# A Review Paper on Soldier Health Monitoring & Position Tracking System

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*Abstract:* In today's security landscape, safeguarding military personnel is paramount. To enhance the security and well- being of soldiers, a range of devices are deployed, including health sensors like pulse rate and body temperature monitors, GPS technology for precise location tracking, and GSM modules for rapid data transmission. This amalgamation of technologies forms a cost-effective and reliable Soldier Health and Position Tracking System. This system continuously relays a soldier's GPS location and health status, including body temperature, to a military base unit. It also incorporates features like a soldier alertness program for activity monitoring and an emergency switch for immediate assistance. Overall, this system is a critical tool for ensuring soldier safety and providing timely support during missions.

*Index Terms* - Multi-sensor network, Wi-fi module, GPS, GSM, IoT

*Introduction*: In the real of national security, military soldiers play a pivotal role, and ensuring their safety and effectiveness is of utmost importance. As warfare and missions become more technologically advanced, there is a growing need for cutting-edge equipment and systems. Initiatives like the United States' Future Force Warrior (FFW) and the United Kingdom's Future Infantry Soldier Technology (FIST) aim to revolutionize combat strategies. These systems include helmet-mounted displays for maps and video sharing, physiological sensors for health monitoring, and wireless communication capabilities. However, one key challenge is establishing lightweight systems for effective communication between soldiers and with the base station. Accurate soldier positioning is also crucial for mission planning. To bolster national defense, we introduce the "Soldier Health Monitoring and Position Tracking System," which enhances soldier safety, communication, and situational awareness..

## I. LITERATURE SURVEY:

A. D. Poorna Kumar et.al (2020) [3] suggested in the research paper entitled "Soldiers Navigation and Health Monitoring System using GPS and GSM". This method is an effective safety and protective method which is done by combining the developments in embedded along with wireless automation. It is useful for a Confidential mission. For the future works it is purposed to developed a hardware system by picking suitable gps

B. Manoj K et.al (2019) [13] suggested in the paper entitled "Soldier Health Monitoring and Tracking System". In their proposed method they focused on knowing the exact spot of the soldier as well as physical status of the armed person. The base station will come to the exact spot where the soldier is present by the message sent by the GPS and the physical health condition of them with the help of the message sent by GSM to them here they also used Google map which can be used to display the locations of soldiers.

C. Deepa J et.al (2019) [4] proposed a paper entitled "Soldier Health Positioning Tracking System Using GPS and GSM Modem". Project is created using wireless body area sensor network (WBASN), which includes heartbeat sensors and temperature sensors, which is used to track the physical health of the armed person

wherever it is needed. The proposed method is useful for determining the exact location of a soldier and map-reading is accomplished between one soldier and another soldier by knowing their height, speed, distance, and physical status of all armed people on the battlefield, allowing military personnel to coordinate war strategies.

**D.** Pallavi Kulkarni et.al (2019) [14] suggested that the paper "Secure Health Monitoring of Soldiers with Tracking System using IoT ". This paper focuses on development of a system which continuously observe Physical status our armed forces using on IOT. This system can also be placed on the person's body to get exact location and health status location using GPS.

**E.** Brijesh Iyer et.al (2018) [2] proposed a paper entitled "IoT enabled tracking and monitoring sensor for military applications". They suggest a technique that is specifically designed to meet the safety needs of armed personnel on the battlefield. The proposed method is primarily concerned with determining the exact location of soldiers on the battlefield. For determining human life expectancy, many human key signs and physical status conditions such as temperature, pulse rate, smoke detection, and oxygen saturation are used.

## II. SYSTEM BLOCK DIAGRAM :
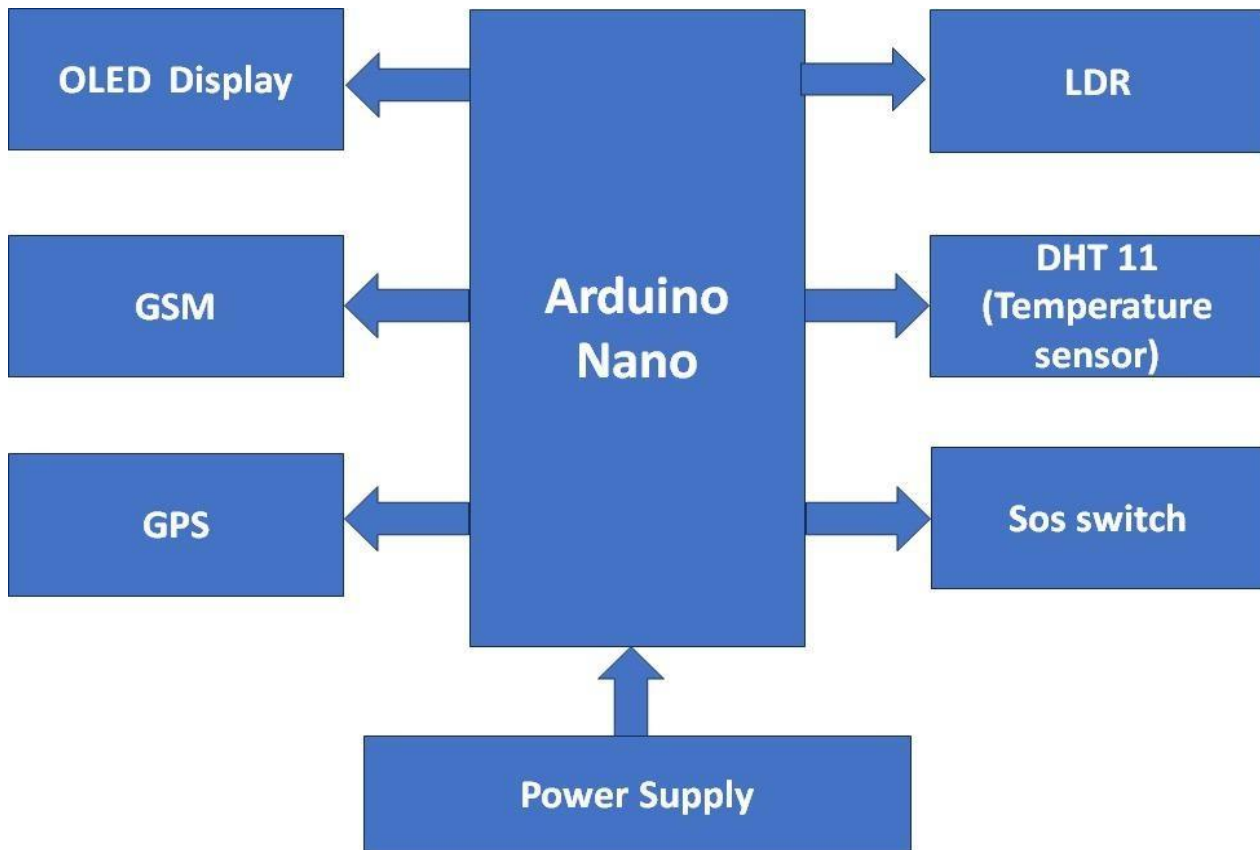


**ARDUINO NANO :** The Arduino Nano is a compact microcontroller board based on the ATmega328P chip, which is the same microcontroller used in the Arduino Uno. It's one of the smallest members of the Arduino family, making it suitable for projects where space is limited.

**Oled 128*64 Display :** The OLED (Organic Light-Emitting Diode) display with a resolution of 128x64 pixels is a small and versatile display module commonly used in various electronic projects

**Power Supply :** A 450mAh Li-ion battery is a rechargeable lithium-ion battery with a capacity of 3450 milliampere-hours (mah), commonly used in various portable electronic devices

**Global System for Mobile Communication (GSM) 800L:** The GSM 800L module is a compact and affordable GSM module primarily used for wireless communication in systems and IoT applications

**Global Positioning System (GPS):** The GPS NEO-6M module is a compact and cost-effective GPS (Global Positioning System) receiver module commonly used in embedded systems and DIY projects for accurate position tracking and navigation

**Temperature sensor:** The DHT11 is a temperature sensor whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. It operates over a temperature range of −55°C to +150°C .

**Heartbeat sensor:** The heartbeat sensor is a system that measures the soldier's pulse rate per minute, or the speed of the heartbeat. The average person heartbeat is 60 to 100 beats per minute. The Heart Beat sensor provides a simple way to study the heart's function. As the heart forces blood through the blood vessels in the finger, the amount of blood in the finger changes with time.

**Danger Switch:** This Button when used by the soldier will address a SMS alert message to the base station, along with their present spot. Danger switch which helps that to alerting the Base Deference voltage.

## III. System Hardware Specifications:

1. **Arduino nano :-** The Arduino Nano is a compact microcontroller board based on the ATmega328P chip, which is the same microcontroller used in the Arduino Uno. It's one of the smallest members of the Arduino family, making it suitable for projects where space is limited.

2. **Global System For Mobile Communications (GSM 800L):** The GSM 800L module is a compact and affordable GSM module primarily used for wireless communication in systems and IoT applications

3. **Global Positioning System (GPS):** The GPS NEO-6M module is a compact and cost-effective GPS (Global Positioning System) receiver module commonly used in embedded systems and DIY projects for accurate position tracking and navigation

4. **DHT 11 :** The DHT11 is a temperature sensor whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. It operates over a temperature range of $-55°C$ to $+150°C$ .

5. **OLED Display 128*64 :** The OLED (Organic Light-Emitting Diode) display with a resolution of 128x64 pixels is a small and versatile display module commonly used in various electronic projects.



6. **lDR (Heartbeat Sensor):** The heartbeat sensor is a system that measures the soldier's pulse rate per minute, or the speed of the heartbeat. The average person heartbeat is 60 to 100 beats per minute. The Heart Beat sensor provides a simple way to study the heart's function. As the heart forces blood through the blood vessels in the finger, the amount of blood in the finger changes with time.



IV. **Software require:**

**ARDUINO IDE:** The Arduino Integrated Development Environment (IDE) is a cross- stage application (for Windows, macOS, Linux) that is written in capacities from C and C++. It is utilized to compose and transfer projects to Arduino perfect sheets.

```
Blinking_LED | Arduino 1.6.5

File  Edit  Sketch  Tools  Help

Blinking_LED §

 1
 2  void setup() {
 3    pinMode(12,OUTPUT); //set digital pin 12 as an output
 4  }
 5
 6  void loop() {
 7    digitalWrite(12, HIGH); //turn on LED
 8    delay(1000);   //wait for a second
 9    digitalWrite(12, LOW); //turn off LED
10    delay(1000); //wait for a second
11  }
```

## V. Working Principle:
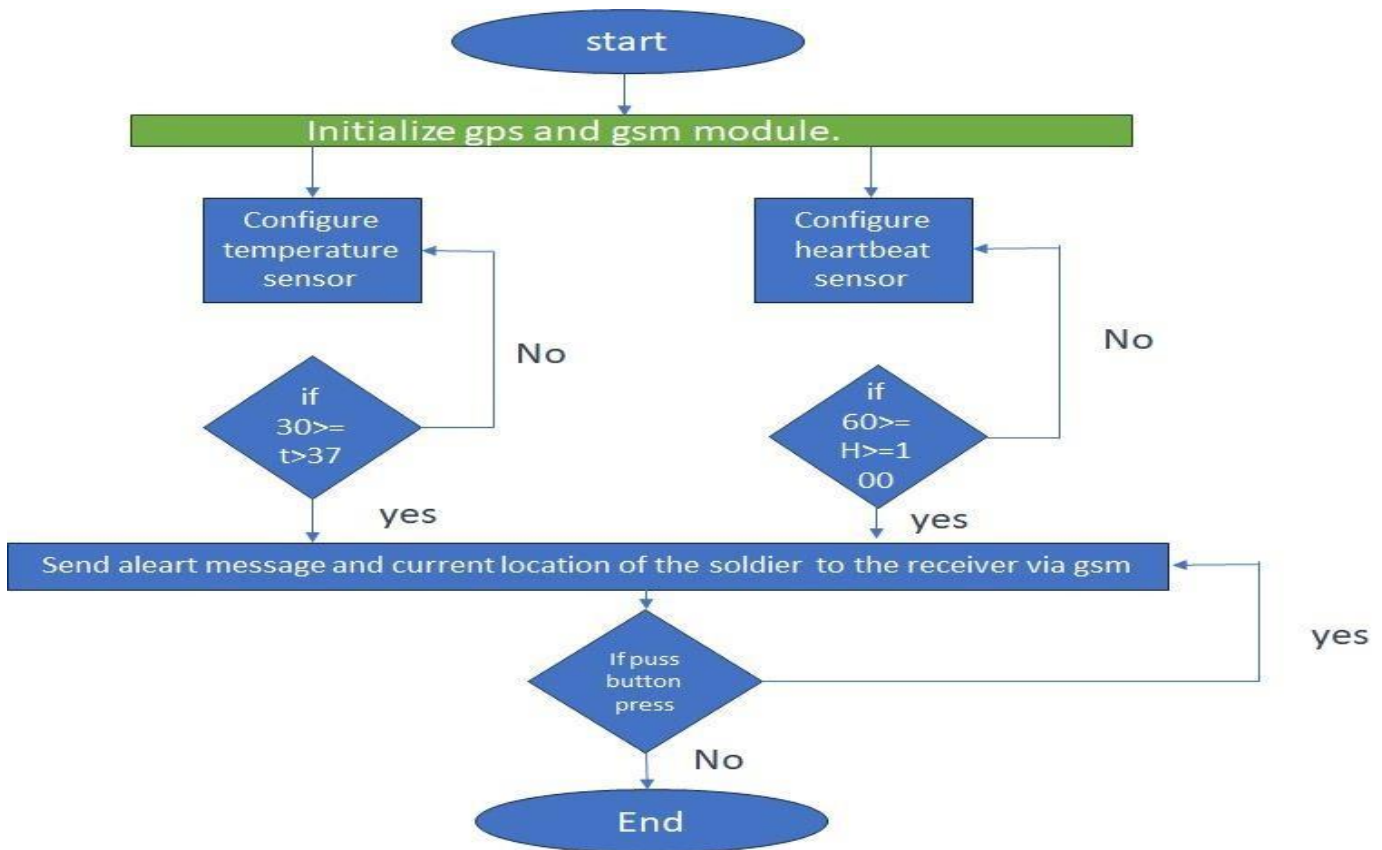


The Soldier Health Monitoring and Position Tracking System utilizes a combination of hardware components to provide real-time monitoring and tracking capabilities. The core components of the system include:
Start
1.    Initialize System - Power on all components (Arduino Nano, GSM 800L, GPS NEO-6M, OLED, LM-35, LDR) - Configure sensor and communication interfaces.
2.    Read Sensor Data a. Read GPS Data - Get current position (latitude, longitude) b. Read Health Sensors -

Read temperature data from LM-35 - Read light intensity data from LDR.

3. Process Data a. Determine Soldier's Position - Use GPS data to determine soldier's coordinates b. Monitor Health Parameters

- Check temperature readings from LM-35 for fever detection - Monitor light intensity from LDR for ambient light conditions.

4. Display Information - Display GPS coordinates and health parameters on OLED display.

5. Transmit Data a. GSM Communication - Send GPS coordinates and health data via GSM 800L - Update central monitoring station with soldier's location and health status .

6. End.

## VI. Acknowledgement:

We would also like to thank the faculty members and head of the department of Electronics and Telecommunication Departmentfor their continuous assistance and valuable feedback during the course of this project. Their expertise and insights were instrumental in shaping the direction of our research and helping us overcome various challenges. We extend our heartfelt gratitude to guide who contributed to the successful completion of our last year project in electronics and telecommunication.

## VII. CONCLUSION:

This a IoT-based project for soldiers of health monitoring and tracking . Biomedical sensors deliver each soldier's heart rate, body temperature and environmental parameters to the control room. This system is useful in providing the exact location of a soldier in a critical condition and in overcoming the shortcomings of missing in action soldiers. The addressing system also helps improve soldier-to-soldier communication in an emergency and provides proper navigation to the control room. So we can conclude that this system will act as lifeguard for army personnel all over the world. In the future, a portable handheld sensor device with multiple sensing capabilities may be developed to assist soldiers.

## VIII. REFERENCES:

[1] "IOT BASED HEALTH AND POSITION TRACKING SYSTEM FOR SOLDIER SECURITY SYSTEM" Rajitha m, s.
Madhav Rao 1. vol 13, issue 06, june,2022, issue no: 0377-9254

[2] Tushar Samal, Saurav Bhondave, Suraj masal, Sagar gite and Prof. Sushma B. Akhade, "SOLDIER HEALTH MONITORING AND TRACKING SYSTEM USING IOT", International Journal of Advance Scientific Research, Volume No:5, Issue :4, pp:13- 16, 2019-2020.

[3] Mrs. Pallavi Kulkarni and Mrs. Tripti Kulkarni, "SECURE HEALTH MONITORING OF SOLDIERS WITH TRACKING SYSTEM USING IOT", International Journal of Trend in Scientific Research and Development (IJTSRD), Volume No:3 , Issue: 4, pp:693-696, May June-2019.

[4] Monika V. Bhivarkar, Anuja G. Asole and P. B. Domkondwar, "IOT AND GPS BASED SOLDIER POSITION TRACKING AND HEALTH MONITORING SYSTEM", International Journal of Emerging Technologies in Engineering Research (IJETER),
Volume No:6, Issue: 4, pp:147-150, January-2018

[5] Jasvinder Singh Chhabra, Akshay Chhajed, Shamlee Pandita and Suchita Wagh, "GPS AND IOT BASED SOLDIER TRACKING & HEALTH INDICATION SYSTEM", International Research Journal of Engineering and Technology (IRJET), Volume No:04, Issue:06, pp:1228-1238, June- 20