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Speaker Based Paralytic Assistant System

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Abstract - People who are paralyzed, confront numerous challenges in meeting their basic necessities on a daily basis. It is very difficult to understand the speech of people with dysarthria, amyotrophic lateral sclerosis (ALS) and similar conditions. Automatic speech command recognition system will enhance the lifestyle of people with voice disorder like dysarthria and paraplegics. The proposed work will convert the speech command of paralyzed people into text and send it to the care taker's mobile with the help of Twilio message services.This study has been undertaken to investigate the model based on the command given by the pateint under paralytic condition. This project support the challenges faced by paralytic patients under helpless condition ,with the use of a finger-mounted flex sensor. A model has been designed by the use of finger-mounted flex sensor which would then integrated with an Arduino microcontroller. Arduino processes the sensor input and translates it into actionable commands.Finally the message will be displayed on LCD screen and sounds with speaker. A gloves will be attached to the senssors .

***Key Words*: Ardinuo, Flex sensor, Speaker, DF flyer, I2C interface.**

I. INTRODUCTION

A speaker-based paralyzed assistant system utilizes voice recognition technology to enable individuals with paralysis to communicate their needs and control devices through voice commands, improving their quality of life and independence. Paralytic patient healthcare system is a system designed to help patient convey various messages to other people like doctor, nurse or family member or caretaker, the system makes use of micro controller based circulate to achieve this functionality[1]. Physically disabled people many of the times rely on others, even to perform simple action like switching on/off lights, turning on/off fan etc. In order to provide solutions to these activities the system use hand motion-controlled device when even there is motion the rely circuit will be activated which time on/off lights and fan[2]. Patient healthcare system is method in which the doctor or care taker will monitor patient's health from any location any time. There are cases when there is no one hereby him/her to overcome such situation is system continuously monitors health records of patients such as heartbeat and body temperature. Patient Monitoring system is a process of continuously tracking the patient's vital parameters[3]. Usually, the patient monitoring is carried out by attaching the sensors. The components involved including the sensors network, Display Devices, Communication Wireless. Nodes and other supporting components Sensors are nothing but the Transducers which is used to capture all the physical quantities of the patient. Display devices are the devices which are used to accumulate the desired received signal and display in the appropriate content in the LCD or HMI displays. Communication devices, are usually shorter distance communication devices[4,5]. Usually, the other supporting components involved in the patient monitoring system are the microcontroller units. A general overview is as shown in fig. 1 below

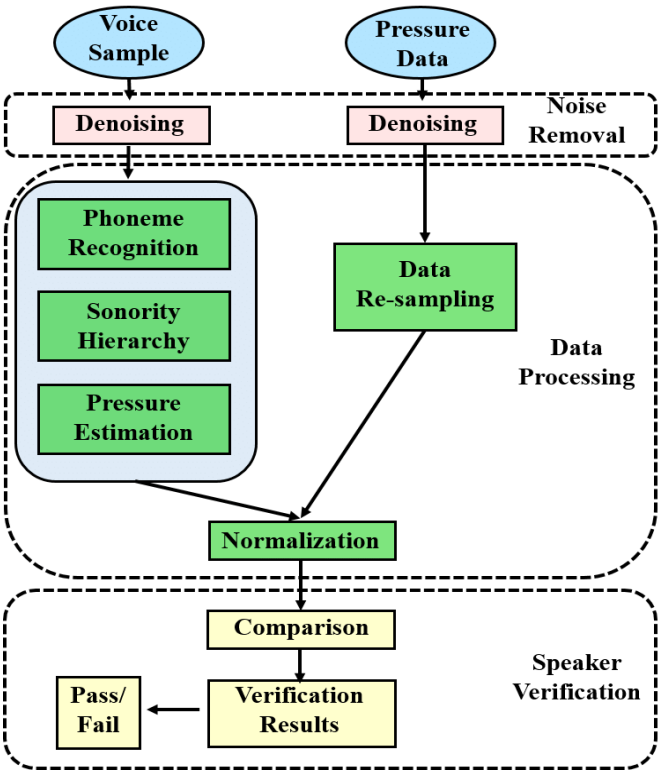

Fig. 1 Overview of Patient Monitoring system.

The proposed system is divided into three parts, Patient Data Acquisition & Device Control (Input, Output & Processing System), Doctor's Panel, Patient Panel (Self-Monitoring & Device Control)[6]. Patient data acquisition and device control, Whole hardware setup forms first module. This is the main & primary module of presented system. It collects the sensor's data and feeds to the IoT enabled microcontroller which acts as a brain of this system[7,8]. This brain sends all data to web application where doctor & patient can login to monitor health. Microcontroller has Wi-Fi chipset to perform the connectivity with webserver via Wi-Fi network present at patient's place. This module also performs the task of appliance control in patient's room on his requests being generated from web application itself[9]. Doctor's Panel, this is the part of web application where only doctor can login to view all the data of all his/her patients. This data includes the threshold values of patient's health parameters being sensed by sensors, alert limits, reminders etc. All the critical data records of patient will be stored here & are accessible only by doctor. Patient Panel, this is the part of web application where only patient can login to monitor his routine health check records and the threshold values as well as reminders set by his doctor[10]. This panel also gives functionality to patient to control devices in his room which are connected to this system.

II.Related Work

In [1] **Smart Voice Assistance for Speech disabled and Paralyzed People Lokitha T; Iswarya R; Archana A; Arun Kumar S; Sasikala S** People who are paralyzed, confront numerous challenges in meeting their basic necessities on a daily basis. It is very difficult to understand the speech of people with dysarthria, amyotrophic lateral sclerosis (ALS) and similar conditions. Automatic speech command recognition system will enhance the lifestyle of people with voice disorder like dysarthria and paraplegics. The proposed work will convert the speech command of paralyzed people into text and send it to the care taker's mobile with the help of Twilio message services. Algorithms like Support Vector Machine (SVM) and Convolutional Neural network (CNN) model is used for speech command identification and speech to text conversion. CNN model yields an accuracy of 90.62%, whereas the SVM algorithm gives a very low accuracy. The developed TensorFlow model is deployed in the flask server.

In[2]E-Assistant for Paralyzed Patients using Internet of Things Dr. Manjula V.1 , Fathimathul Muhsina2 , Gouthami S Kunder3 , Mahin Arif4 , Saramma Lafifa5 There are lots of hospitals and clinics that serve paralytic patients who have their entire or part of their body disabled by the Paralysis attack. In most of the cases, these people are not able to convey their needs as they are neither able to talk properly nor do they convey through sign language due to loss in the motor control by their brain. Many innovations are developed to improve the quality of life. So, the aim of our system is to develop a system or a device which is easy to use and should also be affordable to all kind of people. It should also consist of a person's basic health care monitoring system. This paper presents the development of an E-Assistant device for paralytic patients, aimed at improving their quality of life by providing an affordable and easy-to-use system that can monitor basic health care and assist in communicating their needs. The device uses simple motions, such as finger movements or angle-based controls, to enable patients to display messages. This device can be designed in such a way to be mounted on the back of their hands and their fingers, or other voluntary organ. The device has the potential to significantly improve the lives of paralytic patients by addressing their communication and healthcare needs. In this way the E-assistant for Paralyzed Patients automates the care taking ability of the patient which makes sure a healthy and periodic attention to the patient and thus results in a good health of the patient

In[3]**Voice Recognition based Home Automation System for Paralyzed People Abhishek Bhujbal1 Abhishek Hire2 Akash Jadhav3 Siddhesh Lendhe4 Z. V. Thorat5**The voice recognition based home automation system was built and implemented. The system is specially designed for the people suffering from paralysis and also for the elderly people. The use of voice commands eliminates the need to remote controllers and other electronic device and makes it easy to interact with the system to perform automation and control electrical devices. Buzzer allows disabled person to notify the guardians whenever the person need help. The illumination sensor automatically turns off the lights when sun light is enough to see things around also a time delay is added that if user forgot to turn off lights or any device the will be automatically turned off to conserve energy.

In[4]**Automated Paralysis Patient Health Care & Monitoring System Hasin Eshrak, Mohammad Rejwan Uddin, Asif Mahmood, and Mahady Hasan** The majority of paralysis sufferers have difficulty communicating as well as moving certain body parts. An automated paralysis patient healthcare system can be incredibly valuable to these individuals. It's a computerized healthcare system. By moving any part of their body that can move, a disabled person can utilize this technology to display a message on an LCD panel. This strategy is also useful when the patient is left alone, and no one is available to provide care. A GPRS modem (SIM) is used to send an SMS, allowing whoever is caring for the patient to monitor the patient's condition from a distance. The system functions by understanding the user's tilt direction and monitoring real-time vitals. The device is used to demonstrate how it works by holding the thing in the fingers of the moving hand. The user only needs to tilt the device at a specific angle to send a message. This approach was designed to safeguard the safety and health of paralysis patients by giving immediate assistance.

In[5]**Smart Bed Using Voice Recognition for Paralyzed Patient Nurul Fadillah , Ahmad Ihsan** Smart beds are a way to simplify homework, especially for the elderly (elderly) and those who have physical disabilities, disabilities or paralysis. They can move the height of the bed according to their needs and comfort. The proposed system consists of a speech recognition module, an arduino, a relay circuit, and an adjustable bed. Voice recognition modules need to be trained before they are used to recognize commands. After successfully recognizing the voice command, Arduino directs the charge according to the help of the relay circuit. Adjustable bed height can be adjusted in three different modes according to the user's comfort and needs. The accuracy of the speech recognition module is measured in three bed height modes with different conditions Istirahat, Berbaring dan Bangun, Istirahat in a 145 degree position, Bangun 110 degrees and Berbaring 180 degrees. ON, OFF, Rest, Wake and Lie down. A total of ten experiments were carried out for each order listed in the table. Out of ten experiments, the speech recognition module correctly recognizes voice commands. The percentage accuracy of the voice recognition module in silence is 75%

In[6]S**mart Assist System Module for Paralysed Patient Using IoT ApplicationR Kishore Kanna Nihar, Ranjan Pradhan ,Bhawani Sankar Panigrahi, Santi Swarup Basa, Sarita Mohanty** Those who are hearing impaired or hard of hearing face the most difficult challenges as a result of their handicap. To establish a bond or commit to something, people should be able to express their ideas and feelings via open channels of communication. To solve such issues, simple, transportable, and accurate assistive technology will probably be developed. The glove with sensors and an Arduino microcontroller is the major focus. This system was developed specifically to translate sign languages while analyzing gesture locations using smart technologies in custom gloves. The micro-controller identifies certain hand motions using sensors attached to gloves and converts sensor output data into text. Their capacity to converse may be aided by their ability to read the text on the mobile IOT application. Also, it aids in automating the houses of people with paralysis. It has the capacity to assess biological indicators like pulse and temperature as a patient monitoring device. The system will be put into place with the intention of enhancing the quality of life for people with disabilities and providing additional assistance in bridging the communication gap. It has a low price tag and a small design.

III.PROPOSED SYSTEM

Sign language is a technique by which the gestures finished by the user are used for communication. Human gestures are an efficient and authoritative way of interaction. These are sometimes used to express ourselves. This project focuses on raising a assist for disabled people using this gesture recognition technique. In this scheme, the gestures are converted into text messages for communication. The essential idea is using gloves using Flex Sensors for the disabled people. A sign language typically provides signs for whole words or letters. A sign language editing apparatus comprise a glove-type sensor that converts association of fingers in the sign language into an electrical signal to manufacture time series data of sign language words. Although data gloves are accessible in the marketplace but they are used for gaming and other virtual reality applications and there is no such absolute system.

IV.METHODOLOGY

This organization is completed out of transmitting segment and receiving section. The transmitting section comprises of glove including five flex sensors, one accelerometer sensor (one for every finger and number of sensor may be change) join with microcontroller. The management of sensor estimation is allotted to the microcontroller that performs information transformation. The output of accelerometer sensor in announce through the speaker. The finger movements are detected or not will be displayed on LCD on transmitter side. The output of microcontroller is given to RF 433 MHz for wireless communication. The receiving section, which consist of power supply section, RF Receiver, wireless module, Relay along with driver. The transmitted information through wireless module RF is given to the receiver side wireless module. The output of wireless module is given to the microcontroller. For displaying the data from RF wireless module receiver and also it control the electrical parameter such like fan, light, AC. We have used the c# software for microcontroller programming as mention in following fig.2 below

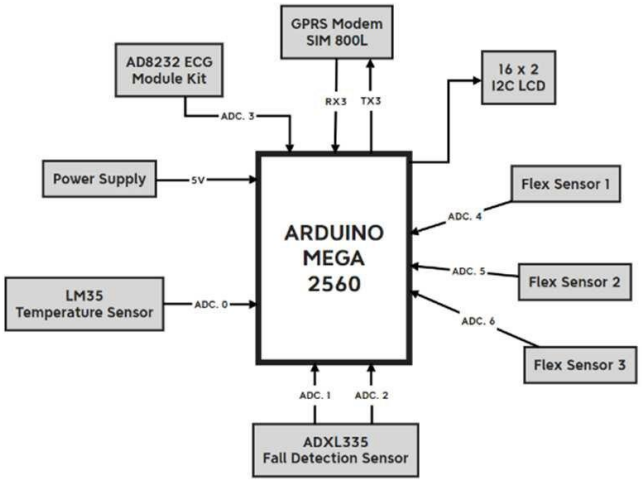

Fig. 2 Methodology of Patient Monitoring system.

V.HARDWARE DETAILS

A **Speaker-Based Assistant System** for a **paralytic patient** using a **flex sensor** and **Arduino Uno**, with communication via the **I2C protocol** to a speaker and **DFPlayer Mini** (an MP3 player module), is designed to help the patient communicate their needs through finger movements.
As shown in fig.3 below

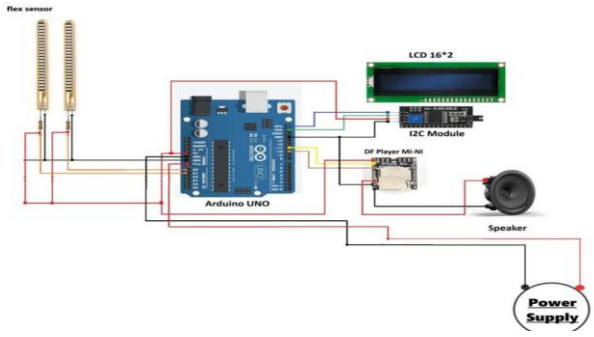

Fig. 3 Hardware Design

(1) **Arduino Uno:** The microcontroller acts as the brain of the system, reading inputs from the flex sensor and controlling the DFPlayer and speaker.
(2) **Flex Sensor:** A sensor attached to the patient's finger to detect movement. The sensor's resistance changes based on the bending of the finger, allowing the Arduino to detect different degrees of movement.
(3) **DFPlayer Mini:** An MP3 player module that communicates with the Arduino to play pre-recorded voice messages based on the patient's needs. It supports I2C communication.
(4) **8-ohm Speaker:** The speaker plays the voice messages from the DFPlayer module.
(5) **I2C Protocol:** A communication protocol used to send commands from the Arduino to other components, like the DFPlayer or additional sensors/modules.

VI. OUTPUT RESULT

The results obtained are as follows:The gadget detects the motion and generates the exact message matching the particular direction of motion, allowing patients to communicate their basic demands simply by moving their hands. Visual and auditory alarms notify the attendants and doctors whenever a message is being conveyed through the device by the patient. If the patient is in an emergency scenario, he or she can use this device to send a message to the doctor's mobile phone by moving his or her hand in a specific direction. The follwing results have been obtain as seen on hardware as in fig. 4

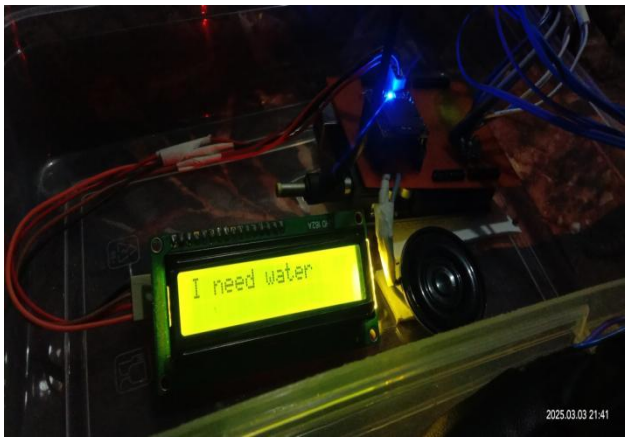

Fig. 4 Hardware Result

VII. CONCLUSION

Finally, this device has solved the major problem faced by paralyzed patients, which is their inability to communicate with their caretakers even to fulfil their most basic needs, and it has also provided a way for patients to notify the doctor when they require assistance or help.Though there already exits a several systems to monitor the paralysed patient's condition, there are few systems that focuses on communication of them. This system proves to be extremely beneficial for patients with paralysis. They are able to seek assistance by making specific movements, enabling them to lead alive similar to that of able-bodied individuals. This system bridges the gap between the patient and others via communication. This system is dependable and affordable and reduce the weight to make it more convenient for them to utilize. This system relieve their stress by revealing their thoughts and help them to motivate as much as possible.

VIII. APPLICATIONS

- This device can be utilized in hospital for communicating with doctors and nurses.
- This device can be utilized in home or office for communicating with other people.
- This system can be utilized by healthcare providers for remote consultations and telemedicine appointments, thereby minimizing the necessity for inperson visits.

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