treating paralysis patients, the aim of treatment is to help a person adapt to life with paralysis by making them as independent as possible[7]. Where we see a problem with these types of devices that are being developed is that they are very large and expensive machines. They seem to be only available in hospitals and not able to be used at the patient's home or at their convenience. Our goal is to make a device that will be able to retrain a patient's motion but have them be able to use the device themselves and have it be cheap enough for them to afford without much debt.

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II. BLOCK DIAGRAM

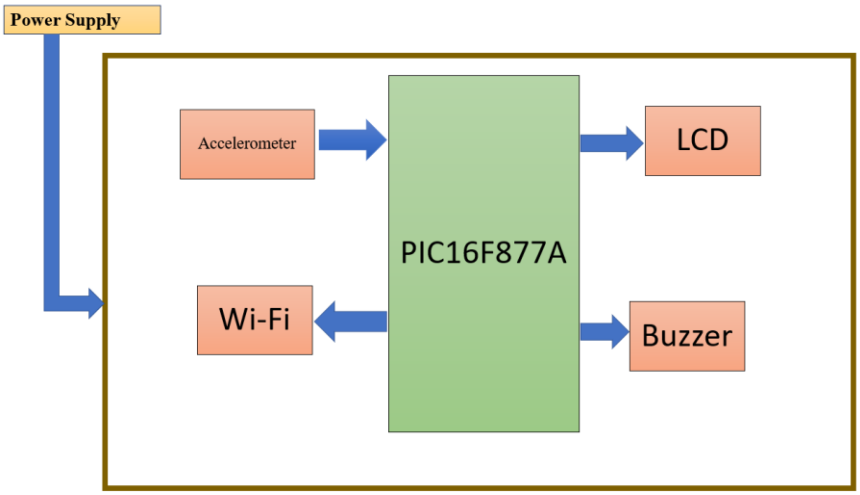

Fig.1: Block Diagram of Paralysis Patients Healthcare Monitoring System.

III. BLOCK DIAGRAM DESCRIPTION

1) Power Supply: The power supply consists of four stages namely transformer, rectifier, filter, and regulator. The transformer is a step-down transformer taking input of 230v AC and given output of 15v at the secondary [3]. This 15v AC is rectified by a bridge rectifier consisting of four diodes, which converts the AC wave into a fully rectified wave. The next stage is the filter stage consisting of a capacitor, which converts the fully rectified wave into the DC wave with so the last ripple. The last stage is the regulator stage. The regulator removes the entire ripple and gives pure DC [4].

2) Wi-Fi Module: The ESP8266 is the name of a microcontroller designed by Es press if Systems. The ESP8266 itself is a self-contained Wi-Fi networking solution offering a bridge from the existing microcontroller to Wi-Fi and is also capable of running self-contained applications. The ESP-01 ESP8266 Serial Wi-Fi Wireless Transceiver Module is a self-contained SOC with an integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor[9].

3) LCD: LCD (liquid crystal display) is the technology used for display in a notebook and other smaller computers. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow displays to be much thinner than LED and gas-display displays because they work on the principle of blocking light rather than emitting it. An LCD is made with either a passive matrix or an active matrix display grid. The passive matrix LCD has a grid of conductors with pixels located at each intersection in the grid[7]. A current is sent across two conductors on the grid to control the light for any pixel. An active matrix has a transistor located at each pixel intersection, requiring less current to control the luminance of a pixel. For this reason, the current in an active matrix display can be switched on and more frequently, improving the screen refresh time.

4) Accelerometer: An accelerometer is a device that measures the vibration, or acceleration of motion of a structure. The force caused by vibration or a change in motion (acceleration) causes the mass to "squeeze" the piezoelectric material which produces an electrical charge that is proportional to the force exerted upon it. Since the charge is proportional to the force, and the mass is constant, then the charge is also proportional to the acceleration[13]. These sensors are used in a variety of ways from space stations to handheld devices, and there's a good chance you already own a device with an accelerometer in it.

5) Buzzer: The Piezoelectric Buzzer is a small and efficient component to add to your system or project if you want to produce any sound feedback or sound an alarm. Its two-pin compact structure allows it to be easily used with a breadboard, perf-board, or even PCBs. This piezoelectric buzzer has a 23mm diameter and 30mm spaced mount holes[1]. It produces a 3.3kHz tone at an 85dB sound level when activated drawing a current of less than 15mA. Supplied with a 100mm lead, it is designed for a 3 - 20V power supply but it is advisable to use a stable

supply in this range. It is very popular among hobbyists and portable electronics due to its small size and ease to use.

6) PIC16F877A Microcontroller: Memory is not The PIC16F877A-I/P is an 8-bit CMOS Flash-based Microcontroller. The PIC16F877A features 256 bytes of EEPROM data memory, self-programming, an ICD, 2 comparators, 8 channels of 10-bit Analogue-to-digital (A/D) converter, 2 capture/compare/PWM functions, the synchronous serial port can be configured as either 3-wire Serial Peripheral Interface (SPI) or the 2- wire Inter-Integrated Circuit (I^2C) bus and a Universal Asynchronous Receiver Transmitter (USART). The data EEPROM and flash program memory is readable and writable during normal operation (over the full VDD range). This is directly mapped in the register file space. It operates on a 2v to 5.5v power supply to control the whole circuit[11].

IV. METHODOLOGY

Paralyzed individuals have trouble interacting with caregivers to satisfy their requirements since they are unable to properly express their concerns and needs. We developed an IoT paralysis patient healthcare system to assist paralyzed people in overcoming this obstacle. In this recommended approach, the paralyzed patient transmits signals to the caregiver using an accelerometer. The Wi-Fi module transmits a message to the pre-programmed caregiver phone numbers when the patient's hand is tilted. We want to integrate this method into desktop screens and an Android app for remote monitoring[11]. The proposed approach allows for the evaluation of hospital doctor's performance, as well as the true treatment of patients and the saving of their lives. The love fit of making the patient aware of a healthy lifestyle is also initiated by this proposed system. The "Automated assistance for Paralytic Patients" accomplishes the task of providing seamless assistance to paralytic patients in both normal and emergency cases. This device is applicable for patients with either leg paralysis (paraplegia) or paralysis of a single limb or an arm (monoplegia) or patients with speech disorders. The device can be worn on any mobile part of a patient[10]. Here, the unit is worn on the patient's wrist. The patient side consists of a system containing an analog accelerometer, a PIC16F877A microcontroller with a Wi-Fi module, a LED display, and a buzzer. Since the ESP8266 01 has analog output so it is connected to the ADC of the microcontroller. It is highly sensitive and any small movement can cause variation in X, Y, and Z directions. Hence, the directions of wrist movement and the corresponding messages to be displayed are predetermined. The X, Y, and Z coordinates are given to the microcontroller. Whenever the coordinates fall in the predetermined range, the corresponding message is displayed on the LED screen along with a buzzer sound. Whenever a patient moves their wrist to the right, to the left, and front, the messages "Need Water", "Need Food" and "Washroom" are displayed on the LED screen respectively. This way, a caretaker nearby will hear the buzzer, read the message on the screen, and respond accordingly. In cases of emergency, the patient moves their wrist backward and a different buzzer sound is played, and the message "Emergency" is displayed. At the same time, a push notification is sent to the application on the caretaker's phone. This ensures that even when the caretaker is far away, the notification on their phone alerts the caretaker and they can provide service to the patient as soon as possible[7].

V. CONCLUSION

By taking an overall survey, it can be found that there are many problems existing for paralyzed people such as paralysis in their leg, hand, vocal tract, and, also in other body parts. There systems are existing their comfort individually. But, this system will help to monitor the needs of paralytic patients when needed. This system helps patients overcome barriers to convey their needs without putting in the effort. Moreover, this can be modified to be used for several purposes where a person's mobility is affected. it is simple, cost-effective easy to use, and can be used by patients with all kinds of paralysis cases. Having said that this system has a vast future scope with the ability to monitor various other vitals and parameters of the human body, this serves to be a great device in assisting paralyzed patients with ease y and an effective communication process with very few efforts from the patient's end.

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