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System for Tracking and Monitoring Soldier Health

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Abstract: *This study presents the development and implementation of an IoT-based military health monitoring system that incorporates LoRa communication, Arduino, ESP8266, GPS, heart rate sensor, DHT11 sensor, and blood pressure sensor. The system is designed to monitor current health data such as heart rate, body temperature, and blood pressure, and to provide location tracking to ensure safety and nutrition. It strengthens the nerves of soldiers in remote areas and in the air. The system can seamlessly transmit health data to the command center by utilizing wireless communication and cloud-based data analytics, facilitating the timely provision of health services. Blynk API integration improves the user experience by providing insights and notifications at important health moments. Test results validated the effectiveness of the system in monitoring and managing the health status of soldiers, demonstrating its potential for efficiency and effectiveness in military use*

Keywords: LoRa communication

I. INTRODUCTION

[1] The security of the country is monitored and controlled by the Army, Navy and Air Force. Our soldiers who sacrificed their lives for the sake of their country played a vital and important role. There are many concerns about the safety of soldiers. Soldiers who enter enemy lines often lose their lives due to lack of communication, so it is important for soldiers at base stations to know the location and health status of everyone. India has lost a large number of soldiers in conflicts due to inadequate healthcare facilities and lack of communication between soldiers in conflict and Recently, on September 29, 2016, there was a military conflict between India and Pakistan;

Indian army conducted an operation in the Azad region under Pakistani control, on the lines of the Real Government, to obtain the commercial information of the soldiers.

The operation. Indian soldiers are generally known for their bravery and have achieved many victories despite the low ammunition and poor security measures. We all need to be really concerned about the safety of the soldiers, so we decided to create a program to check the health and exact location of the soldiers so that they can receive the necessary treatment as soon as possible. The tracking of the soldiers is done using GPS.

We use biomedical sensors like temperature, heart rate to track the health of the soldier and the base station needs to determine the location of the soldier and his healthy diet. In this project, the exact location and health status of soldiers can be instantly transmitted to the base station for timely intervention in case of crisis. This tool helps in reducing the rescue, time and search workload of the military rescue control room. This is the most technologically advanced and most important part of the project.

The aim is to increase combat readiness, reduce the risk of health problems during operations and enable soldiers to perform at their best without any risk to their safety and well-being. The system can also contribute to the creation of a more effective and powerful army by helping to support health management and provide more effective medical interventions when necessary.

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II METHODOLOGY

System Architecture

[2] The Warrior Wellbeing Checking Framework comprises of two fundamental components: the transmitter unit worn by the warrior and the collector unit found at the command center. The transmitter side is dependable for collecting and transmitting physiological and natural information

Transmitter Side (Warrior Wearable Unit)

[3] Each warrior is prepared with a wearable wellbeing checking unit that incorporates different sensors and a microcontroller. This unit persistently collects imperative wellbeing parameters and natural information. The obtained information is prepared locally some time recently being transmitted employing a LoRa module. In case network is misplaced, the information is put away briefly and sent when the association is re-established.

Receiver Side (Command Center)

[4] The recipient side comprises of a LoRa door that collects transmitted information from numerous officers. This information is handled and shown on a observing dashboard for real-time investigation. The ESP8266 module empowers cloud network, permitting farther get to through the Blynk app. Alarms are activated in case of crises, and GPS area information helps in quick reaction operations.

Hardware Components Microcontrollers:

[5] Arduino (Atmega328/ESP32): Collects sensor information and forms information.
ESP8266: Empowers cloud network and inaccessible monitoring.

Communication Modules:

[7]LoRa SX1278: Gives long-range, low-power information transmission.
GPS Module (NEO-6M or comparative): Tracks real-time warrior location.

Health Sensors:

MAX30100 (Heart Rate & SpO2 Sensor): Screens heart rate and oxygen levels.
Blood Weight Sensor (BP Observing Module): Measures systolic and diastolic pressure.
DHT11 (Temperature & Mugginess Sensor): Measures natural conditions.

Power Supply:

Lithium-Ion Battery Pack with Voltage Controller: Guarantees drawn out field operation.
Solar Charging Module (Discretionary): For amplified deployment.

Software Implementation Sensor Information Acquisition:

[6] The Arduino microcontroller persistently peruses information from all associated sensors.
A predefined inspecting rate is set for intermittent information collection.

Wireless Communication:

The LoRa module transmits the collected information to the base station at predefined intervals.
In case of network misfortune, the framework stores information locally and transmits it when the association is restored.

Cloud and Portable Integration:

ESP8266 transmits information to the cloud for inaccessible monitoring.
The Blynk app is utilized for real-time information visualization and alarms.

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III. PROPOSED SYSTEM

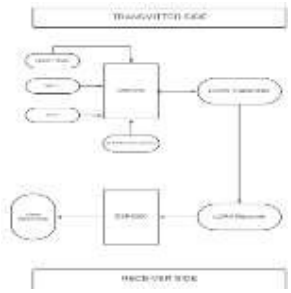

Figure 1 : system for tracking and monitoring soldier health

IV. RESULTS & DISCUSSION

[8] The comes about from the test trials illustrate the system's adequacy in observing soldiers' wellbeing and transmitting information dependably over long separations. The framework effectively collects and forms heart rate, blood weight, temperature, and natural information with negligible idleness. The GPS following include guarantees real-time area checking, helping in quick reaction amid crises. The LoRa communication module shows steady information transmission indeed in farther regions. Furthermore, the Blynk app gives an natural interface for farther wellbeing following and crisis cautions. These discoveries approve the system's unwavering quality, making it appropriate for real-world military applications.

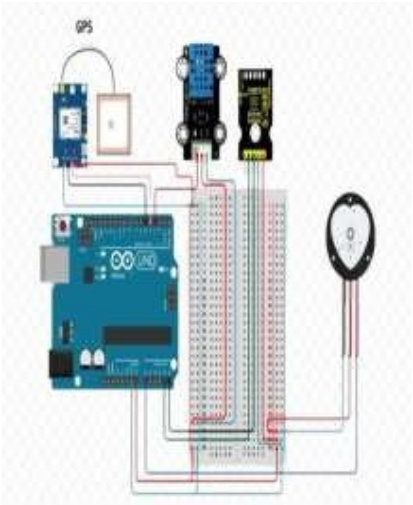

Figure 2: Transmitter Side

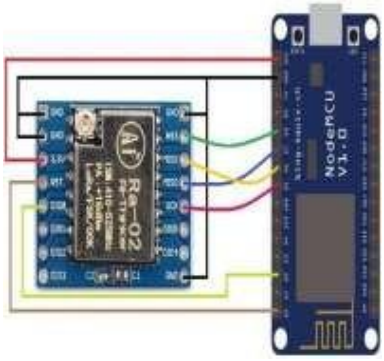

Figure 3 : Receiver Side

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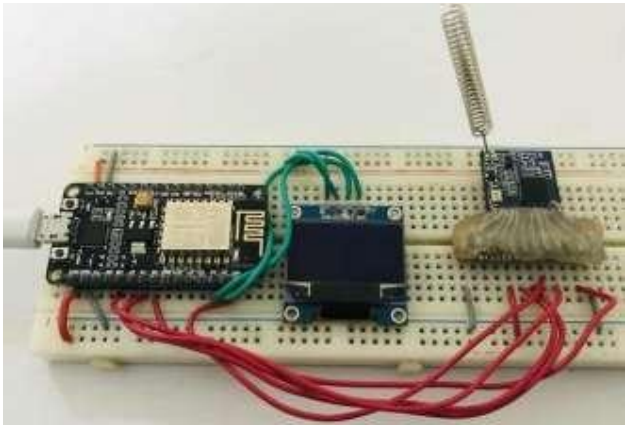

Figure 4.1 : Hardware Implementation

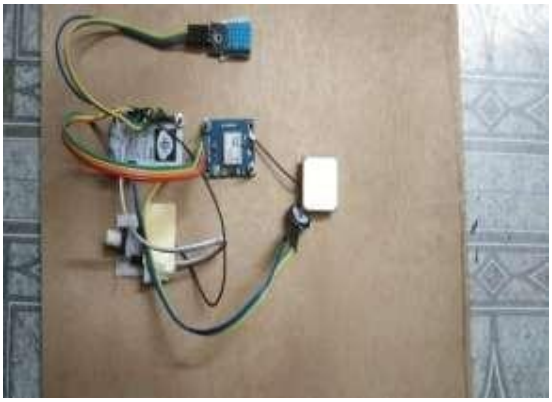

Figure 4.2 : Hardware Implementation

V. CONCLUSION

This inquire about presents a novel IoT-based Trooper Wellbeing Observing Framework joining LoRa, Arduino, ESP8266, GPS, and different wellbeing sensors. The framework offers a solid, effective, and versatile arrangement for real-time wellbeing following in military operations. By leveraging remote communication and cloud-based information handling, it improves restorative status and guarantees convenient mediations, altogether making strides warrior security and operational adequacy. Future improvements will center on AI-based wellbeing expectation and amplified battery optimization to advance progress framework proficiency and unwavering quality. . In future, a portable handheld sensor device with more sensing options may be developed to aid the soldiers.

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