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Automatic Health Monitoring Device using Gloves and Gesture Recognition System for Emergency Alert

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Abstract*: Even after voice assistants, virtual assistants, and other new technologies have come into existence, many are still facing problems to use them conveniently and effectively. Our project is mainly applicable to old people, physically challenged, and bedridden people. Our project application areas are hospitals and old age homes. During emergency situations where the user is not able to access his/her mobile phone, our prototype can handle such situations effectively by detecting the user's hand gestures and sending alerts to caretakers and hospitals. Our model also has a medical alert system. According to the prior initialization of the time for the medicines to be taken, this prototype alerts the user at that exact time. The alert message is displayed on the mobile and also through a buzzer. This glove has a temperature sensor, flex sensors, and pulse-oxy sensors embedded which give the continuous readings of user-health parameters and are displayed on the display placed on the glove. The main feature of the glove is to communicate the needs of the user which can be accomplished by a flex sensor*

Keywords: voice assistants

I. INTRODUCTION

There are a huge number of people all over the world, who are losing their lives due to delayed access to health care. There are many cases where people died only due to late access to medication or delay in reaching the hospital. So, continuous monitoring of health parameters is not only important for patients in hospitals, but also the people who are suffering from long-term health complications and who are taking health care at home by caretakers. The second problem is that though many new technologies in the medical field came into existence not many people are aware of how to use those technologies. People who are deaf, dumb, paralyzed affected, and taken care of by caretakers need to have a system with which they can effectively communicate with caretakers or doctors. As a solution to the above-mentioned problems, we have designed a glove that can continuously monitor patient health parameters, store the data in the cloud, and also displays the in the mobile app. The second feature of this glove is to help the user effectively communicate withthe caretaker or doctor using the hand gestures of the user.

Problem Definition

There are a huge number of people all over the world, who are losing their lives due todelayed access to health care. There are many cases where people died only due to lateaccess to medication or delay in reaching the hospital.
The elder person and the children with heart related problem need continuouslyobservation in hospital or at home.
In the rural area's the hospital are not available or the proper traveling facility is notavailable.
In the COVID-19 period the people are not allowed to go outside of there homes for monitoring there health condition and the health monitoring also required huge some ofmoney.

Objective

- The hand glove which, equipped with sensors are respectively connectedto the controller which can detect the oxygen level and heartbeat.
- The IoT platform is used to interact between patient and doctors.
- The cost effective solution to monitor the health problem

II. LITERATURE SURVEY

Priyanka Lokhande, Riya Prajapati, and Sandeep Pansar[1] proposed a model for sign language recognition using flex sensors. The project's heart, the Glove, is where the sign language translator begins. The black glove has nine flex sensors, four touch sensors, one two-dimensional x-y-axis accelerometer, and one one-dimensional z-axis accelerometer. The flex sensors are the most significant sensors since most letters can be recognized based on finger flexes. All fingers, with the exception of the thumb, have two flex sensors, one at the knuckle and the other at the lower joint. As a result, these fingers can flex to two different degrees.

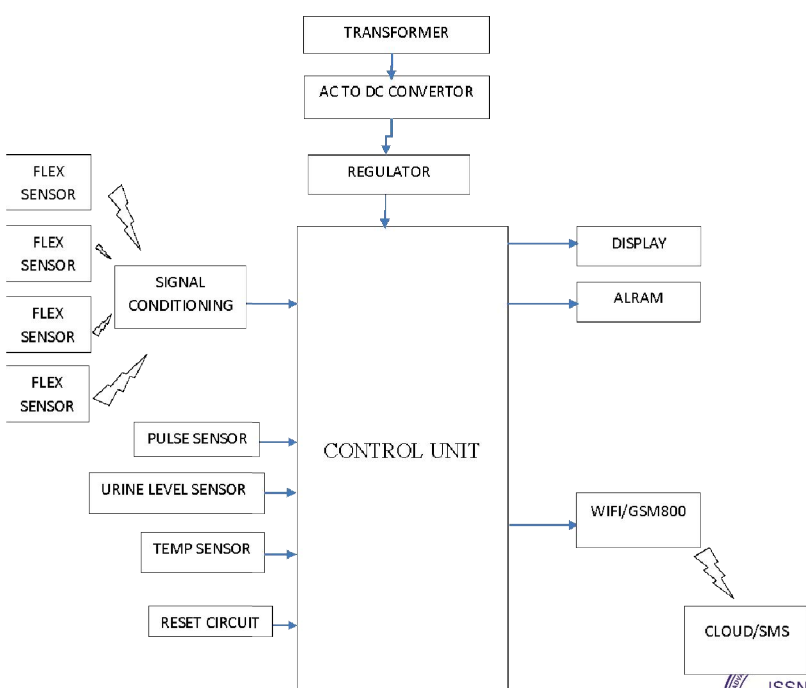
Amandeep Kaur and Ashish Jasuja [2] proposed a system that uses specific sensors, Raspberry Pi, and IoT to monitor a person's heart rate and body temperature (vital body parameters). A wearable system that also allows for remote health monitoring is available. Bluemix uses the MQTT (Message Queuing Telemetry Transport) protocol. Accuracy and cost must be evaluated in addition to remote monitoring and system wearability. A perfect compromise between accuracy and system cost can be accomplished by selecting appropriate sensors, such as the DS18B20 (temperature sensor) and KG011 (pressure sensor) (heart rate sensor). The sensors take multiple readings of a person's heart rate and temperature. On the IBM Watson IoT platform, the data is shown as graphs.

Aniket Pramanik[3] Their project presents a digital notice board and a home automation system using a GSM SIM900 module. The purpose of this project is to provide users with a simple, rapid, and dependable way to display important notifications on an LCD by allowing them to send a message to be displayed on the LCD. An android application developed for this project may convey the message to the GSM SIM900 module, which includes a SIM card. A home automation system was also designed, allowing domestic appliances like lights and fans to be turned on and off using the same android application developed for this project.

The Android application can be used to control home appliances and display notices on an LCD display from anywhere in the world. It employs a microcontroller to control the system, GSM technology for communication, and an Android app to send the message via SMS. The project includes a 32-bit ARM-based microcontroller LPC2148, a GSM SIM900 module, an LCD, a motor, and an Android application to connect with the hardware. As long as there is mobile network connectivity, the device can be utilized anywhere, regardless of deployment location.

III. SYSTEM DESIGN

Block Diagram



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Block Diagram Description

This glove consists of a pulse-oxy sensor, temperature sensor, flex sensor, and touch sensor shown in Fig.1. When the finger of the user touches the touch sensor the touch sensor activates the other sensors. The other sensors start reading input values from the user. The taken values are analyzed by the pic microcontroller. Controller starts sending data to the cloud and the mobile app starts retrieving data from the cloud. If the values read by the sensors are more than the given threshold values then the caretaker receives alerts in the mobile app. Pulse oximetry is a frequently used medical sensing method for measuring heart rate and arterial blood oxygen levels. Pulse oximeters that employ red and infrared light to monitor Spo2 levels. A pulse oximeter measures absorption with a constant stream of light and a complex calculation, filtering out muscle, tissue, and fingernail interference. A flex sensor is used to communicate the needs using hand gestures. When the user bends their finger, the strip is twisted the resistance changed, we measure those resistance values using pic microcontroller. There are three flex bending conditions. The resistance will be normal when the sensor is flat, the 2nd condition is when we bend the sensor to 45° the resistance increased when further bend the sensor to90° the resistance even managed the is the 3rdcase.

Component Specification

Microcontroller (PIC18F4520)

PIC18F4520 is a low-cost, low-power, high-speed 8-bit, fully-static Microcontroller unit that has 40 pins out of which 36 pins can be used as I/O pins. It has Power-on-Reset (POR) as well as the Extended Watchdog Timer (WDT) circuitry, which can be programmed for 4ms to 131s.

It is an 8-bit enhanced flash PIC microcontroller that comes with nano Watt technology and is based on RISC architecture. Many electronic applications house this controller and cover wide areas ranging from home appliances, industrial automation, security system and end-user products. This microcontroller has made a renowned place in the market and becomes a major concern for university students for designing their projects, setting them free from the use of a plethora of components for a specific purpose, as this controller comes with inbuilt peripheral with the ability to perform multiple functions on a single chip.

PIC18F4520 is a PIC microcontroller, introduced Microchip, and mainly used in automation and embedded systems. It comes in three packages known as PDIP, QFN, and TQFP where the first one is 40-pin (mostly used) while other two come with a 44-pin interfacePIC18F4520 also comes with 3 programmable external interrupts & 4

Interrupts-On-Change (IOC) pins, which are reliable features for interrupts related applications. Also, the system has a 13-channel 10-bit ADC converter module.

It has a wide operating voltage range, from 2V to 5.5V., Thus it can be used in 3.3V or 5.0V logic level operations. The below image is showing the detailed pin diagram of the PIC18F4520.

Features:

- CPU Speed: 40MHz
- Program Memory Size: 32KB
- RAM Memory Size: 1.5KB
- No. of Pins: 40Pins
- MCU Case Style: DIP
- No. of I/O's: 36I/O's
- Embedded Interface Type: EUSART, I2C, PSP, SPI
- Supply Voltage Min: 4.2V
- Supply Voltage Max: 5.5V
- MCU Family: PIC18
- MCU Series: PIC18F45xx

Fig 3.3.1(a): pic18f4520 microcontroller

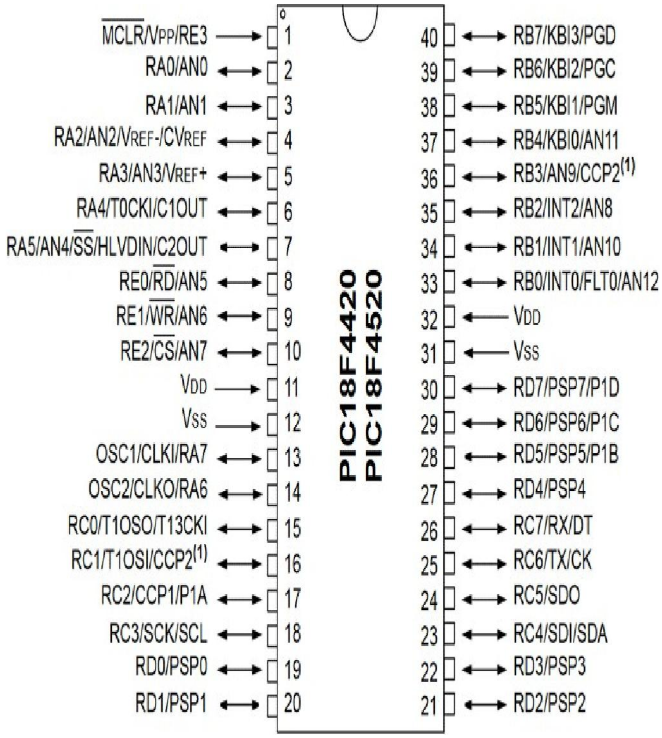


Fig 3.3.1(b): pin diagram of PIC18f4520

GSM Module

This GSM modem has a **SIM800A chip and RS232** interface while enables easy connection with the computer or laptop using the USB to Serial connector or to the microcontroller using the RS232 to TTL converter. Once you connect the SIM800 modem using the USB to RS232 connector, you need to find thecorrect COM port from the Device Manger of the USB to Serial Adapter. Then you can open Putty or anyother terminal software and open an connection to that COM port at 9600 baud rate, which is the default baud rate of this modem.Once a serial connection is open through the computer or your microcontroller you can start sending the AT commands. When you send AT commands for example: "AT\r" you should receive back a reply from the SIM800 modem saying "OK" or other response depending on the command send.

SIM800 is a complete **Quad-band GSM/GPRS** solution in a LGA type which can be embedded in the customer applications. SIM800H support Quad-band 850/900/1800/1900MHz, it can transmit Voice, SMS and data information with low power consumption. With tiny size of 15.8*17.8*2.4 mm, it can fit into slim and compact demands of customer design. Featuring and Embedded AT, it allows

total cost saving and fast time to market for customer applications

IOT (Internet of Things)

"The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction."

Things are either sensors or actuators. A sensor is something that tells us about our environment. Think of a temperature sensor, or even the GPS receiver on your mobile phone. Actuators are something that you want to control, things like thermostats, lights, pumps, and outlets. The "Internetof Things" brings everything together and allows us to interact with our things. For example, you could have your thermostat control itself based on where you're located.

Think Speaker

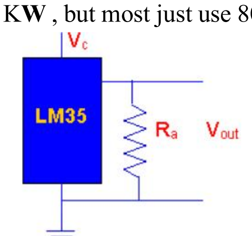
ThingSpeak is an application platform for the Internet of Things. ThingSpeak allows you to build anapplication around data collected by sensors. Features of ThingSpeak include real-time data collection, data processing, visualizations, apps, and plugins.

At the heart of ThingSpeak is a ThingSpeak Channel. A channel is where you send your data to be stored. Each channel includes 8 fields for any type of data, 3 location fields, and 1 status field. Onceyou have a ThingSpeak Channel you can publish data to the channel, have ThingSpeak process the data, and then have your application retrieve the data.

Temperature Sensor (LM 35)

Temp sensor details:

- It has an output voltage that is proportional to the Celsius temperature.
- The scale factor is .01V/**o**C or 1mV/C.
- Another important characteristic of the LM35 is that it draws only 60 micro ampsfrom its supply and possesses a low self-heating capability. The sensor
- self-heating causes less than 0.1 oC temperature rise in still air.
- The operating temperature range is from -55°C to 150°C
- In this circuit, parameter values commonly used are:o Vc = 4 to 30v
- 5v or 12 v are typical values used.
- R**a** = V**c** /10**-6**
- Actually, it can range from 80 K**W** to 600 K**W** , but most just use 80K**W**



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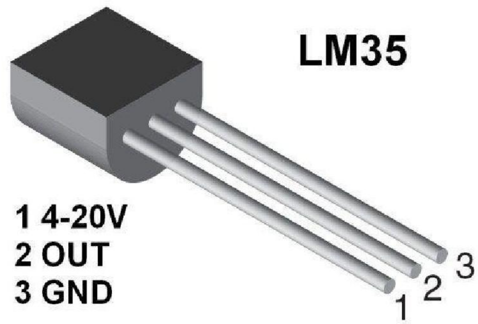
LM35 is an analog, linear temperature sensor whose output voltage varies linearly with change in temperature. LM35 is three terminal linear temperature sensor from National semiconductors. It can measure temperature from-55 degree celsius to +150 degree celsius. The voltage output of the LM35increases 10mV per degree Celsius rise in temperature. LM35 can be operated from a 5V supply andthe stand by current is less than 60uA. The pin out of LM35 is shown in the figure below.



Power Supply

All electronic circuits use DC power supply of adequate voltage for their operation.

To obtain this DC voltage from 230V AC mains, we need to use a 'rectifier'. The rectified DC voltage is 'pulsating ' in nature. We know that a combination of rectifier & filter can produce a dc voltage which is almost pure i.e. ripple free.

However, the problem with such a power supply is that its output voltage will not remain constant in the event of fluctuations in ac input voltage or changes in load current. This type of power supply is called as unregulated power supply.

The power supply, which provides a constant output voltage irrespective of everything is called, regulated power supply. So we have to design a regulated power supply using series voltage regulator IC 7805.

Following figure shows general block diagram of regulated power supply.

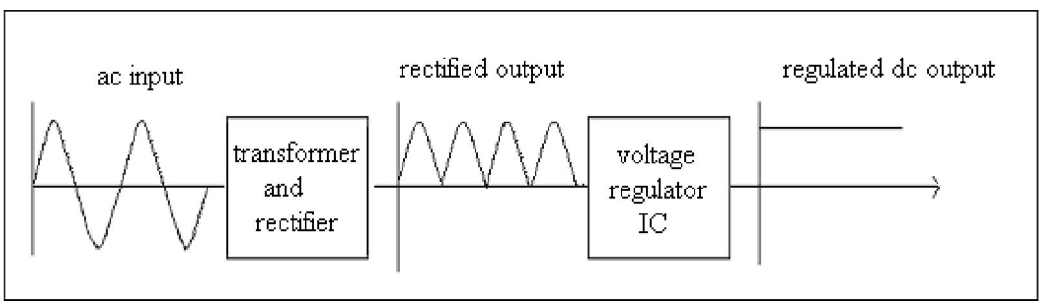
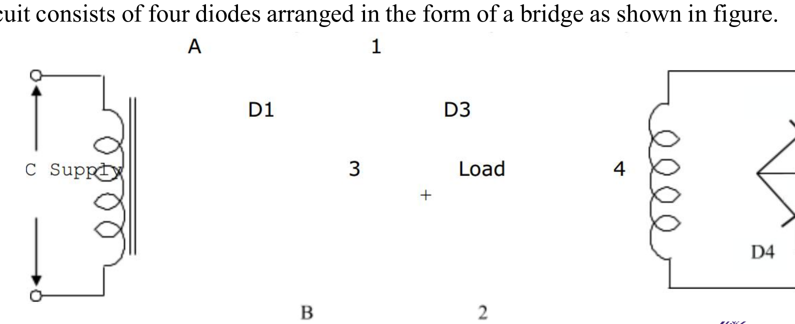


FIGURE 8: GENERAL BLOCK DIAGRAM OF POWER SUPPLY

BRIDGE RECTIFIER

Bridge rectifier circuit consists of four diodes arranged in the form of a bridge as shown in figure.



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OPERATION

During the positive half cycle of the input supply, the upper end A of the transformer secondary becomes positive with respect to its lower point B. This makes Point1 of bridge

Positive with respect to point 2. The diode D1 & D2 become forward biased & D3 & D4 become reverse biased. As a result a current starts flowing from point1, through D1 the load & D2 to the negative end.

During negative half cycle, the point2 becomes positive with respect to point1. Diodes D1 & D2 now become reverse biased. Thus a current flow from point 2 to point1.

TRANSFORMER

Transformer is a major class of coils having two or more windings usually wrapped around a common core made from laminated iron sheets. It has two cols named primary and secondary. If the current flowing through primary is fluctuating, then a current will be inducted into the secondary winding. A steady current will not be transferred from one coil to other coil.

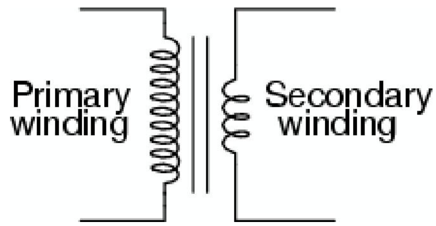
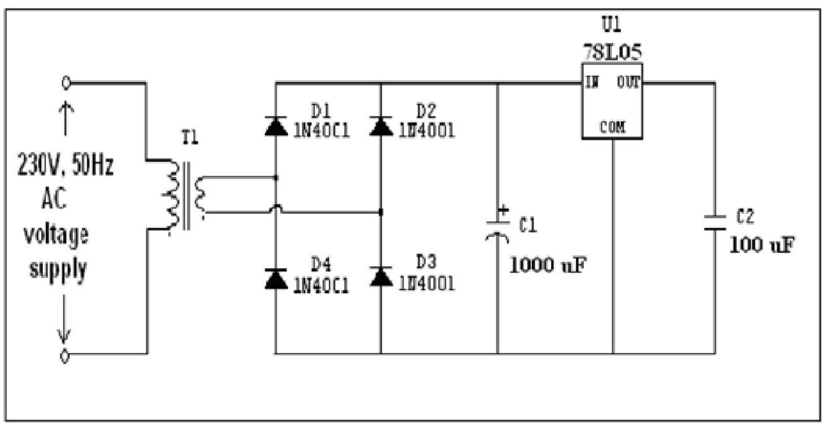
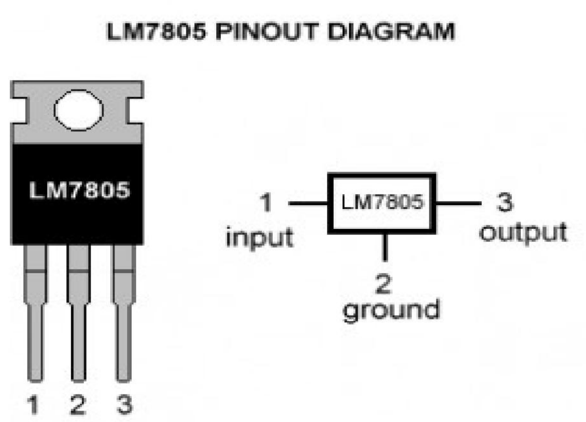


Figure No. 1.12: Basic Transformer



DESIGN FOR 5v POWER SUPPLY

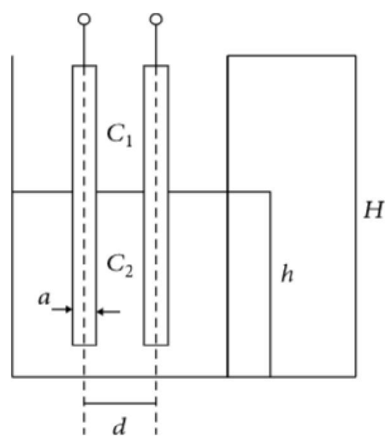


The MC78XX/LM78XX/MC78XXA series of three terminal positive regulators are available in theTO-220/D-PAK package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided,they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

Liquid Level Sensor

The equation for the capacitance level sensor is derived from the basic principles of capacitance, where the capacitance between two parallel plates can be given in Equation (1) [40, 41].where “A” is the cross-sectional area of the plates, “d” is the distance between two plates, “E0” is the permittivity of air, and “Er” is the permittivity of liquid. If there is a change in the dielectric element, the capacitance will change accordingly.

In the proposed work, the capacitance level sensor is designed considering two parallel cylindrical rods that act as electrodes instead of parallel plates. The choice of this structure is for the ease of maintenance and for improved ruggedness as shown in Figure 2.



$$C = \frac{\pi\varepsilon_o (H - h)}{\ln[(d - a)/a]} + \frac{\pi\varepsilon_o\varepsilon_r h}{\ln[(d - a)/a]}, \quad (2)$$

Total capacitance is given by where is the total capacitance, is the vacuum permittivity, is the relative permittivity of water, is the distance between electrodes, is the electrode radius, is the liquid level, and is the electrode and tank height. In the experimental setup considered for the proposed work, the dimensions of the capacitive level sensor are the distance between the electrodes d= 0.0088m, radius of electrodes a= 0.0015m , and the full height of the tank H= 0.66m .

To convert the CLS output to voltage, a timer circuit and frequency to voltage conversion circuit is used. Timer circuit consists of a 555 IC as shown in Figure 3, and frequency to voltage conversion achieved using LM331 IC and a conversion circuit as shown in Figure 4. The outputs obtained from the timer circuit and frequency to voltage circuit is represented using Equation (3) and Equation (4), respectively. The output voltage is then acquired on to the computer using an analogue channel of NI myRIO (National Instruments Reconfigurable Input-Output Embedded Boards). The datasheets for 555 IC and LM331 IC provide the following equations. Figure 5 shows the practical implementation of the circuit for acquiring the capacitance and converting to voltage to acquire to PC by data acquisition devices.

$$f_{i/p} = \frac{1}{\ln(2)(R_A + 2R_B)C}\text{Hz}, \quad (3)$$

$$V_{O/P} = \left(\frac{R_7}{R_5 + R_6}\right) \times 2.09 \times R_4 \times C_2 \times F_{I/P}\text{V}. \quad (4)$$

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Resistors

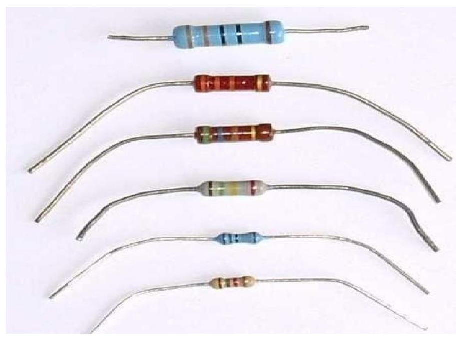
A resistor is a two-terminal electronic component designed to oppose an electric current by producinga voltage drop between its terminals in proportion to the current, that is, in accordance with Ohm's law:

$$V = IR$$

Resistors are used as part of electrical networks and electronic circuits. They are extremely commonplace in most electronic equipment. Practical resistors can be made of various compounds and films, as well as resistance wire (wire made of a high-resistivity alloy, such as nickel/chrome).

The primary characteristics of resistors are their resistance and the power they can dissipate. Other characteristics include temperature coefficient, noise, and inductance. Less well-known is critical resistance, the value below which power dissipation limits the maximum permitted current flow, and above which the limit is applied voltage. Critical resistance depends uponthe materials constituting the resistor as well as its physical dimensions; it's determined by design.

Resistors can be integrated into hybrid and printed circuits, as well as integrated circuits Size, and position of leads (or terminals) are relevant to equipment designers; resistors must bephysically large enough not to overheat when dissipating their power.



A resistor is a two-terminal passive electronic component which implements electrical resistance as a circuit element. When a voltage V is applied across the terminals of a resistor, acurrent I will flow through the resistor in direct proportion to that voltage. The reciprocal of the constant of proportionality is known as the resistance R, since, with a given voltage V, a larger value of R further "resists" the flow of current I as given by Ohm's law:

$$I = \frac{V}{R}$$

Resistors are common elements of electrical networks and electronic circuits and are ubiquitous in most electronic equipment. Practical resistors can be made of various compounds and films, as well as resistance wire (wire made of a high-resistivity alloy, such as nickel-chrome). Resistors are also implemented within integrated circuits, particularly analog devices, and can also beintegrated into hybrid and printed circuits.

The electrical functionality of a resistor is specified by its resistance: common commercial resistors are manufactured over a range of more than 9 orders of magnitude. When specifying that resistance in an electronic design, the required precision of the resistance may require attention to the manufacturing tolerance of the chosen resistor, according to its specific application. The temperature coefficient of the resistance may also be of concern in some precision applications. Practical resistors are also specified as having a maximum power rating which must exceed the anticipated power dissipation of that resistor in a particular circuit: this is mainly of concern in power electronics applications. Resistors with higher power ratings are physically larger and may require heat sinking. In a high voltage circuit, attention must sometimes be paid to the rated maximum working voltage of the resistor.

The series inductance of a practical resistor causes its behavior to depart from ohms law; this specification can be important in some high-frequency applications for smaller values of resistance.

In a low-noise amplifier or pre-amp the noise characteristics of a resistor may be an issue. The unwanted inductance, excess noise, and temperature coefficient are mainly dependent on the technology used in manufacturing the resistor. They are not normally specified individually for a particular family of resistors manufactured using a particular technology. A family of discrete resistors is also characterized according to its form factor, that is, the size of the device and positionof its leads (or terminals) which is relevant in the practical manufacturing of circuits using them.

Units

The ohm (symbol: Ω) is the SI unit of electrical resistance, named after Georg Simon Ohm.

An ohm is equivalent to a volt per ampere. Since resistors are specified and manufactured over a verylarge range of values, the derived units of milliohm (1 mΩ = 10^{-3} Ω), kilohm (1 kΩ = 10^{3} Ω), and megohm (1 MΩ = 10^{6} Ω) are also in common usage.

Variable resistors

Adjustable resistors

A resistor may have one or more fixed tapping points so that the resistance can be changed by moving the connecting wires to different terminals. Some wirewound power resistors have a tapping point that can slide along the resistance element, allowing a larger or smaller part of the resistance to be used.

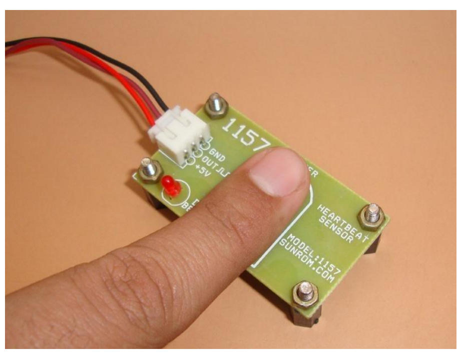
Where continuous adjustment of the resistance value during operation of equipment is required, the sliding resistance tap can be connected to a knob accessible to an operator. Such adevice is called a rheostat and has two terminals.

Potentiometers

A common element in electronic devices is a three-terminal resistor with a continuously adjustable tapping point controlled by rotation of a shaft or knob. These variable resistors are known as potentiometers when all three terminals are present, since they act as a continuously adjustable voltage divider. A common example is a volume control for a radio receiver.

Accurate, high-resolution panel-mounted potentiometers (or "pots") have resistance elements typically wire wound on a helical mandrel, although some include a conductive-plastic resistance coating over the wire to improve resolution. These typically offer ten turns of their shafts to cover their full range. They are usually set with dials that include a simple turns counter and a graduated dial. Electronic analog computers used them in quantity for setting coefficients, and delayed-sweeposcilloscopes of recent decades included one on their panels

Heart Beat Sensor :-



person's heartbeat is the sound of the valves in his/her's heart contracting or expanding as they force blood from one region to another. The number of times the heart beats per minute (BPM), is theheart beat rate and the beat of the heart that can be felt in any artery that lies close to the skin is the pulse.

Two Ways to Measure a Heartbeat

Manual Way: Heart beat can be checked manually by checking one's pulses at two locations- wrist (the **radial pulse**) and the neck (**carotid pulse**). The procedure is to place the two fingers (indexand middle finger) on the wrist (or neck below the windpipe) and count the number of pulses for 30 seconds and then multiplying that number by 2 to get the heart beat rate. However pressure should be applied minimum and also fingers should be moved up and down till the pulse is felt.

Using a sensor: Heart Beat can be measured based on optical power variation as light is scatteredor absorbed during its path through the blood as the heart beat changes.

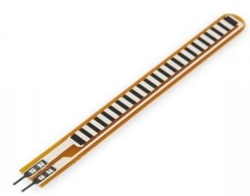
Principle of Heartbeat Sensor

The heartbeat sensor is based on the principle of photo phlethysmography. It measures the change in volume of blood through any organ of the body which causes a change in the light intensity through that organ (a vascular region). In case of applications where heart pulse rate is to be monitored, the timing of the pulses is more important. The flow of blood volume is decided by the rate of heart pulses and since light is absorbed by blood, the signal pulses are equivalent to the heart beat pulses.

Working of a Heartbeat Sensor

The basic heartbeat sensor consists of a light emitting diode and a detector like a light detecting resistor or a photodiode. The heart beat pulses causes a variation in the flow of blood to different regions of the body. When a tissue is illuminated with the light source, i.e. light emitted by the led, it either reflects (a finger tissue) or transmits the light (earlobe). Some of the light is absorbed by the blood and the transmitted or the reflected light is received by the light detector. The amount of light absorbed depends on the blood volume in that tissue. The detector output is in form of electrical signal and is proportional to the heart beat rate.

Flex Sensor:-



Flex sensors are usually available in two sizes. One is 2.2 inch and another is 4.5 inch. Although thesizes are different the basic function remains the same. They are also divided based on resistance.
There are LOW resistance, MEDIUM resistance and HIGH resistance types. Choose the appropriatetype depending on requirement. Here we are going to discuss 2.2inch Flex sensor that is FS-L-0055.

FLEX SENSOR function:-

FLEX SENSOR terminal resistance changes when it is bent.
FLEX SENSOR Features and Specifications:-
Operating voltage of FLEX SENSOR: 0-5V
Can operate on LOW voltages
Power rating : 0.5Watt (continuous), 1 Watt (peak)
Life: 1 million
Operating temperature: -45ºC to +80ºC
Flat Resistance: 25K Ω
Resistance Tolerance: ±30%
Bend Resistance Range: 45K to 125K Ohms(depending on bend)

Where to Use FLEX SENSOR:-
For understanding the use of FLEX SENSOR consider:
Case1: Where you want to check whether the surface of a device or thing is leveled or not. Say you want a device to check whether a window or door is open or not. At that time a Flex sensor could beused. The sensor could be fixed at door edge and when the door opens the Flex sensor gets flexed. With the sensor being flexed its parameters changes which could be designed to provide an alert.

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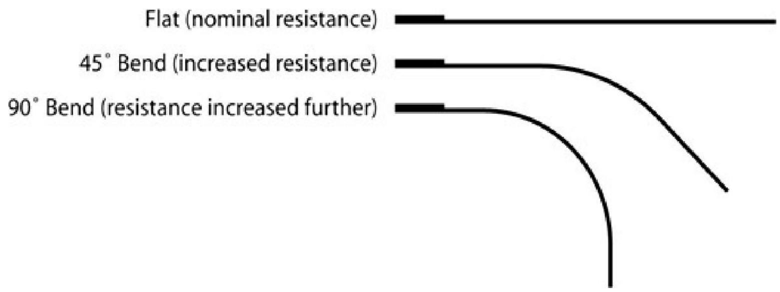
Case2: Where you want to measure the FLEX or BENT or ANGLE change of any instrument or device. The FLEX SENSOR internal resistance changes almost linearly with its flex angle. So by sticking the sensor to the instrument, we can have the flex angle in electrical parameter of resistance.How to Use FLEX SENSOR

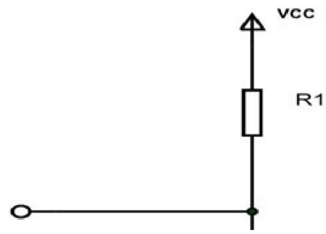
As mentioned earlier, FLEX SENSOR is basically a VARIABLE RESISTOR whose terminal resistance increases when the sensor is bent. So this sensor resistance increases depends on surface linearity. So it is usually used to sense the changes in linearity.



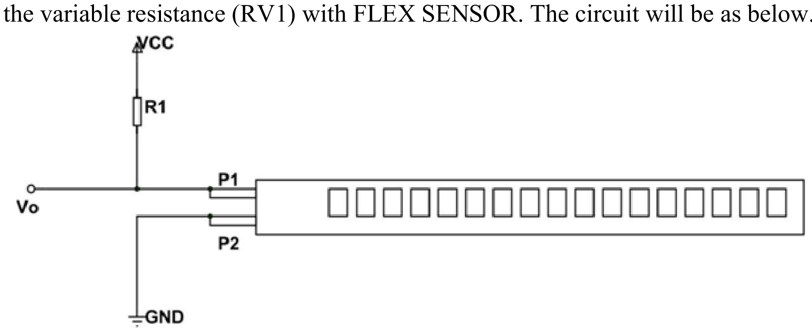
As shown in the above figure, when the surface of FLEX SENSOR is completely linear it will be having its nominal resistance. When it is bent 45º angle the FLEX SENSOR resistance increases totwice as before. And when the bent is 90º the resistance could go as high as four times the nominal resistance. So the resistance across the terminals rises linearly with bent angle. So in a sense the FLEX sensor converts flex angle to RESISTANCE parameter.

For convenience we convert this RESISTANCE parameter to VOLTAGE parameter. For that we are going to use VOLTAGE DIVIDER circuit. A typical VOLTAGE DIVIDER circuit is shown below.

In this resistive network we have two resistances. One is constant resistance (R1) and other is variable resistance (RV1). Vo is the voltage at midpoint of VOLTAGE DIVIDER circuit and is alsothe output voltage. Vo is also the voltage across the variable resistance (RV1). So when the resistancevalue of RV1 is changed the output voltage Vo also changes. So we will have resistance change in voltage change with VOLTAGE DIVIDER circuit.



Here we will replace the variable resistance (RV1) with FLEX SENSOR. The circuit will be as below.



As shown in figure, R1 here is a constant resistance and FLEX SENSOR which acts as a variableresistance. Vo being output voltage and also the voltage across the FLEX SENSOR.

Here,

Vo = VCC (Rx/ (R1+Rx)).

Rx - FLEX SENSOR resistance

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Now, when the FLEX SENSOR is bent the terminal resistance increases. This increase also appears in VOLTAGE DIVIDER circuit. With that the drop across the FLEX SENSOR increases so is Vo. Sowith increase in bent of FLEX sensor Vo voltage increases linearly. With that we have VOLTAGE parameter representing the flex.
We can take this VOLTAGE parameter and feed it to ADC to get the digital value which can be usedconveniently.

Buzzer :-
MICRO BUZZER 5V DC / 20mA PCB TYPE

Features

- sealed: yes
- operating power: 3-6V DC / 25mA
- extremely compact, ultrathin construction
- no electrical noise
- low current consumption yet high sound pressure level

Specifications

- tone type: single
- operating voltage: 3-6V DC
- rated voltage: 5V DC
- current consumption: 25mA
- osc. frequency: 3.2kHz
- sound level: 87dB
- connector type: pcb
- body color: gray
- weight: 0.056oz

IV. PROJECT PLAN

Week No.	Action plan
1	Searching of Project information
2	Collection of components required for project
3	Designing of PCB , printing of copper for interior layer
4	Etching, drilling, layer alignment of PCB
5	Mounting components on PCB as per circuit diagram
6	Soldering components on PCB
7	Software Development for the project
8	Testing circuit is proper or not
9	Troubleshooting for any problems
10	Checking project is properly working or not if not then correct
11	Presentation of report
12	Presentation of PPT
13	Checking project from project guide

14	Checking report & PPT from project guide
15	Confirmation from project guide, co-ordinator , HOD
16	Submission of Project model, Project report, PPT

V. ADVANTAGES AND DISADVANTAGES

Advantages:-

- Real-time monitoring
- Non-invasive
- Mobility and convenience
- Early warning and emergency alerts
- Remote monitoring
- Improved quality of life

Disadvantages :-

- Limited scope
- Technical challenges
- High cost

Application

- The IoT can benefit patients, physicians and hospitals.
- The IoT applications are implied using a wearable type of device which monitors in the wired and wireless medium

VI. CONCLUSION

Our prototype solves real-time problems faced by bed-ridden, paralyzed, deaf, and dumb people. This model develops a user-friendly interface between user and caretaker. No training is required for the user to handle this model. As the alert systemsare automated, in case of emergency the hospitals are alerted and necessary actions canbe taken to save the lives of the users.

Future Scope

It would be uses as a medicine reminder, so that the patient never forgets to takemedicine (tablet) on time.

It reduces the time that we spend for regular checkup.

It would be used as a self-monitoring gadget, from which we could note regular graphical data or day to day improvement from injury or bone fracture

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