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ASSISTING SYSTEM FOR PARALYZED AND MUTE PEOPLE WITH HEART RATE MONITORING

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Abstract - *The noble aim behind this project is to design a health care system which will be helpful for paralyzed and mute people as well as for the detection of heart attack. A Dumb individual all through the world uses gesture based communication for the correspondence. The progression in implanted framework can give a space to plan and build up an interpreter framework to change over the communication via gestures into discourse. As sign language primarily used by deaf but also used by people who can hear having problem in speaking so the approach used in this analysis is vision based. The glove uses are fitted with flex sensor in three dimensions to collect the data from every position of figure and hand motion to differentiate and distinguish each and every word from a particular sign. Heart attack is the major reason for death among both genders men and women. However, its occurrence cannot be always predictable. Most common device used to detect heart related problems is an EKG machine which is reliable to normal user, but is not mobile enough to be used as a monitoring device for a heart patient continuously. This project is to develop an algorithm for detecting a heart attack and if so, then to alert doctors, family members and emergency services .Hence here we introduce a smart health care system which will take care of problems and need of paralyzed and mute people and will also help in detection of heart attack.*

***Key Words*: Heart rate, flex sensor, Mute People, Gesture Recognition, sign language.**

1. INTRODUCTION

Paralysis is defined as the complete loss of muscle function in any part of the body. It occurs when there is a problem with the passage of messages between the muscles and brain .Due to paralysis patients are not able to move their some of body parts and also it is very difficult for them to talk with other person for their need or help. Hence our project will help paralyzed people to convey their messages to doctor or family member .This project will help them to do something by their own [2]. Its very difficult for mute people to convey their message to regular people. Since regular people are not trained on hand sign language, the communication becomes very difficult. In emergency or other times when a mute person travelling or among new people communication with nearby people or conveying a message becomes very difficult. [4]. Here we propose a smart speaking system that helps mute people in conveying the message to regular people using hand motions or gestures. The system makes the use of hand motion reading system equipped with motion along with a speaker unit. This system is powered by a battery powered circuitry to run it [3]. This framework offers voice to voiceless i.e. voice is given to the individual who can't talk. Imbecilic/quiet individuals utilize gesture based communication for correspondence reason. Communication through signing utilizes signals rather than sound to pass on data. This dialect incorporates consolidating hand shapes, hand developments, outward appearances to express person's considerations [7]. In this framework flex sensors assumes the real part. Flex sensors are the sensors whose resistivity changes with the measure of curve. This framework show fill in as an attractive Interpreter used to deciphers Sign Language in type of Gesture by a Dumb Person to Synthesized English Word which has a relating significance in Sign Language which translates a specific thing, as an Audio Output for Normal Person.[8]

2. LITERATURE SURVEY

According to a survey, nearly 1 in every 5000 people are paralyzed. Fully paralyzed patients require 24 hour support. But in this days, it is not possible to constant monitor patient. So they need a person which take care's movement disabled or paralyzed patient. And appliances cannot be handled by them. So they need constant help and they cannot work independently there are various applications which can be drive from eye blink detection and these are not limited. An efficient, real time blink detection can be used for almost any purpose. It can be used for on/off appliances such as lighting devices, fan, television or a microwave oven. Electrooculographic direction of a wheelchair utilizing eye development A convenient remote eye development controlled Human Computer Interface (HCI) for debilitated individual Eye controlled turning on and off the electronic gadgets Launching the rocket utilizing look in war field A few inquires about have been done as of late to develop Human Computer Interface [HCI][4].Human Computer Interface as an assistive innovation helps the general population with engine incapacities and who can't move their arms thus mind boggling human PC interface must be more developed, specific to that of the information charges, adjusted - to the incapacity of the user, designed in a sheltered and straightforward way. Under to human PC interface

the most developed. The primary point of the proposed framework is to build up a financially savvy framework which can offer voice to voiceless individual with the assistance of Smart Gloves. It implies that utilizing brilliant gloves correspondence won't be obstruction between two distinct groups and they will have the capacity to discuss effortlessly with the typical individual. Utilization of keen glove by individual with incapacity influences country to develop and furthermore they won't vary themselves from the typical individuals. In this paper Quiapo et.al. Cover the various prevailing methods of deaf-mute communication interpreter system. The two broad classification of the communication methodologies used by the deaf –mute people are - Wearable Communication Device and Online Learning System. Under Wearable communication method, there are Glove based system, Keypad method and Handicom Touch-screen. All the above mentioned three sub-divided methods make use of various sensors, accelerometer, a suitable micro-controller, a text to speech conversion module, a keypad and a touch-screen. The need for an external device to interpret the message between a deaf –mute and non-deaf-mute people can be overcome by the second method i.e online learning system. The Online Learning System has different methods. The five subdivided methods are- SLIM module, TESSA, Wi-See Technology, SWI_PELE System and Web-Sign Technology [1].

In another research Abhinandan Das et.al proposed ISLR system is considered as a pattern recognition technique that has two important modules: feature extraction and classification. The joint use of Discrete Wavelet Transform (DWT) based feature extraction and nearest neighbour classifier is used to recognize the sign language. The experimental results show that the proposed hand gesture recognition system achieves maximum 99.23% classification accuracy while using cosine distance classifier [2] . In their research Anetha K et.al. presented a scheme using a database driven hand gesture recognition based upon skin color model approach and thresholding approach along with an effective template matching with can be effectively used for human robotics applications and similar other applications.. Initially, hand region is segmented by applying skin color model in YCbCr color space. In the next stage thresholding is applied to separate foreground and background. Finally, template based matching technique is developed using Principal Component Analysis (PCA) for recognition [3]. Aarthi M et.al. Presented the static hand gesture recognition system using digital image processing. For hand gesture feature vector SIFT algorithm is used. The SIFT features have been computed at the edges which are invariant to scaling, rotation, addition of noise [4]. Priyanka Lokhande et.al proposed a method for automatic recognition of signs on the basis of shape based features is presented. For segmentation of hand region from the images, Otsu's thresholding algorithm is used, that chooses an optimal threshold to minimize the within-class variance of threshold black and white pixels. Features of segmented hand region are calculated using Hu's invariant moments that are fed to Artificial Neural Network for classification. Performance of the system is evaluated on the basis of Accuracy, Sensitivity and Specificity [5].

Another Authors Anetha K et.al presented various method of hand gesture and sign language recognition proposed in the past by various researchers. For deaf and dumb people, Sign language is the only way of communication. With the help of sign language, these physical impaired people express their emotions and thoughts to other person [6]. Priyanka R Potdar et.al. Proposed a system to aid communication of deaf and dumb people communication using Indian sign language (ISL) with normal people where hand gestures will be converted into appropriate text message. Main objective is to design an algorithm to convert dynamic gesture to text at real time. Finally after testing is done the system will be implemented on android platform and will be available as an application for smart phone and tablet pc [7]. Another Author proposed a real time vision based system for hand gesture recognition for human computer interaction in many applications. The system can recognize 35 different hand gestures given by Indian and American Sign Language or ISL and ASL at faster rate with virtuous accuracy. RGB-to-GRAY segmentation technique was used to minimize the chances of false detection. Authors proposed a method of improvised Scale Invariant Feature Transform (SIFT) and same was used to extract features. The system is model using MATLAB. To design and efficient user friendly hand gesture recognition system, a GUI model has been implemented [8].

One of the researcher Sachin Bhatt et.al. Presented the recent research and development of sign language based on manual communication and body language. Sign language recognition system typically elaborate three steps preprocessing, feature extraction and classification .Classification methods used for recognition are Neural Network (NN), Support Vector Machine(SVM), Hidden Markov Models (HMM) [9]. Mukul Singh Kushwah et.al. Presented application that helps the deaf and dumb person to communicate with the rest of the world using sign language. The key feature in this system is the real time gesture to text conversion. The processing steps include: gesture extraction, gesture matching and conversion to speech. Gesture extraction involves use of various image processing techniques such as histogram matching, bounding box computation, skin colour segmentation and region growing. Techniques applicable for Gesture matching include feature point matching and correlation based matching. The other features in the application include voicing out of text and text to gesture conversion [10].

3. PROPOSED SYSTEM

Sign languages are languages that use the visual-manual modality to convey meaning. Language is expressed via the manual sign stream in combination with non-manual elements. Sign languages are full-fledged natural languages with their own

grammar and lexicon. This means that sign languages are not universal and they are not mutually intelligible, although there are also striking similarities among sign languages.

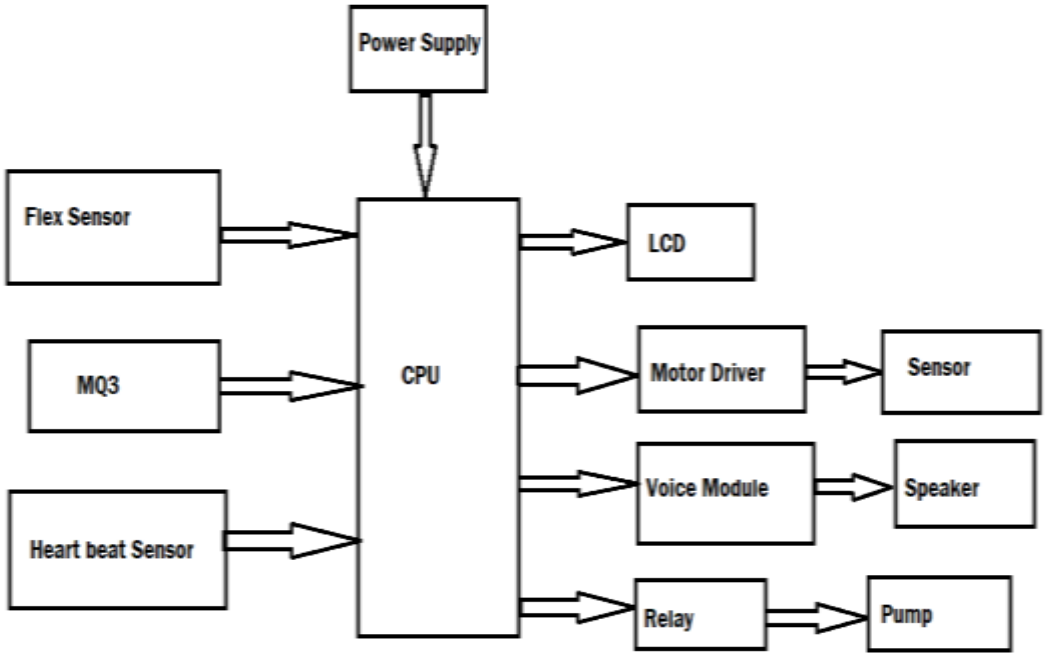

Fig -1: Block diagram of Assisting System for Paralyzed and Mute People with Heart Rate Monitoring

Linguists consider both spoken and signed communication to be types of natural language, meaning that both emerged through an abstract, protracted aging process and evolved over time without meticulous planning. Sign language should not be confused with body language, a type of nonverbal communication. Wherever communities of deaf people exist, sign languages have developed as handy means of communication and they form the core of local deaf cultures. Although signing is used primarily by the deaf and hard of hearing, it is also used by hearing individuals, such as those unable to physically speak, those who have trouble with spoken language due to a disability or condition (augmentative and alternative communication), or those with deaf family members, such as children of deaf adult.

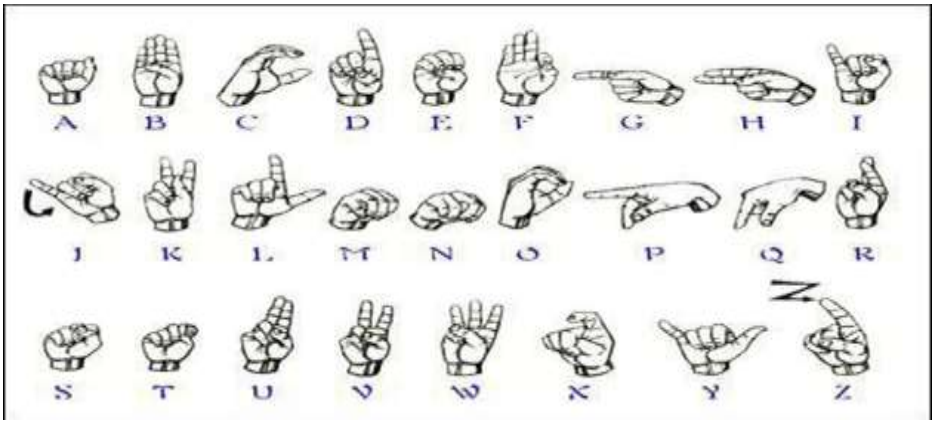

Fig 2: sign language

In this system we used handicap wheelchair which basically works on the principle of acceleration, one acceleration sensor, provides two axes, acceleration sensors whose output is analog, varies according to acceleration applied to it, by applying simple formula we calculate the amount of tilt and output of tilt will decide to move in which direction. Sensor gives X-

axis and Y-axis output independently which is fed to ADC and then micro controller and depending on the pulse width it decides to move or not. As from the circuit diagram it is clear that we have used micro controller AVR. So the accelerometer sensor is connected to the port 3 of micro controller. Depending on the movement of sensors, the motor moves in any of the four directions (i.e. left, right, forward, backward). If the four fingers of the left hand are bend the wheel chair will move in forward direction. And if the middle two fingers of the left hand are bend then the wheel chair moves in reverse direction. If the two fingers from the right hand side are bend then wheel chair moves in right direction. In the same way if the two fingers from the left hand side are bend then the wheelchair moves in the left direction. Similarly, the movement of single fingers are bend one by one then various commands are recorded on that particular movements for helping the patient.

4. SYSTEM IMPLEMENTATION

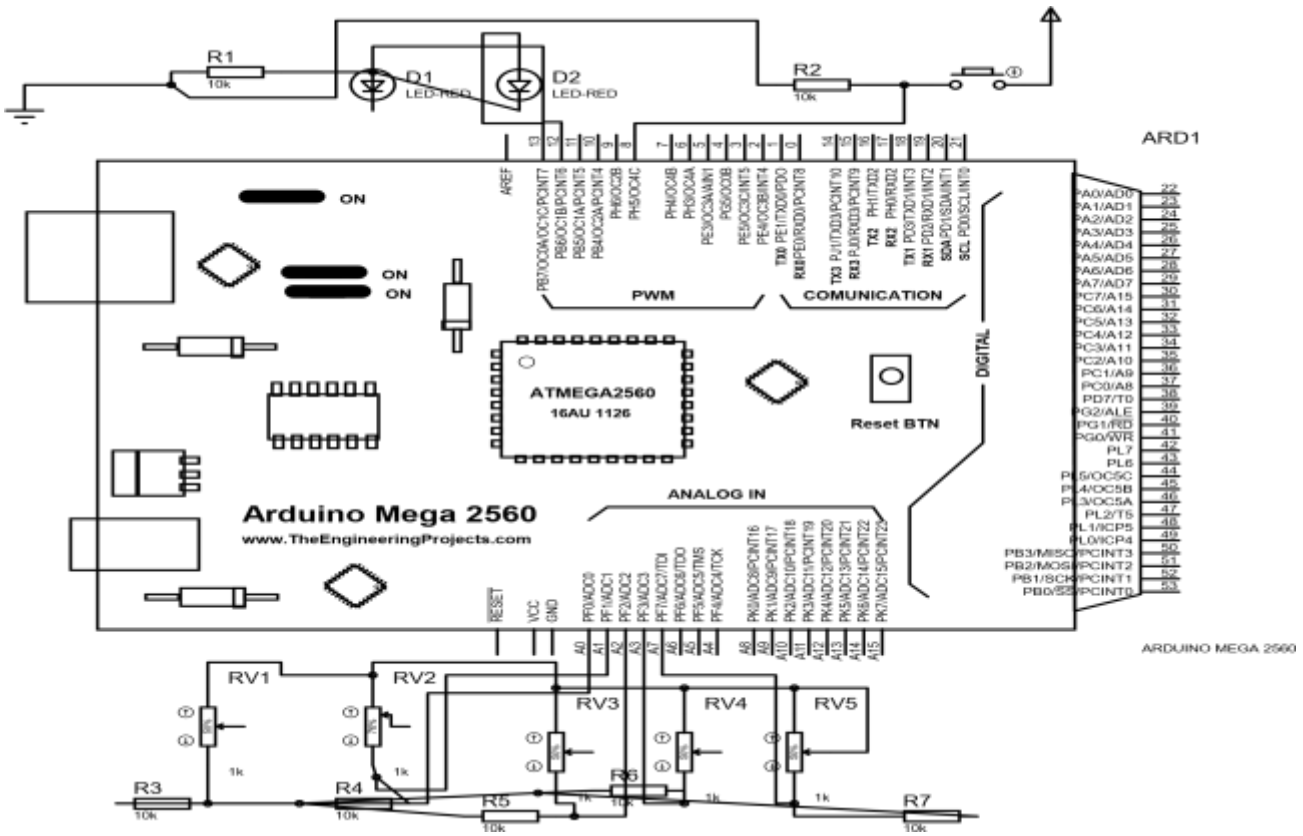

Fig -3: Circuit diagram of Assisting System for Paralyzed and Mute People with Heart Rate Monitoring.

The circuit consists of ATMEGA2560 16AV 1126. It has various impulse of which six are used .The inputs provided to Arduino are five flex sensors : Flex 1, flex 2,flex 3,flex 4, flex 5 and a heart rate sensor as a sixth input. With the help of these provided inputs it gives output in the vocal form as well as in the display format. Five vocal outputs of flex sensors are related on the five outputs of flex sensors .If the first flex sensor is bent then it displays the output as food and provides the output in vocal format too as "Food". If second flex sensor is bent then Arduino provides output as "Water". The bending of third sensor provides the output as "Medicine". The output is shown as a "Fan" when the fourth sensor is bent. The bending of fifth sensor provides the output as "Washroom". When the first two sensors are bent it moves the wheel chair in the right direction. And if the third and fourth flex sensors are bent then the chair is moved to the left side. If first four sensors are bent then wheelchair is moved to the forward direction. In the same case if second and third flex sensors are bent then the wheel chair moves backwards. The movement of wheel chair depends on the movement of motors. In this circuit four motors are used. L293D use two motors in and as we require 4 motors two motors are connected in parallel making two pairs. The voice module has eight channels with the help of which voice can be recorded in the circuit module. The voice module is regulated by the Arduino and it provides data to the hardware circuit of voltage divider. LCD is connected to the motor driver. This helps to display the message which is programmed for a particular movement of sensors. To the voice module a speaker is connected for the family of vocal messages. Relay is used in the circuit runs at 5V. Battery provides supply to the relay. In addition to this gas sensor is connected to the Arduino which helps to sense smoke of sprinkler is connected to relay to prevent fire.

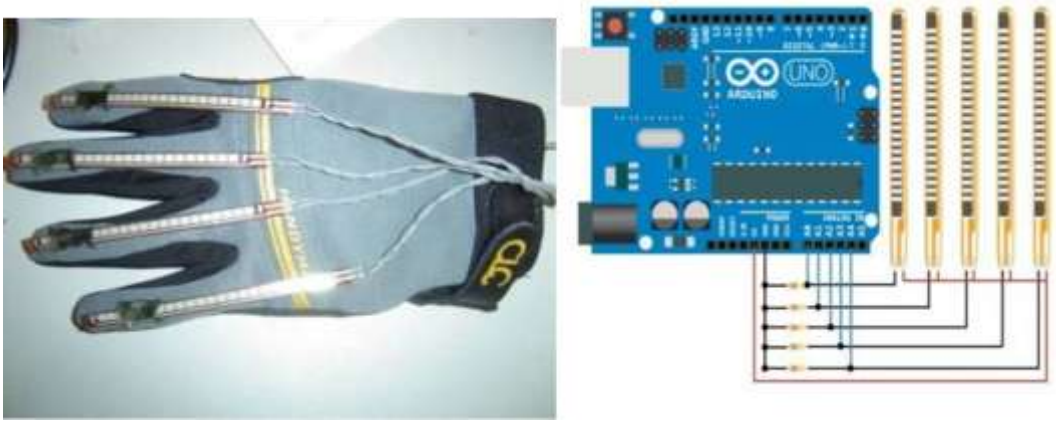

Fig 4. -: simulation diagram of Assisting System for Paralyzed and Mute People with Heart Rate Monitoring

4. EXPERIMENTAL RESULTS

The hardware model of the project. The model consists of components like Arduino ATMEGA 2560, Flex sensors, Heart rate sensor, Resistors, LCD, Voice module, Speaker, L293D motor, MQ3 Sensor, Led, Relay and Pump. Arduino ATMEGA 2560 acts as a controller of the model. Flex sensors are used to drive the model in forward and backward direction. Voice module is used to record vocal messages and these recorded messages are displayed on the LCD screen. Four L293d motors are mounted at the bottom of the model. The pump is mounted to sprinkle the water at the time of fire emergency.

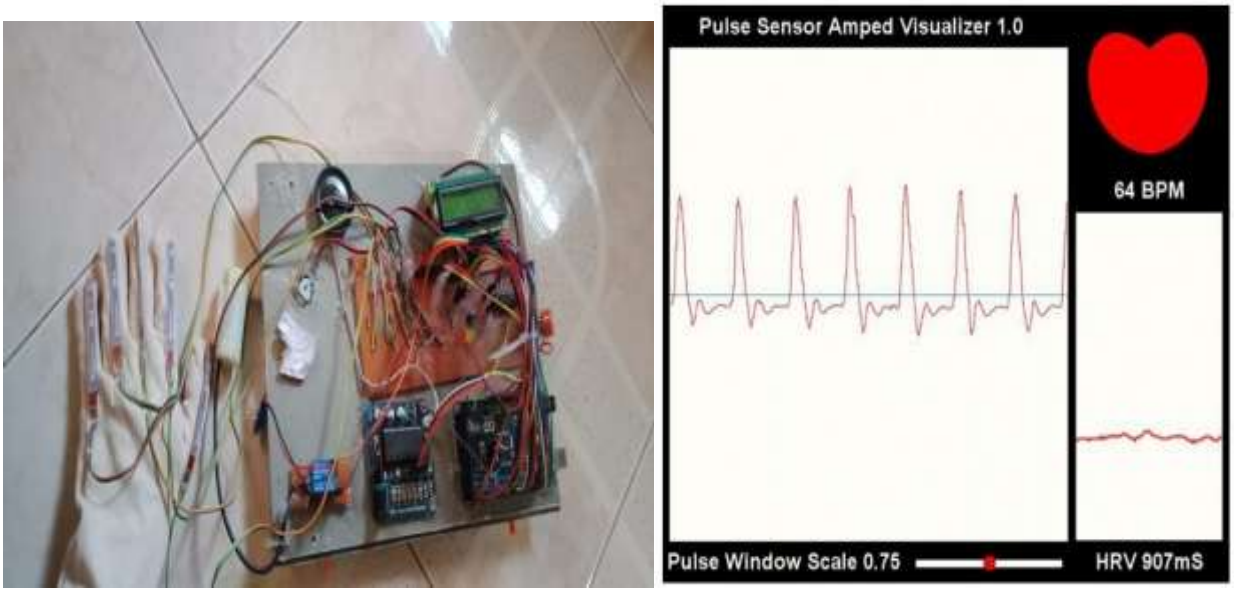

Fig -5: hardware and software implementation of Assisting System for Paralyzed And Mute People with Heart Rate Monitoring

In about system flex sensors are mounted on the gloves. With the help of movement of fingers the patient can convey message to the respected care taker. Along with this with the help of flex sensors patient can move the wheel chair in the forward and backward direction. With the help of pump water is sprinkled when there is fire emergency.

5. CONCLUSION

The task plans to lessen the correspondence hole between hard of hearing or quiet group and ordinary individuals. This framework will enhance stupid/hard of hearing individual's way of life. Indeed, even it will be useful for the correspondence between the hard of hearing individual and the idiotic individual. General System is successful and proficient due to the utilization of Arduino microcontroller and android telephone. With this task gesture based communication can be executed to convey, the objective individual. The framework has some preferred standpoint over past framework: Translation of discourse

to content done effortlessly without squeezing catch. Hard of hearing individual's discourse effortlessly comprehends by individuals utilizing android telephone. Hard of hearing individual needn't bother with pen or paper for clarifying their discourse, this framework gives great exactness. In future it may be possible to convert individual character instead of converting complete sentence. In this proposed system, at max we can used 32 combination because for every flex sensor we use only one bend, but if all of the bends are used then the combination will become 7776 sentences.

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