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# Health Monitoring and Soldier Tracking System using IOT

Archana Padikar A, Cinmayee C K,
Chaithra E, Chethan[1]
Students, Dept. of E&TE
Sri Siddhartha Institute of Technology
Tumakuru, India

Puneeth Kumar D N[2]
Assistant professor,
Department of ETE, SSIT,
Tumakuru, India.

*Abstract*— **Now a day, battle ground is a main part in any country's safety. One of the main parts is played by the army soldiers. Several steps taken in concerning the protection of soldiers. So for their safety intend, many instruments are on horseback them to observe their medical condition. Bioprobes system contains different types of biosensors, transmission system and processing capabilities, and can thus ease low-cost wearable not obtrusive solutions for health monitoring. GPS is to find the longitude and latitude so that direction of soldier can be known easily. These devices are being added to weapons and clothes, and some militaries such as the Israeli Army which are exploring the option of embedding GPS devices into soldiers vests and uniforms, therefore that base station can monitor their soldier's in real time.**

*Keywords— Heartbeat Sensor, Temperature Sensor, Gas Sensor and GPS.*

## I. INTRODUCTION

This work deals with the keep track of the soldier parameters such as temperature, breathing and heart rate. Arduino Uno and Node MCU are used in designing the soldier monitoring system, can be explained as the system used for monitoring physiological information that includes the parameters like heart beat, body temperature, gases related parameters, etc. based prototype Model where we are monitoring the heart beat rate and temperature of body parameters through the Arduino Uno. The perfect direction and the medical related information of the soldier can be sent to the base station in real time, so that desired steps can be taken by base station. Internet of Things (IoT) with Global Positioning System (GPS) is used for tracking the location of the soldier and monitoring of the health parameters like heartbeat, gas sensor and body temperature. The heart of the project is the Node MCU. The power system consists of IC7805 for 5V supply and IC7812 for 12V supply. Soldier can be rescued, when in different situations in the following conditions:

1 In unstable physiological regulatory systems – for instance, in the case of overdose of poisonous gas

2 In a life threatening condition – for instance, heart attack in a soldier.

3 In a situation leading to the developing of a risky life threatening condition.

i.4 In a critical physiological state.

ii. 5 To track the exact location of the soldier.

## II. LITERATURE REVIEW

Jasvinder Singh, et al., [1] proposed Global Positioning System (GPS) and Internet of Things (IoT) based soldier positioning and health signal system in 2019. Nonstop communication is possible. soldiers can communicate anywhere, which can help soldier to communicate among their other soldier whenever in need. Simple circuit and less power needed, use of low power needing peripherals and ARM processor lower the total power usage of module. Peripherals used are smaller size and also has low weight so that can be carried around safety and security for soldiers. GPS trace location of soldier anywhere on globe also health system monitors so soldiers important health parameters which gives safety and security for soldiers.

Niket Patil, et al.,[2] proposed a health monitoring and tracking system in 2018. This paper turn-up an IoT based health monitoring and tracking system for soldiers. This suggested module can be horseback on the soldier's body to find their health condition and present position using GPS. These data will be sent to base station via IoT. The presented module it is possible to execute a low cost circuit to safeguard the valuable soldier life on the battle field.

William Walker A L, et al., [3] proposed a mobile health monitoring in 2018. The authors had discussed on different wearable, portably low weight and small size biosensors that have been developed for monitoring of the soldier health status. The BSN consists of sensors such as heart beat, temperature and gas sensors which can be put on a soldier body for health condition monitoring in real time. In this paper suggest a methodology to develop a system for real time health monitoring of soldiers, consisting of interconnected BSNs.

Akshay Gondalic, et al., [4] designed IoT Based Healthcare Monitoring System for War Soldiers using Machine Learning in 2018. This system enables to army base station to track the position and observe the medical status of soldiers using GPS, temperature sensor, heart beat sensor etc. The information from sensors and GPS values will be transmitted wirelessly using ZigBee system with the other soldiers. In addition LoRaWAN network system has been suggested to be used between the leader and base station war zones where cellular network coverage is either absent or does

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not allow data transmission The collected information will be uploaded on the cloud for next step data analysis and predictions using K means clustering algorithm.

Afef Mdhaffar, et al., [5] proposed a work on IoT Based Health Monitoring via LoRaWAN in 2017 in which collected bio sensor data is sent to analysis module through low cost, low power and secure communication using a LoRaWAN network framework. Heart beat, temperature and glucose have been measure in rural areas where cellular network coverage is either does not allow data transmission or absent. The average area covered by LoRaWAN is around 33km when the LoRaWAN gateway is put in outdoor on a 12 meter altitude power consumption of this monitoring module is claimed to be at ten times less than other long range cellular solutions, such as GPRS/3G/4G.

## III. SYSTEM STRUCTURE
The block diagram representation of the system components is as shown in figure 1.

The paper focuses on the health monitoring system of the soldiers. The block diagram of soldiers position tracking and health monitoring system using IoT includes heart beat, temperature and gas sensors, power supply and GPS as input Arduino UNO as processing device.
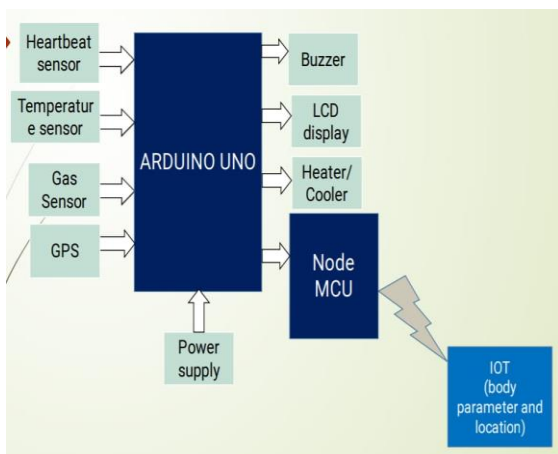


Fig. 1 Block diagram of the proposed system.

Node MCU for updating information to cloud. Buzzer, LCD display, heater/cooler as output devices.

This system increases safety in emergency response of military operation. Heartbeat sensor gives the heart rate by the sensor that measure the rate of flow of blood at the finger tip, by the amount of blood changes with time. Temperature sensor is the sensor that measure the amount of heat that it observes and gives the temperature in Degree Celsius. Gas sensor detects the concentration of gas in the atmosphere that detects the poisonous gas. GPS is used to find the exact location of the soldier. The direction of the soldier can be find with the use of GPS modem. GPS modem receives the signal from the satellite and calculates the longitude and latitude of the direction of soldiers and send to the controller from serial data.

Arduino UNO is an open source microcontroller board based on the microchip AT mega 328P microcontroller and developed by Arduino. Arduino UNO checks the status of heart rate, temperature and gas. If the heart rate is greater than or lesser than its threshold value, Arduino turns ON the buzzer, if the temperature differs from threshold value, it will turn ON the heater/cooler. The position information, heart rate, temperature and gas detection is sent to the Node MCU through serial communication. When Wi-Fi is available, it receives and read the serial data from Arduino and uploads data in IoT and compares the data, if there is any difference in threshold values, it will send SMS/E-mail to the army base station.

## IV RESULTS AND DISCUSSIONS
The result is as shown in Table 1 and Fig.2. A message/email is send to the desired receiver confirming about GPS geography. 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 get from above execution. It is capable of collect and process the vital body parameters and location information from the soldier's body. When temperature of surrounding rises above the threshold value greater or equal to 30 degree then cooler will turn ON. When the temperature falls below threshold value lesser or equal to 22 degree then heater will turn ON. When the pulse rate is higher or lower than the normal value the system will send E-mail/Msg along with the location information of soldier to base station. When the gas value is above the threshold value greater or equal to 700, then system will send E-mail/Msg along with the location information of soldier to base station.

Table 1:- Parameters of sensors with their result

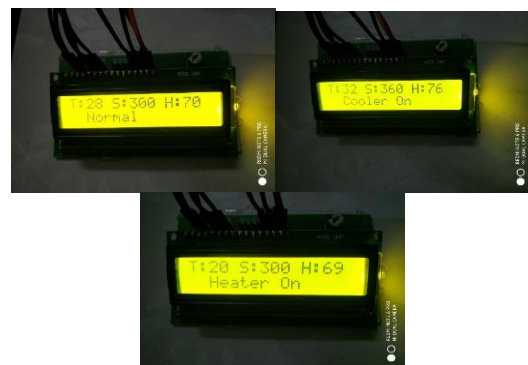| Parameters | Sensed values |
|---|---|
| Heart Beat/minute | 69bpm |
| Temperature | 20C |
| Gas | 300 |



Fig.2 Results of Temperature, Heart Beat and Gas

## V CONCLUSION
The subjective of this paper is to present the information about the Soldier Monitoring system is successfully implemented

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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/concerned persons to view the soldier activities remotely. In the future, we can include the Solar harvesting system to recharge the DC power source automatically when the user is exposed to the sun and we can also interface the camera which will help the doctors/concerned persons to view the patient activities remotely.

## ACKNOWLEDGMENT

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