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Portable Test Kit for Coma Patient with Eye Blink Alert System

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ABSTRACT: Unconsciousness is a state of unawareness of self and environment of those mental activities by which people are made aware of themselves and their environment, coupled with a diminished responsiveness to environmental stimuli. Smart sensors are mostly used in aeronautical, computer and for gesture recognition in biomedical application. This system designed and developed a reliable, energy efficient for sending alert message to the concern person when person in coma. The system used smart sensors like temperature sensor and eye blink sensor. Whenever person moves any finger, any eye lid and tilt the body, eye blink sensor and PIR sensor detects the movement respectively, and alert to the concern person through GSM.

KEYWORDS: Attention, Alerting, Coma patient, Monitoring, Heart beat sensor, Motion detection, GSM module, Microcontroller, Transreceiving, Temperature sensor, Wet sensor

I. INTRODUCTION

As seen everywhere the quantum of the accident happens very high, if there is an accident, the patients are admitted in ICU (Intensive Care Unit), In such condition the patient may goes in coma state [1], coma means a serious injury in the brain so the challenge is to back in normal condition that have need to get the proper information about the development in physical movement of particular person for further treatment [2]. Now days the coma person is going into the different test for diagnosis. There are different diagnosis test such as electroen-cephalogram, electrocardiogram, computerize tomography scan, X-ray, heart beat test. These tests are required to diagnosis the coma patient internally for the internal function of heart, brain, and bones. For monitoring the patient physically it is usually happen in hospitals where two or three hospital staff needed to monitor the patient 24*7 for watching if there is movement or not, but this is not efficient method to get maximum efficiency. So this project helps to monitor the patient physically for every moment [3] [4]

II. PROPOSED SYSTEM

This proposed system is based on motion detection sensor system. The system is used for monitoring physical health and physical changes in a vegetative state individual. The various hardware requirements and their working principles various hardware requirements and their working principles are discussed below

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IV. COMPONENT DETAILS

1. TEMPERATURE SENSOR

The body temperature is measured using LM 35 sensor. Temperature regulation is a main part that keeps the body at correct operating temperature due to its impact on the rate of chemical processes. In normal individual the temperature is about 30 °C to 38 °C. In LM 35 sensor the output voltage is in direct proportion with the body of the patient. The operating range of LM 35 sensor is from -55 to +150°C. The advantage of this sensor is that it does not require any external calibration. The sensor is sealed to avoid oxidation effects. This sensor generates greater output voltages compared to that of thermocouples

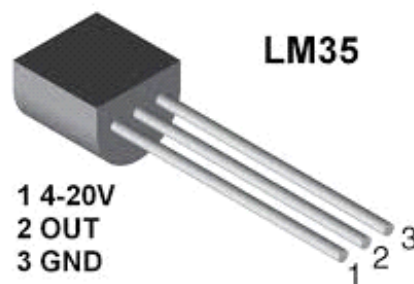


Fig 2 Temperature sensor

2. EYE BLINK SENSOR

This sensor is used to detect any blinks in a comatose. This sensor works on IR principle. This sensor works by sensor works on IR principle. This sensor works by illuminating an eye area using an infrared light. It has a transmitter and a receiver. The transmitter is used to transmit an infrared light that is used for illuminating the eye area. The reflected light is obtained at the receiver. When there is an eye blink there will be no infrared light received at the receiver end



Fig 3 Eye blink sensor



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3. POWER SUPPLY

The input to the circuit is applied from the regulated power supply. The a.c input ie., 230V from the mains supply the mains supply is step down by the transformer to 12V and is fed to a rectifier. The output obtained from the rectifier is a pulsating d.c voltage. So in order to get a pure d.c voltage, the output voltage from the rectifier is fed to a filter to remove any a.c components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant dc voltage.

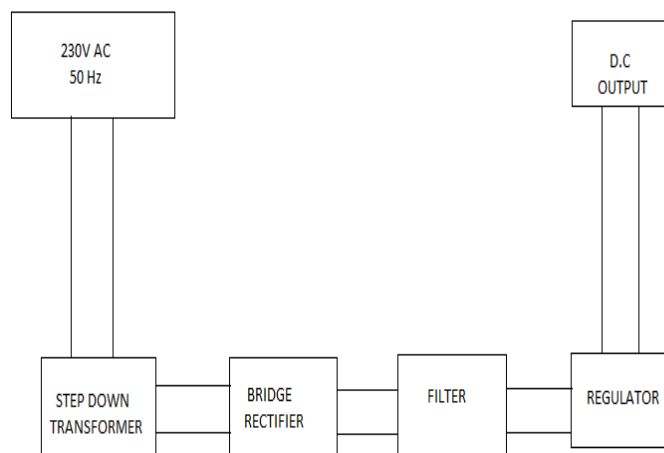


Fig 4 Power supply

4. MICROCONTROLLER: PIC 16F877A

PIC is a family of Harvard architecture microcontrollers made by Microchip Technology derived from the PIC 1640 originally developed by General Instrument's Microelectronics Division. The name PIC initially referred to "Peripheral Interface Controller".

PICs are popular with developers and hobbyists alike due to their low cost, wide availability, large user base, extensive collection of application notes, availability of low cost or free development tools, and serial programming

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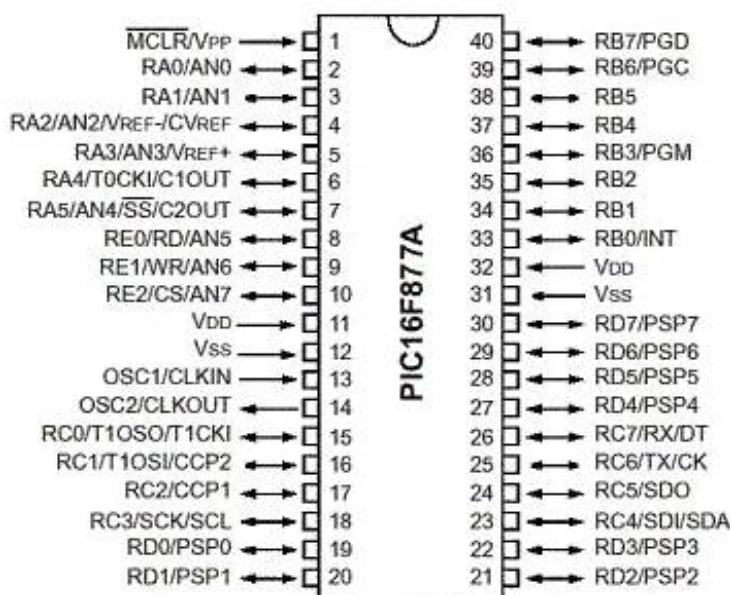


Fig 5 Microcontroller: PIC16F877A

5. LCD DISPLAY

A liquid crystal display or LCD draws its definition from its name itself. It is a combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. Liquid crystal displays are super-thin technology display screen that is generally used in laptop computer screen, TVs, cell phones and portable video games. LCD's technologies allow displays to be much thinner when compared to cathode ray tube (CRT) technology. Liquid crystal display is composed of several layers which include two polarized panel filters and electrodes. LCD technology is used for displaying the image in the notebook or some other electronic devices like mini computers. Light is projected from a lens on a layer of liquid crystal. This combination of colored light with the grayscale image of the crystal (formed as electric current flows through the crystal) forms the colored image. This image is then displayed on the screen.



Fig 6 LCD display

6. GSM MODULE

GSM module is used to establish communication between a computer and a GSM system. GSM module consists of a GSM modem assembled together with power supply circuit and communication interfaces (like RS232, USB, etc) for computer. GSM MODEM is a class of wireless MODEM devices that are designed for communication of a computer



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with the GSM network. It requires aSIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network. Also they

7. PASSIVE INFRARED SENSOR (PIR SENSOR)

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors

They are small, inexpensive, low power, easy to use and don't wear out. for that reason they are commonly found in appliances and gadgets used in homes or business

Infrared radiation enters through the front of the sensor, known as the 'sensor face'. At the core of a PIR sensor is a solid state sensor or set of sensors, made from pyroelectric materials which generate energy when exposed to heat. Typically, the sensor are approximately 1/4 inch square , and take the form of a thin film. Materials commonly used in PIR sensors include gallium nitride (GaN), cesium nitrate, polyvinyl fluorides, derivatives of phenylpyrazine, and cobalt phthalocyanine. The sensor is often manufactured as part of an integrated circuit



Fig 7 PIR sensor

8. MOISTURE DETECTION SENSOR

The moisture detection sensor is applied to the outside of garments and can detect the presence of liquid. The typical use is in healthcare and Smart Diaper settings. Healthcare workers can determine if patients need attention. This sensor can be read wireless through bedding and clothing.

9. HEART BEAT SENSOR

The Heart Beat Sensor is designed to provide digital output of heart beat when a finger is placed on it. When the Heart detector starts working, the top most LED will starts flashing with every heart beat. The output of this sensor can be connected to Micro Controller directly to measure the heart beat per minute (BPM) rate. It functions on the principle of light modulation by blood flow through the nerves of the finger at every pulse. The module output mode, Digital output mode is simple, Serial Output is with exact readings.



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Fig 8 Heart beat sensor

V. CONCLUSION

With the help of this system we can monitor the whole body of a coma patient and if there exists a change in any part of the body of a patient, it will automatically generates an alarm or send a sms via GSM to a person sitting at a distant place.

This paper reviews the product Patient Monitoring System Using GSM which is innovated to enable remote monitoring of patients. The key objective of developing patient monitoring systems is to reduce health care costs by reducing emergency room and physician office visits, hospitalizations, and diagnostic testing procedures. Many new wireless transmission protocols and technologies adapt easily to new applications

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