Smart Gloves For Paralyzed Patient

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Abstract— **Smart Health care system enable all humans to be equal with each other. A dumb person can't communicate, these smart gloves make it possible for users to transform hand gestures into written text and prerecorded voices, that help alleviate the communication barrier. The smart gloves also aid a person in understanding what a specially-abled person is actually trying to say so that one can reply accordingly. This particular Smart Glove also possesses an additional functionality of Home Appliance automation using which a specially-abled person can regulate and manage household appliances**.

*Keywords—***Smart Healthcare, Dumb person, Communication, Gestures, Smart Gloves.**

I. 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. Some paralyzed people cannot move even a single part of the body other than their eyes. Hence, the main aim of this paper is to design a real time system that can helpful the paralyzed to control appliances. through a number of eye blinks. Image processing techniques are also used for detecting the eye blinks. In our system, the face tracking is done by using eye blink sensor which is IR based sensor. which reflects from eye's surface and threshold is generated. With which the devices are ON/OFF Initially, the involuntary blinks of the paralyzed person are used to locate the patient's eyes by finding the number of connected components in a frame. Once the eyes are detected by checking time for which eye is blinked,. In these days electronic devices are improving day by day and there demand is also improving. Smart phones, tablets are example of this. The system detects the eye blink and differentiates between an intentional long blink and a normal eye blink. Here one eye blink of one eye is required to ON one appliance This system can not only be used to save electricity, but also to help paralyzed patients to lead their own life without anyone's help. Tetraplegia is a condition where people cannot move parts below neck. The proposed system can be used to control two appliances simultaneously. where one eye is used to control one device like bulb and other eye's blink is used to control second device like alarm bell. In this system simply ARM processor is used, and embedded language is used and mat lab or image processing is not used therefore this system's efficiency and accuracy is more. today PC's outdated. So here there no need to use pc for functioning or visualise the waveforms generated by sensor so simple hardware is used to assist the paralyzed people. and smart automation system is builded by this. And also in these project constant patient monitoring system is added for helping fully paralyzed people which consists of various sensors. These sensor values are processed by arm controller and if specific value of body parameter is changes from its ideal value and goes to danger level then sms is sent to patients relative or doctor through gsm. So this system is highly useful for paralyzed people.

II. LITERATURE SURVEY

1. Smart Glove: Gesture Vocalizer for Deaf and Dumb [1]

In [1], the system comprises a Glove, flex receptors, and an accelerometer. These sensors are motion sensitive and give values that are different for various degrees of bends. This particular program even offers a speech synthesizer module that transforms motion of fingers into real-time speech output, along with a display that has written text for the corresponding gesture. Sign language is the standard way for communication between specially-abled and ordinary individuals. With that said, usually, they find trouble

in talking with other people as a lot of people don't actually understand sign language. The above results in a continuous language barrier, to reduce this barrier. The content and speech output is actually in English.

2. Design of Smart Gloves.[2]

Being deaf and dumb is considered to be a perceptual disability. To eradicate this barrier of communication in [2], the gadget makes use of flex sensors, a micro controller and a PSU. The software component of this prototype uses embedded C written in Keil Micro vision. This converts the degree of bends into measurable values which further correspond to recognized hand movement sign languages. This glove presents the corresponding alphabet for each sign language movement, thus reducing the communication barrier between the deaf/dumb and normal people.

3. Review Paper On Evolution Of Smart Glove.[3]

Each day interaction with the general public poses a tremendous struggle for all with hearing loss and hearing disability. For this purpose, an immediate sign language recognition system was developed using the machine learning algorithm of Random Forest Classifier, as well as in order to convert the sign alphabets and words that are common into sound and text. A glove circuit has been created with flex sensors, a 3 axis accelerometer, along with a gyroscope to record the gestures or perhaps sign data. The finger bend information is received from flex sensors on every finger as the accelerometer, as well as a gyroscope, offers the trajectories of the hand movement. The information from the receptors is then transferred from the skilled model to understand the Gesture. The main purpose of Smart Glove would be to present ease of sharing simple concepts, reduce communication gap and much easier cooperation for the hard of listening to individuals.

III. IMPLEMENTED SYSTEM

3.1 Software and Hardware requirement

3.1.1 Software Requirements:
1. Arduino IDE (Programming)

Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board. The key features are:

• Arduino boards are able to read analog or digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connect to the cloud and many other actions.

• You can control your board functions by sending a set of instructions to the microcontroller on the board via Arduino IDE (referred to as uploading software). Unlike most previous programmable circuit boards, Arduino does not need an extra piece of hardware (called a programmer) in order to load a new code onto the board.You can simply use a USB cable.

2. Express PCB (Circuit &layout design)

The main purpose of printed circuit is in the routing of electric currents and signal through a thin copper layer that is bounded firmly to an insulating base material sometimes called the substrate. This base is manufactured with an integrally bounded layer of thin copper foil which has to be partly etched or removed to arrive at a predesigned pattern to suit the circuit connections or other applications as required. The term printed circuit board is derived from the original method where a printed pattern is used as the mask over wanted areas of copper. The PCB provides an ideal baseboard upon which to assemble and hold firmly most of the small components. From the constructor's point of view, the main attraction of using PCB is its role as the mechanical support for small components. There is less need for complicated and time consuming metal work of chassis contraception except perhaps in providing the final enclosure. Most straight forward circuit designs can be easily converted in to printed wiring layer the thought required to carry out the inversion cab footed high light an possible error that would otherwise be missed in conventional point to point wiring .

3.1.2 Hardware Requirements:

1. Microcontroller (AT mega 328)

2. Power supply

3. GSM model

4. Voice module

5. Speaker

6. Accelerometer

7. Temp Sensor

8. Buzzer

9. LED

10. Diode

11.　　　Relay

12.　　　Regulator

13.　　　Lcd 16*2

 1. Microcontroller AT Mega 328
Features
•High Performance, Low Power AVR® 8-Bit

Microcontroller

•Advanced RISC Architecture

–　　　131 Powerful Instructions – Most Single Clock Cycle

Execution

–　　　32 x 8 General Purpose Working Registers

–　　　Fully Static Operation

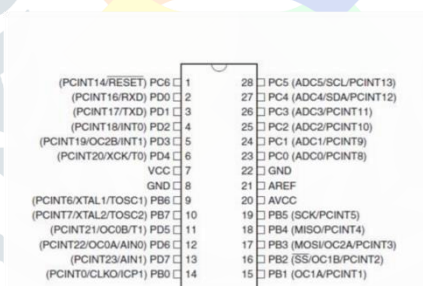–　　　Up to 20 MIPS Throughput at 20 MHz

–　　　On-chip 2-cycle Multiplier

• High Endurance Non-volatile Memory Segments

–　　　4/8/16/32K Bytes of In-System Self-Programmable Flash program memory – 256/512/512/1K Bytes EEPROM

–　　　512/1K/1K/2K Bytes Internal SRAM

–　　　Write/Erase Cycles: 10,000 Flash/100,000 EEPROM

–　　　Data retention: 20 years at 85°C/100 years at 25°C(1)

–　　　Optional Boot Code Section with Independent Lock Bits

In-System Programming by On-chip Boot Program

True Read-While-Write Operation

–　　　Programming Lock for Software Security

Pin diagram

2. Diodes

Diodes allow electricity to flow in only one direction. The arrow of the circuit symbol shows the direction in which the current can flow. Diodes are the electrical version of a valve and early diodes were actually called valves.

Forward Voltage Drop **:** Electricity uses up a little energy pushing its way through the diode, rather like a person pushing through a door with a spring. This means that there is a small voltage across a conducting diode, it is called the forward voltage drop and is about 0.7V for all normal diodes, which are made from silicon. The forward voltage drop of a diode is almost constant whatever the current passing through the diode so they have a very steep characteristic (current-voltage graph).

Reverse Voltage : When a reverse voltage is applied a perfect diode does not conduct, but all real diodes leak a very tiny current of a few µA or less. This can be ignored in most circuits because it will be very much smaller than the current flowing in the forward direction. However, all diodes have a maximum reverse voltage (usually 50V or more) and if this is exceeded the diode will fail and pass a large current in the reverse direction, this is called breakdown.

TRANSFORMER
The fundamental principle of how the transformer functions are mutual induction between the two coils or Faraday's Law of Electromagnetic Induction. Below is a description of how the transformer operates. The laminated silicon steel core of the transformer is covered by two distinct windings. According to the diagram below, the primary winding is the one to which the AC supply is connected, and the secondary winding is the one to which the load is connected.
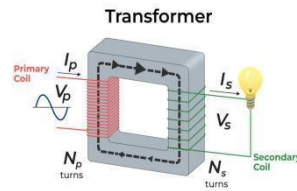
Fig: 1 Transformer

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3. GSM model

Fig: 2 . GSM model

General Description:

GSM/GPRS Modem-RS232 is built with Dual Band GSM/GPRS engine- SIM900A, works on frequencies 900/ 1800 MHz's. The Modem is coming with RS232 interface, which allows you connect PC as well as microcontroller with RS232 Chip (MAX232). The baud rate is configurable from 9600-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface.. Using this modem, you can make audio calls, SMS, Read SMS; attend the incoming calls and internet etc through simple AT commands.

Features*:*

1)   Dual band GSM/GPRS 900/1800MHz.

2)   Configurable baud rate.

        SIM card holder.
3)

Applications*:*
1)   In Access control devices.

2)   In Supply chain management.

Pin Configuration*:*

1)   GND Power supply ground

2)   TX transmitter
3)   RX receiver

4)   Line_r&Line_l Line input

5)   Spk_p&spk_n Speaker positive & negative

6)   Mic_p&mic_nMic positive & negative

7)   DTR Data terminal ready

8)   CTS Clear to send

9)   RTS Request to send

Working*:*

Unlike mobile phones, a GSM modem doesn't have a keypad and display to interact with. It just accepts certain commands through a serial interface and acknowledges for those. These commands are called as AT commands. There is a list of AT commands to instruct the modem to perform its functions. Every command starts with "AT". That's why they are called as AT commands. AT stands for attention.   In our simple project, the program waits for the mobile number to be entered through the keyboard. When a ten digit mobile number is provided, the program instructs the modem to send the text message using a sequence of AT commands. Thermistors are variable resistors that change their resistance with temperature. They are classified by the way their resistance responds to temperature changes. In Negative Temperature   Coefficient   (NTC) thermistors,   resistance decreases with an increase in temperature. In Positive Temperature   Coefficient   (PTC) thermistors,   resistance increases with an increase in temperature.

The Arduino will measure the voltage at a point between the thermistor and a known resistor. This is known as a voltage divider. The equation for a voltage divider is:

$$V_{out} = V_{in} \times \left(\frac{R2}{R1 + R2} \right)$$

In terms of the voltage divider in a thermistor circuit, the variables in the equation above are:

V_{out} : *Voltage between thermistor and known resistor*
V_{in} : *V_{cc}, i.e. 5V*
$R1$: *Known resistor value*
$R2$: *Resistance of thermistor*

This equation can be rearranged and simplified to solve for R2, the resistance of the thermistor:

$$R2 = R1 \times \left(\frac{V_{in}}{V_{out}} - 1 \right)$$

Finally, the Steinhart-Hart equation is used to convert the resistance of the thermistor to a temperature reading. The value of the resistor should be roughly equal to the resistance of your thermistor. In this case, the resistance of my thermistor is 100K Ohms, so my resistor is also 100K Ohms.

4.   Buzzer

Fig:3 BUZZER

An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.

Specifications
• Color is black.

• The frequency range is 3,300Hz.

• Operating Temperature ranges from – 20° C to +60°C.

5 . LED

LEDs emit light when an electric current passes through them. Colours of LEDs LEDs are available in red, orange, amber, yellow, green, blue and white. Blue and white LEDs are much more expensive than the other colours. The colour of an LED is determined by the semiconductor material, not by the colouring of the 'package' (the plastic body). LEDs of all colours are available in uncoloured packages which may be diffused (milky) or clear (often described as 'water clear'). The coloured packages are also available as diffused (the standard type) or transparent.

6.Relay

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as relays. Relays are used where it is necessary to control a circuit by a separate low signal, or where several circuits must be controlled by one signal. low-cost digital temperature and humidity sensor.

FIG :4 RELAY

IV. CONCLUSION

The Smart health care system will provide a far more effective, dependable, and light-weight assembly to the end user than the already existing systems. This can play a huge task in creating meaning in the daily lives of Disabled People. During this particular task, we faced a variety of challenges like the price, weight, and portability of the unit. The Smart Hand Glove not only enables the abolishment of the communication barrier between the specially abled people and other individuals but also makes them independent by providing home automation functionalities.

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