



# SOLDIER HEALTH MONITORING AND TRACKING SYSTEM USING LORAWAN AND IOT

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**Abstract:-** Nowadays, the security system of the nation depending upon the enemy's war and so the security of the soldiers is considered as an important role in it. Concerning the safety of the soldiers, there are numerous tools to observe the health condition of the soldiers. The proposed system uses GPS to track the direction of the soldier in the form of latitude and longitude values. So that direction can be found easily. The proposed system can be mounted on the soldier's body to track their health status and current location using GPS. These information will be transmitted to the control room through IoT. The proposed system comprise of tiny wearable physiological equipment's, sensors and LoRa WAN modules. Hence, with the use of the proposed equipment, it is possible to implement a low cost mechanism to protect the valuable human life on the battlefield. Designing of this system using GPS and GSM gives a wireless system for tracking the location of the soldier and observing the heart beat rate and body temperature of the soldier

## I. INTRODUCTION

Border surveillance is the most important task in the field of national defense and security. To maintain peace and to ensure safety of a country's people, the borders need to be kept under 24/7 monitoring. Especially, under current circumstances, when activities like terrorist infiltrations and illegal movement of both living as well as non-living beings have become common, it becomes of utmost importance to strictly protect the border areas against such activities. To curb such happenings on the border areas, the least that can be done is to provide constant monitoring. In current scenario, this monitoring takes place manually by the border security forces which are responsible for continuously keeping an eye on the borders.

It takes a lot of manpower and assets as the borders are stretched across hundreds of miles and have extreme terrain as well as climatic conditions. Hence, the need of the hour is to design an automated border surveillance system which can perform the surveillance task without requiring any human assistance.

An essential requirement of this situation is a controller which automatically detects trespasser in the border and report nearby board security control unit. To reach any corner of the security region without alarming the enemy it can employ for suspicious bomb detection & demolition, threat detection It can also be used for tactical

## II.METHODOLOGY

Designing a soldier health monitoring and tracking system using LoRaWAN and IoT involves a comprehensive approach. First, the specific health parameters to monitor, such as heart rate, body temperature, and location tracking, must be identified through requirement analysis. Next, suitable sensors capable of real-time and accurate measurements are selected and integrated with LoRaWAN-enabled IoT devices. A robust LoRaWAN infrastructure is established with strategically deployed gateways to ensure adequate coverage in the operational area. Secure data transmission protocols over LoRaWAN are implemented to protect sensitive health data. Real-time data processing algorithms are developed to analyze health metrics and trigger alerts for anomalies. A user-friendly interface, like a mobile app or web dashboard, is designed for soldiers and healthcare personnel to monitor health status and access historical data. Efficient power management techniques are employed to maximize battery life, ensuring long-term operation in the field. Thorough testing is conducted before deployment to ensure reliability and accuracy under various conditions, ultimately enhancing situational awareness and improving healthcare outcomes in military environments.

### BLOCK DIAGRAM: TX:

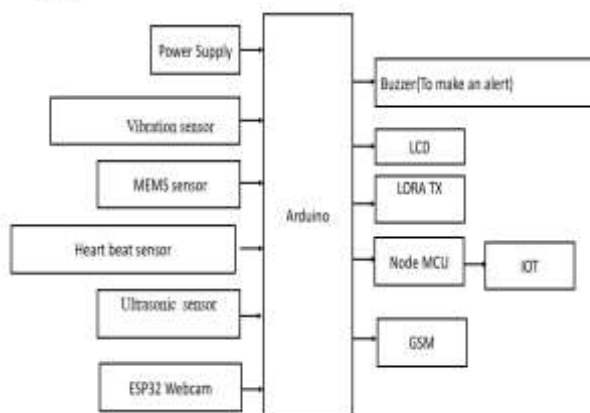


Fig: TX Block diagram of soldier health monitoring and tracking system using LORAWAN IoT.



**BLOCK DIAGRAM:  
RX**

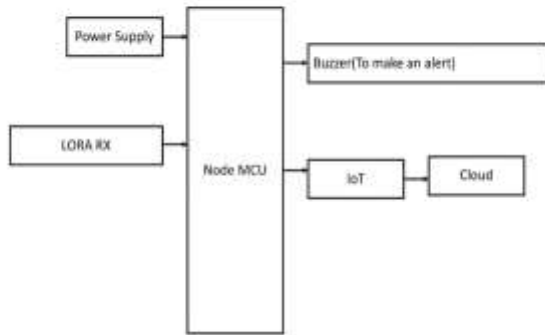


Fig:RX Block diagram of soldier's health monitoring and tracking system using LORAWAN IoT.

**III.WORKING PRINCIPLE**

The project sensor itself has two slots in it, each slot is made of a special material that is sensitive to IR. The lens used here is not really doing much and so we see that the two slots can 'see' out past some distance (basically the sensitivity of the sensor). When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors. When a warm body like a human or animal passes by, it first intercepts one half of the PIR sensor, which causes a positive differential change between the two halves.

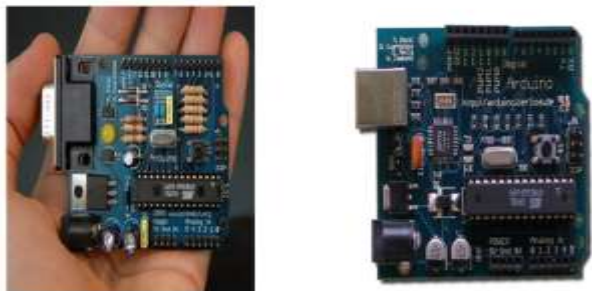


Fig: arduino uno

**i.Introduction**

The Soldier Health Monitoring and Tracking System utilizing LoRaWAN and IoT is a cutting-edge solution aimed at enhancing the safety and well-being of soldiers during missions. Unlike traditional systems, which often rely on manual monitoring or limited-range wireless technologies, this proposed system harnesses the power of LoRaWAN (Long Range Wide Area Network) and IoT (Internet of Things) to revolutionize soldier monitoring.

In the existing systems, monitoring soldiers' health and tracking their location can be challenging due to limited connectivity and range constraints. Often, data transmission is intermittent, leading to delays in response times and potentially putting soldiers at risk. Additionally, traditional systems may require bulky equipment and infrastructure, limiting mobility and flexibility on the battlefield.



Fig: Node MCU

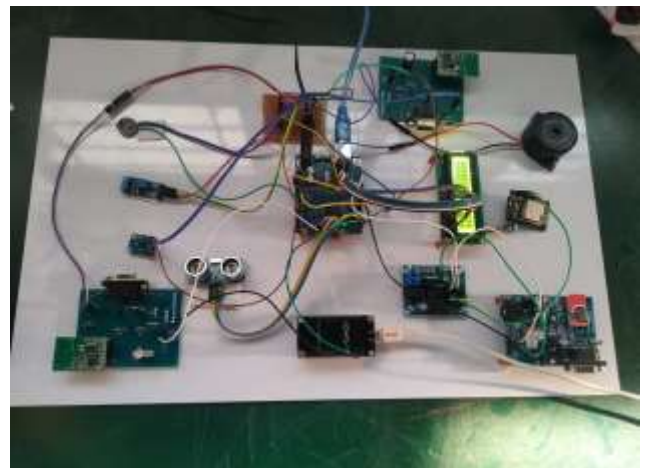


Fig: working of soldier health monitoring



ii. Manual mode

The proposed system, on the other hand, offers several advantages over its predecessors. By leveraging LoRaWAN technology, which provides long-range wireless communication with low power consumption, the system enables continuous real-time monitoring of soldiers' vital signs, such as heart rate, body temperature, and oxygen levels, regardless of their location within the operational area. This seamless connectivity ensures that commanders and medical personnel are constantly informed about the health status of each soldier, allowing for timely intervention in case of emergencies.

Overall, the Soldier Health Monitoring and Tracking System using LoRaWAN and IoT represents a significant advancement in military healthcare technology, offering unprecedented capabilities for ensuring the safety and performance of personnel in the field.

### ADVANTAGES

- I. Accuracy
- II. Optimized character axis
- III. Less delay.
- IV. Low cost

### APPLICATIONS

- The current study gives an up-to-date summary of the potential healthcare applications of IoT- (HIoT-) based technologies
- It can assist in the smarter control of homes and cities via mobile phones. It enhances security and offers personal protection.
- By automating activities, it saves us a lot of time.
- Information is easily accessible, even if we are far away from our actual location, and it is updated frequently in real time.
- Electric Devices are directly connected and communicate with a controller computer, such as a cell phone, resulting in efficient electricity use.
- Personal assistance can be provided by IoT apps, which can alert you to your regular plans.

### V. FUTURE WORK

Healthcare field is one of most delicate and important fields to be developed and enhanced by Smart systems designed to present sustainable medical interventions at manner time where the smart system should be simple, low energy consumption and real time feedback here we implement such health care in soldier When the normal body parameters differs from threshold values an alert message/email is send to base station along with the exact location of the soldier. Following results can be getting from above execution. It is capable of collect and processes the vital body parameters and location information from the soldiers body. When temperature of surrounding rises above the threshold value then buzzer will activate. When the temperature falls below threshold value lesser or equal then also buzzer.

### VI. CONCLUSION

Healthcare field is one of most delicate and important fields to be developed and enhanced by Smart systems designed to present sustainable



medical interventions at manner where the smart system should be simple, low energy consumption and real time feedback here we implement such health care in soldier When the normal body parameters differs from threshold values an alert message/email is send to base station along with the exactlocation of the soldier. Following results can be getting from above execution. It is capable of collect and processes the vital body parameters and location information from the soldiers body. When temperature of surrounding rises above the threshold value then buzzer will activate. When the temperature falls below threshold value lesser or equal then also buzzer is activate.

The subjective of this paper is to present the information about the Soldier Monitoring system is successfully implemented and executed which can be capable of collect and process the physiological parameters from the human body. In future we can include the solar harvesting system to recharge the DC power source automatically when user is exposed to sun and we can also interface the camera which will helpful to the doctors/persons to view the soldier activities remotely.

## VII. REFERENCES

[1]Akshita V Armarkar, Deepika J Punekar, Mrunali V Kapse, Swetha Kumari, Jayashree A, "Soldier Health and Position Tracking System", ", JESC, vol. 7, no. 3, pp.235-312, 2015.

[2] Armarkar V, Deepika J Punekar, Mrunali V Kapse, Swetha Kumari, Jayashree A Shelk, "Soldier Health and Position Tracking System", International Journal of Engineering Science and Computing, vol.3, no.23, pp.1314-1743, 2017.

[3] A. Ahammed, N. Fathima, R. Banu, B.D. Parameshachari, and N.M. Naik, "Optimized neighbor discovery in Internet of Things (IoT). In Proc. of International Conference on Electrical, Electronics, Communication, Computer, and Optimization Techniques (ICEECCOT), pp. 1-5, 2017.

[4] Aashoy Gondalic, Dhruv Dixit, Shubham Darashar, Vijjyanand Raghava, Animesh Sengupta, "IoT Based Healthcare Monitoring System for War Soldiers Using Machine Learning", International Conference on Robotics and Smart Manufacturing, , vol. 289, pp. 323- 467, 2018.

[5] Afef Mdhaffar, Tarak Chaari, Kaouthar Larbi, Mohamed Jamaiel and Bernd Freisleben, "IoT Based Health Monitoring via LoRaWAN", International Conference of IEEE EUROCON, vol. 115, no. 89, pp.2567-2953, 2018.

[6] Akshay Chahajed , Jasvinder Singh, Samle Pandit, Suchith Weigh, "GPS and IOT Based Soldier Tracking and Health Indication System", International Research Journal of Engineering and Technology, pp. 2395-0056, 2019.

[7] Brijesh Iyer, Nkit Patil, "IoT Enabled Tracking and Monitoring Sensor for Military Applications", International Conference on Computing, Communication and Automation (ICCCA), vol. 9, no. 2 pp. 2319-7242, 2018.

[8] Douglas C Johnson, Matthew J Zieniewicz, Douglas C Wong and John D Flat, "The Evolution of Army Wearable Computers", Research Development and Engineering Center, US Army Communication, vol. 1, no. 6, pp. 5133-5442, 2017.