



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Special Issue 2, May 2024

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com

A Review Paper on Soldier Health Monitoring & Position Tracking System

Prof. Manjusha Patil¹, Prof. Monali Shirsath², Prof. Swati Khawate³, Mr. Swarupand Desai⁴,
Mr. Manish Shinde⁵, Ms. Aditee Pawar⁶

Assistant Professor, Department of E&TC, Ajeenkya D. Y. Patil School of Engineering (ADYPSOE), Pune, India^{1 2 3}

UG Student, Department of E&TC, Ajeenkya D. Y. Patil School of Engineering (ADYPSOE), Pune, India^{4 5 6}

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.

KEYWORDS: Multi-sensor network, Wi-fi module, GPS, GSM, IoT

I. 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 defence, we introduce the "Soldier Health Monitoring and Position Tracking System," which enhances soldier safety, communication, and situational awareness.

II. PURPOSE OF MODEL

The proposed system serves the crucial function of tracking soldiers' locations and monitoring their health parameters during wartime, facilitating effective military strategy. Utilizing GPS and GSM modules, the base station can continuously track soldiers' positions and communicate with them in real-time. If a soldier becomes disoriented or encounters danger, the base station can provide guidance to safety or deploy assistance as necessary. Biomedical sensors, compatible with Arduino, monitor vital signs such as temperature and heartbeat. The Arduino Uno board interfaces with these sensors, along with a 128x64 LCD or OLED display, to provide immediate readings. The GSM module facilitates seamless communication between Arduino boards, ensuring swift data exchange. This system enables rapid response to assist soldiers in distress or preempt potential threats, ultimately bolstering operational efficiency and soldier safety in the field.

III. WORKING MODEL

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

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 $+150^{\circ}\text{C}$.

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.

IV. SYSTEM METHODOLOGY

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.

V. RESULTS

The results, as illustrated in Figure 1, demonstrate the successful transmission of a confirmation message to the intended recipient regarding the soldier's GPS coordinates. Additionally, when the soldier's vital signs deviate from preset threshold values, an alert message is promptly dispatched to the base station, accompanied by the precise location of the soldier. Through this execution, several key outcomes are achieved: the system adeptly collects and processes vital body parameters and location data from the soldier. In instances where the surrounding temperature exceeds the threshold range of 97-99 degrees Fahrenheit, a notification message is dispatched within 1.30 minutes. Conversely, if the temperature falls below the threshold of 98 degrees Fahrenheit, the system activates the heater. Moreover, deviations in the soldier's pulse rate from the normal range prompt the system to transmit a message, including the soldier's location, to the base station. Overall, the system demonstrates its capability to swiftly relay vital information to ensure prompt action and enhance soldier safety.



AJEENKYA
D Y PATIL UNIVERSITY
THE INNOVATION UNIVERSITY

Soldier Health Monitoring and Tracking System

Project by:

Swarupanand Desai

Manish Shinde

Aditee Pawar

Under the guidance of:

Prof. Manjusha Patil

Figure 1. Application.

The application of the Soldier Health Monitoring & Position Tracking System can have significant implications in various scenarios, particularly in military operations and emergency response situations. Here are some key aspects of its application. Various data visualization techniques can be used to enhance the clarity and effectiveness of monitoring charts. Monitoring charts can be designed to update in real-time, providing continuous monitoring of health parameters and position data. Monitoring charts can also provide historical data for retrospective analysis and trend identification. Monitoring charts can be integrated with other systems or dashboards, allowing for seamless data sharing and interoperability. For example, charts displaying health parameters can be integrated into a centralized monitoring platform accessible to healthcare providers or commanders. Overall, monitoring charts play a critical role in the Soldier Health Monitoring & Position Tracking System by providing visual representations of health parameters and position data. These charts enable real-time monitoring, trend analysis, and decision-making, ultimately contributing to the safety, well-being, and effectiveness of soldiers in the field.



Figure 2. Coordinates via SMS

	A	B	C	D	E
1	Timestamp	Temperature	Heartbeat	Latitude	Longitude
2	3/31/2024 12:02:29		37	89	18.6130478 73.9424217
3	3/31/2024 12:04:52		37	108	18.6130478 73.9424217
4	3/31/2024 12:07:13		37	89	18.6130478 73.9424217
5	3/31/2024 12:25:48		37	89	18.6130478 73.9424217
6	3/31/2024 12:26:44		37	89	19.6130478 78.9424217
7	3/31/2024 12:28:43		37	108	18.6130478 73.9424217
8	3/31/2024 12:42:42		37	108	18.6130478 73.9424217
9	3/31/2024 12:42:57		37	89	19.6130478 78.9424217
10	3/31/2024 12:45:38		37	89	19.6130478 78.9424217
11	3/31/2024 12:45:54		37	108	18.6130478 73.9424217
12	3/31/2024 13:09:44		37	108	18.6130478 73.9424217
13	3/31/2024 13:10:17		37	108	18.61304 73.94243
14	3/31/2024 13:11:04		34	109	19.6130478 78.9424217
15	4/1/2024 9:50:59		37	89	18.6130478 73.9424217
16	4/1/2024 9:52:06		30	109	18.61306 73.94244
17	4/1/2024 9:55:48		3	19	18.61306 73.94244
18	4/4/2024 15:44:02	96.13		78	18.62233409 73.91165758
19	4/4/2024 21:21:41	95.79		43	18.62233409 73.91165758
20	4/4/2024 21:56:09	94.1		30	18.62233409 73.91165758
21	4/5/2024 14:15:09	95.79		63	18.62233409 73.91165758
22	4/5/2024 14:33:44	93.88		45	18.62233409 73.91165758
23	4/5/2024 14:37:45	95.79		71	18.62233409 73.91165758
24					

Figure 3. Monitoring Chart

VI. CONCLUSION

This IoT-based project focuses on health monitoring and tracking for soldiers, utilizing biomedical sensors to transmit vital data such as heart rate, body temperature, and environmental parameters to a central control room. The system serves as a crucial tool for pinpointing the exact location of a soldier in critical conditions, addressing the issue of missing in action soldiers. Additionally, it enhances soldier-to-soldier communication during emergencies and provides navigation assistance to the control room. Consequently, this system emerges as a lifeguard for army personnel worldwide. Looking ahead, there's potential for the development of a portable handheld sensor device with multiple sensing capabilities to further assist soldiers in the future.

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



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details