Research Article

Heartbeat & Temperature Monitoring With Emergency Rescue System

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Abstract

Health safety and rescue systems are very important for welfare of the society and have become need of the hour in current situations. This paper discusses the prototype designed to mitigate such issues effectively. The proposed approach consists of sensors which measures heartbeat and vital sign of the person continuously. The heartbeat sensor counts the heartbeat for specific interval of time and estimates Beats per Minute while the temperature sensor measures the temperature and both parameters are sent to the microcontroller which monitors the parameters and ensures normal condition of user. An algorithm to determine abnormal or unusual heartbeat is designed and incorporated in the microcontroller. This automatically identifies emergency situations from the parameters and initiates alerts. It also incorporates emergency button which sends the SMS to the Women/Child Safety Department along with location on single press. All this information is also displayed in LCD panel for user reference.

Keywords: Women safety, Emergency Rescue System, Arduino, ATmega328, Temperature Sensor(MAX30100), Heart Beat Sensor, GPS & GSM

Introduction

Women's wellbeing is a vital issue because of rising wrong doings against women nowadays. To help settle this issue we propose a GPS based women's wellbeing framework that has double security highlight. This gadget comprises of a framework that guarantees double alarms in the event that a lady is badgering or she thinks she is in a tough situation. This framework can be turned on by a lady on the off chance that she even figures she would be in a tough situation. It is helpful in light of the fact that once an occurrence happens with a lady she could conceivably find the opportunity to press the crisis button. In a catch press alarming framework, on the off chance that a lady is hit on the head from behind, she may never find the opportunity to squeeze emergency signal and nobody will realize she is in a difficult situation. Our framework takes care of this issue. This gadget is to be turned on ahead of time by a lady on the off chance that she is strolling on a forlorn street or some dim rear entryway or any far off region. When begun the gadgets requires the lady to continually check her finger on the framework every few seconds, else the framework presently sends her area to the approved faculty number through SMS message as a safety effort and furthermore sounds

a bell ceaselessly so that close by persons may understand the circumstance of the person who is making the sound. In a situation regardless of whether somebody hits the girl or the girl tumbles down and get oblivious, the framework initiates rescue protocol and sends the current location and health parameters to local approved faculty members through SMS. This device will end up being helpful in saving lives just as forestalling monstrosities against women and child. The gadget utilizes GPS sensor alongside a GSM Modem, LCD Display, LEDs and microcontroller based circuit to accomplish this framework. Any medical emergency or diagnosis starts with measurement of vital body signatures like temperature and heartbeat where the heartbeat represents how well the body is functioning. The frequency of heartbeat usually referred as Beats Per Minute(BPM) signifies the condition of person. For babies, this value could be at a higher pace when compared to an average adult. Another vital sign which reflects the person's health condition is body temperature. Human bodies generate and maintain heat inside to certain extent which is sensitive to changes in human immunity or health condition. Usual human body temperature is 98.4 degrees Celsius scale. These vital parameters are monitored based on the user's age with the help of sensors like Resistance Temperature Detectors(RTD) or thermistors, or semiconductor based precision temperature measurement devices like LM35.

Architecture
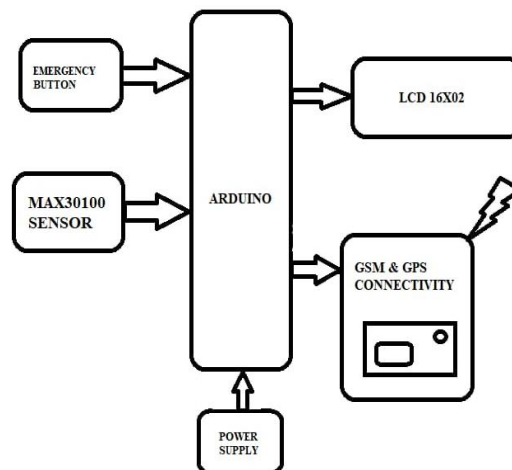
The block diagram has two parts,
1. Emergency Alert System
2. Health Monitoring System

Emergency Alert System
The main parts used for this emergency alert system are ATMEGA 328P, GSM & GPS Connectivity, Emergency button.
The working of this system is when we give the power supply to the GSM & GPS Connectivity module the sim card that is present in it will
get the network, when the person is in danger or if there is any issue in the surroundings of the particular person (he/she) can press the

emergency button then the alert message will be sent to the particular rescue team like fire station, police department, SHE team any many more departments can solve or stop the issue that's illegal.

Health Monitoring System

This part consists of Arduino UNO, LCD Display, MAX 30100 Sensor.

The aim of this proposed system is to design an automatic wireless health monitoring system. Our objective is to monitor the temperature and heartbeat of the person's body which should be displayed to the him using NRF technology. The temperature and heart rate of the person's body is checked constantly and a record of it is kept. The required components used in this system include a power supply, ATmega328 microcontroller, a temperature sensor(MAX30100), an RF TX, an RX module and an LCD display. The ATmega328 microcontroller is used as a CPU for monitoring the temperature of the person's body. The working of this proposed health monitoring system can be described with the help of a block diagram. This block diagram includes a power supply block that supply power to the whole circuit, and a temperature sensor(MAX30100) is used to sense the temperature and heartbeat of a person's body. The circuit diagram of the automatic wireless health monitoring system mainly includes transmitter section and receiver section. In the TX section, the temperature and heart beat sensor is used to detect the temperature and heartbeat of the person's body and the data which are sensed by the sensor is sent to ATmega328. The transmitted information can be encoded into serial data over the air through nRF module and the temperature of the person's body values is displayed on the LCD display using an antenna placed at the end of a transmitter and the data from the transmitter is transmitted to the receiver end. In our language it works as follows when the power is turned on, all the LEDs on PCBs starts glowing, indicating that circuit is properly working. Here we use a industrial temperature sensor i.e. MAX30100 which gives us room temperature in °C(degree Celsius). That temperature is displayed on the LCD. The working of this system includes the Blood Pressure Measurement and Temperature measurement of the person who is placing their hand near the sensor. When the power supply is given to the Arduino and if the person places his/her hand near the sensor the output

values like body temperature and Blood Pressure Measurement are displayed on the LCD which is connected to the Arduino. We also have a potentiometer to adjust the contrast of the LCD Display. There is a cavity for the measurement of the heartbeat, which consist of an LED and LDR arranged. Patients' finger in placed between LED and LDR, and the heart pulses are detected. The analog voltages are further processed with an operational amplifier MAX30100, and this chip has two built in OPAMPs. Result is shown on the LCD. This collected data is transmitted using nRF24L01 module. This data is received at the receiver side using same nRF24L01 module.

Future Scope

- An android app could be developed and data can be visualized in it instead of LCD display.

- Health parameters from sensors can be recorded and a ML model can be trained to recognize the abnormal situations and initiate rescue protocol automatically without button press.
- Warning for abnormalities of health condition can be shown in the android app.
- Sound can be added to the gadget so that the device gives a signal each time a pulse is received and alarm is started for abnormal health condition.
- The output of the device can be sent to mobile phones by using GSM module or Bluetooth module for further analysis.
- More parameters (like blood pressure) can be added to the device.
- In addition to the system can also provide more than one mobile numbers so that more than one user can receive emergency message.
- We can develop this as a device and bring the awarness in public to reduce the accidents, and many issues like women trafficking, child trafficking, Holy war, fire accidents etc.

Conclusion

In this prototype, we had achieved self-checking BPM and Emergency SOS women safety system, it will be helpful for the users to health checkup themselves & as well as for women safety. In this proposed concept we mostly are planning to definitely improve women's safety and the health safety measures, In the future would like to particularly develop further well on this concept to maximize the portability, much cheaper, location accuracy in a subtle way. This prototype mostly is created as a backbone for future model development.

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