International Journal of Engineering and Techniques - Volume 12 Issue 2, March-April - 2026

RESEARCH ARTICLE OPEN ACCESS

IOT –POWERED SMART WOMEN SAFETY WATCH WITH REAL-TIME EMERGENCY ALERT SYSTEM

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ABSTRACT:
In the context of the increasing cases of crimes and emergencies, this paper discusses the safety of women in the modern society. This research provides an insight into the development and designing of a smart wearable IoT safety watch which provides real-time emergency alerts along with health monitoring facilities. The system makes use of Arduino Nano to perform as a controller, while the other components like heartbeat sensor and temperature sensor are used to detect abnormalities. In case of emergencies, the system automatically sends the alert message with real-time GPS locations through GSM module to pre-defined contacts. Moreover, a manual emergency button is included in order to generate the alert message manually by the user.
Keywords— *Arduino nano (ATMEAG 328), Body sensor, LCD display, Heat beat senso, Power supply unit, Emergency key, Buzzer, GPS/GSM.*

I.INTRODUCTION

In today's society, protecting women from danger has emerged as one of the most pressing issues. Several cases have been reported where immediate help cannot be provided, especially when travelling, working late nights, or being alone in an area. Traditional safety solutions like mobile apps and phone numbers require human intervention, and their efficacy is questionable during emergencies.

With technological developments in IoT and embedded systems, wearables can serve as a better tool for monitoring and triggering alarms. The proposed study aims at designing a smart safety watch that can continuously monitor the condition of the individual and surroundings. It automatically senses any unusual events and sends an alarm message with coordinates to predefined contacts.

It is aimed at minimizing delays, providing real-time location, and ensuring safety in all situations.

1.1 EXISTING METHOD:

Currently, solutions that help keep women safe make use of mobile applications, wearables, and surveillance systems to offer protection in case of emergencies. Mobile apps feature functions such as emergency alerts, sending one's location to pre-selected contacts in real-time, and sending a notification to one's emergency contacts. Similarly, wearables like smart bands and pendants have panic buttons that send notifications to the people near you and your relatives through GPS. AI-driven surveillance systems are used in public spaces to

detect any hazardous behavior. These solutions depend heavily on users' actions since they need to activate these features manually; however, this may not work in cases where someone is panicking or unconscious.

1.2 PROPOSED SYSTEM:

The suggested model constantly tracks the physiological parameters of the user and his/her surroundings using sensors embedded within the system. Data is collected through heartbeat and temperature sensors and fed into the Arduino Nano chip that acts as a processor of the data collected. The system analyzes and compares the incoming data with pre-set thresholds to determine any abnormalities. If an abnormal situation occurs, the system identifies the situation as an emergency. Besides detecting abnormalities, the user can declare an emergency on the basis of feeling unsafe by pressing the emergency button. Once the emergency signal is received, the Arduino Nano sends alert signals to predefined contacts, including family members and authorities, along with the current GPS position details using the GSM module. Furthermore, the buzzer generates a local alarm signal at the time of emergency. The LCD screen displays information related to system operations and sensor readings.

II. WORKING:

This project is mainly used for women's safety. In this system, we are using an Arduino Nano as the main controller, which controls all the components.First, the temperature sensor is used to monitor the body or surrounding temperature. If the temperature becomes abnormal, the system will treat it as a possible unsafe condition.

Then, the GPS module is used to get the current location of the user. It continuously tracks the latitude and longitude.The GSM module is used to send messages. If any emergency happens, it will send an alert message along with the location to the saved contacts like family members.

We also have an emergency push button (SOS). If the user feels unsafe, they can press this button, and immediately the system will send a danger message with location.The LCD display is used to show the current status, like system working, GPS signal, or alert message.The buzzer is used to make a sound during emergency, so nearby people can notice and help.All the components are powered using a power supply.

Overall, the system continuously monitors the condition, and if any abnormal situation occurs or the SOS button is pressed, it sends an alert message quickly to ensure safety.

i) Arduino Nano:

The Arduino Nano acts as the microprocessor of the system, tasked with the processing of information from all the sensors involved and making decisions based on the programmed logic. It receives input from multiple sensors like heartbeat and temperature sensors and continually looks out for any signs of abnormality. Using this information, it controls the operations of various output systems like GSM module, GPS module, buzzer, and LCD display. Its small size and power efficiency make it appropriate for use in wearable devices.Figure 2.1.1 Arduino Nano.

Figure 2.1.1 Arduino Nano

ii) Heartbeat Sensor:

The heartbeat sensor is capable of measuring the heartbeat rate of the individual in real-time and detecting any unusual heartbeat rate. It continually collects data related to heartbeats and sends this information to the microprocessor. If the heartbeat rate either drops or becomes too fast, the system perceives that there is an emergency situation. This helps in detecting any dangers in terms of health and generating necessary alerts. Figure 2.1.2 shows HeartbeatSensor.

Figure 2.1.2 Heartbeat Sensor

iii) Temperature Sensor:

The temperature sensor measures the body temperature of the user and enables detecting abnormalities in the process. It sends the temperature measurements continually to the microprocessor to keep comparing it with standard readings. An increase or decrease in body temperature may be perceived as distress by the system. Therefore, it adds credibility to the system in detecting dangers. Figure 2.1.3 shows Temperature Sensor.

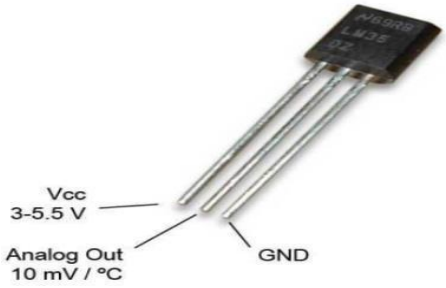


Figure 2.1.3 Temperature Sensor

iv) GPS Module:

The GPS module helps track the real-time location of the user in cases of emergencies. The GPS module continually receives data about the user's location from satellite and relays accurate location data to the Arduino Nano. In case of emergencies, the GPS location of the user will be included in the message sent through the GSM module, helping rescuers know the location accurately. Figure 2.1.4 shows GPS Module.

Figure 2.1.4 GPS Module

v) LCD Display:

The LCD display shows essential information about the state of the system, such as the readings of the sensors, system states, and alerts. Information displayed on the LCD display allows one to verify whether the device operates as required. Testing and debugging of the system can easily be done by looking at the display. Figure 2.1.5 shows LCD Display.

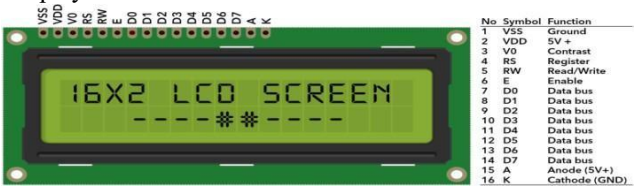


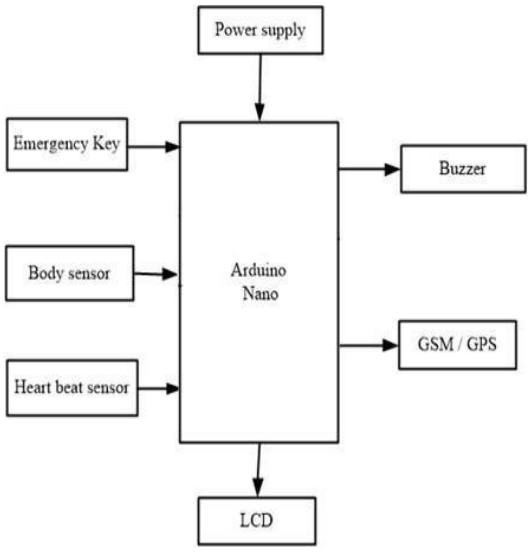
Figure 2.1.5 LCD Display

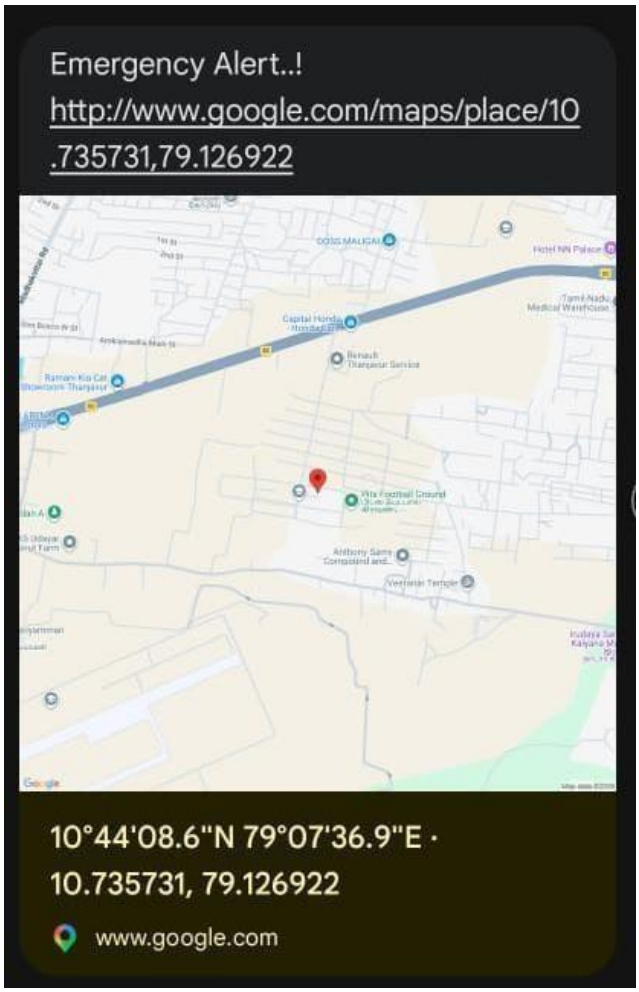
vi) Buzzer:

The buzzer acts as an alert mechanism that produces sound in times of emergencies. This is achieved in case of the detection of an anomaly in the system or pressing of the emergency button. The alert mechanism serves to attract the attention of surrounding individuals and increase the chances of receiving help immedietly Emergency Push Button. The emergency push button forms part of a manual trigger system that enables users to trigger alarms immediately when they feel insecure. Pressing the push button triggers the entire alarm system manually and does not depend on an automatic detection process. This becomes handy in cases where users sense a threat, yet there is no data detected by the sensors in the system. Figure 2.1.6 shows Buzzer.

Figure 2.1.6 Buzzer

1.2.1 FLOWCHART FOE PROPOSED SYSTEM:

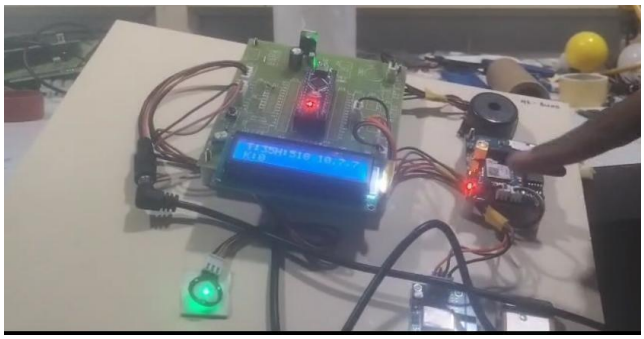




HARDWARE USED:

- Arduino Nano
- Temperature Sensor
- GSM Module
- GPS Module
- LCD Display
- Buzzer
- Emergency Push Button
- Power Supply

HARDWARE RESULTS:



SOFTWARE USED:

- Arduino IDE

SOFTWARE RESULT:

ADVANTAGES:

- Real-time emergency alert system Automatic detection without Uers action.
- Accurate GPS tracking.
- Health monitoring integration.
- Fast response time.
- Cost-effective and portable.
- Easy to use wearable device.

APPLICATIONS:

- Women personal safety.
- Elderly monitoring systems.
- Child safety tracking.
- Medical emergency alert systems.
- Smart wearable devices

CONCLUSION:

The introduction of the IoT-based women's safety watch proves to be a viable and reliable approach to ensuring safety. By virtue of the incorporation of sensor technology, GPS positioning, and GSM connectivity, the system allows for immediate detection and handling of emergencies. The process of sending alerts becomes largely automated, reducing the need for human intervention and improving safety levels significantly. The device is affordable, easy to use, and practical to implement.

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