

# IOT Based Warrior Position Tracking And Health Monitoring System

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**ABSTRACT:** In the recent years, smart sensing approach creating a vibrant impact in shaping our future. Recent technological advancement which has influenced a change in lifestyle is the field of IOT (Internet of things). IOT is the internetworking of physical devices, and other devices embedded with the electronics, software, sensors and network connectivity that enable to get data of those objects. Now-a-days people are suffering with several diseases and counts of the patients are increasing day by day. The monitoring of patient health in several parameters using some sort of sensors makes the work easy to the doctors. This project reports health monitoring and tracking system of warrior using IOT, army base station and need wireless base station to sense health related parameters of soldiers and an IOT transmission. Upon losing in the battlefield it is necessary for the base station to guide the soldier. The base station can access the current status of the soldier which is displayed on the Personal Computer. This information will be transmitted to the control room through the Internet of Things. The proposed system comprises tiny wearable physiological devices, sensors, transmission modules. Hence, with the use

of the proposed system, it is possible to implement a low cost mechanism to protect the valuable human life on the battlefield

**KEYWORDS:** Internet of Things, Microcontroller, WIFI module, Sensors, Health Monitoring.

## I. INTRODUCTION

One of the most usable technologies in this trending world is IOT. IOT describes about the embedded devices which are interlinked with the internet. Internet of Things encompasses devices like sensors, actuators, motors etc. Nowadays the major concern of the people is securing the health these emerging advanced technologies are firmly adapted by defence services to provide some safety systems to our soldiers. There are many parameters by which defence services can provide safety to the soldiers. The nation's security is monitored and kept by the army, navy and air-force. The important and vital role is of soldiers who sacrifice their life for their country. There are many concerns regarding the safety of the soldier. Soldiers entering the enemy lines often lose their lives due to lack of connectivity, it is very vital for the army base station to know the location as well as health status of all soldiers. So many soldiers lost in war fields as there was no proper health backup and connectivity

between the soldiers on the war-fields and the officials at the army base stations.

## 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 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. Heartbeat, 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.DESIGN CONSIDERATIONS

In the recent years, smart sensing approach creating a vibrant impact in

shaping our future. Recent technological advancement which has influenced a change in lifestyle is the field of IOT (Internet of things). IOT is the internetworking of physical devices, and other devices embedded with the electronics, software, sensors and network connectivity that enable to get data of those objects. Now-a-days people are suffering with several diseases and count of the patients are increasing day by day. The monitoring of patient health in several parameters using some sort of sensors makes the work easy to the doctors. The IOT based warrior health monitoring and tracking system can be used to monitor physiological parameters, such as heart rate, temperature of a human body and track the person using GPS. The objective of this project is to design and implement a reliable, cheap, low powered and accurate system that can be worn on a regular basis and monitors the vital signs. This project includes modern hardware and software components that help for real time warrior health monitoring. The heart of the project that is, as microcontroller we used Arduino Nano.

#### IV. RELATED WORK

Medically, health statuses of patients with critical conditions are a great concern for doctors who seek new and innovative healthcare systems. In the past, militarily armies monitored their soldiers with the aid of primitive communication systems, such as walkie-talkie, until the technological development enabled tracking systems using satellites.

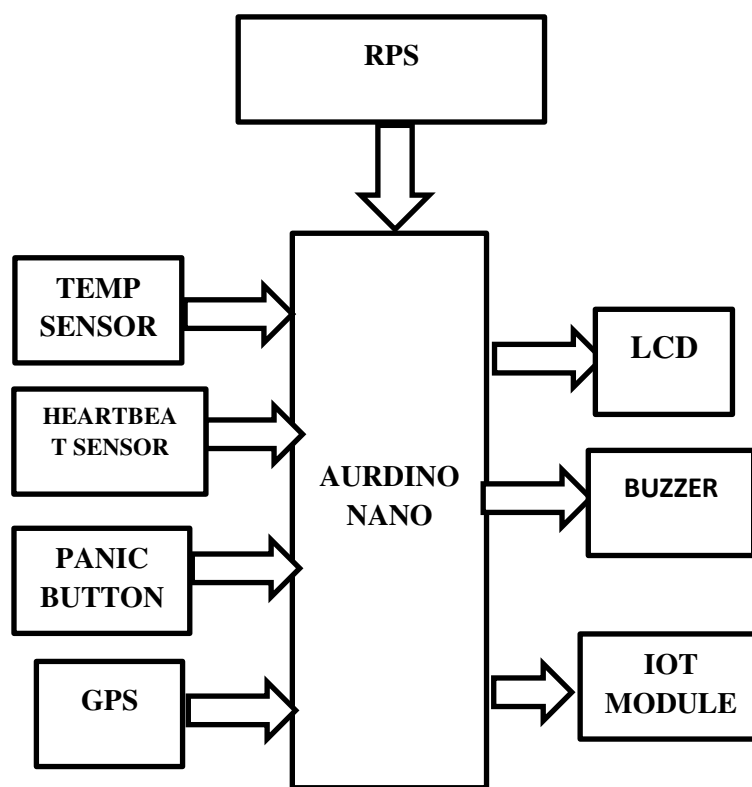
This system is designed for continuous monitoring of the patient and to describe the status of the patient condition

#### V. PROPOSED SYSTEM

The proposed system not only performs the task of health monitoring but also does the tracking of soldiers using

GPS. The control room can acquire the details about the soldiers. The base station can access the current status of the soldier using GPS. These information will be stored on the Cloud and can be extracted on the PC of the control room, as and when extracted. Based on this information, the authorities can initiate immediate action by deploying a medical, rescue team or any backup force for their help. Using various biomedical sensors, health parameters of a soldier is observed along with its surrounding environment condition observed.

#### A. BLOCK DIAGRAM:

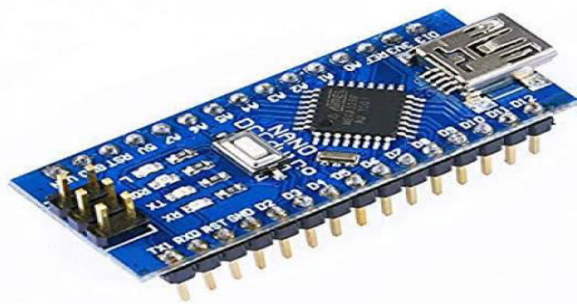


**Figure: Functional pattern of health monitoring system.**

The above image shows a block diagram of health monitoring system which is implemented using a GPS and IOT Module platform. It contains Arduino, GPS, sensors, ESP8266 modules.

**B) Interfacing Device:****D) ARDUINO NANO:**

ARDUINO NANO The main part of the health monitoring system is microcontroller. Arduino NANO is the open access microcontroller. Arduino Nano controller board contains 14 digital pins, 8 analog Pins, 2 Reset Pins & 6 Power Pin which are used to interfaced embedded devices. It works with a voltage of 5v. It has a flash memory of 32KB and static RAM of 2KB. Arduino controller can be programmed in embedded c language in Arduino IDE.



**Figure: Ardino Nano Board**

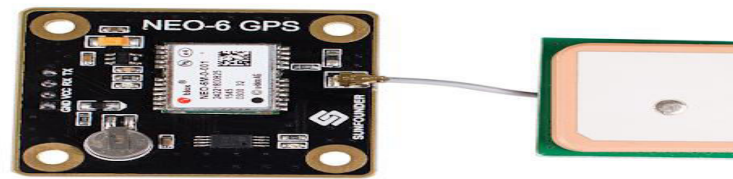
**ii) GPS MODULE:**

Global Positioning System uses a satellite technology to trace the signals. It works on the principle of 2D trilateration. When an object sends signals to the satellites, satellites resend the feedback signals back to the object. The time required to send the feedback signal is calculated to determine the geographical location of the object.

GPS Tracking system uses Global Navigation Satellite System network to

track the exact location of the vehicle.

Vehicle tracking systems have been categorized into two types, passive and active system. Passive system monitors the location and stores the data whereas active tracking system monitors and sends information to a central tracking portal.



**Figure: GPS MODULE**

**iii) HEART BEAT SENSOR:**

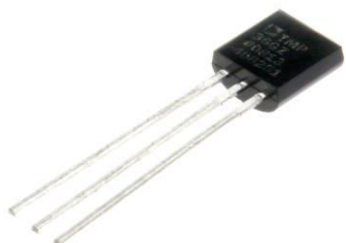
Heart beat sensor is designed to give digital output of heart beat when a finger is placed on it. When the heart beat detector is working, the beat LED flashes in unison with each heartbeat. This digital output can be connected to microcontroller directly to measure the Beats per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse. The operating frequency is +5V DC, operating current is 100mA, Output data level is 5V TTL Level.



**Figure: HEART BEAT SENSING MODULE**

#### iv) TEMPERATURE SENSOR:

A temperature sensor is an electronic device that measures the temperature of its environment and converts the input data into electronic data to record, monitor temperature changes.

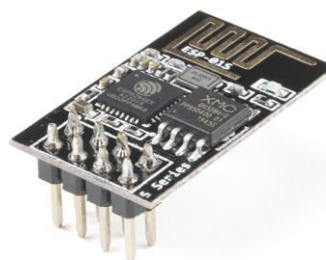


**Figure: TEMPERATURE SENSOR**

#### v) WI-FI Module:

The ESP8266 is a low-cost Wi-Fi microchip, with a full TCP/IP stack and microcontroller capability.

It is used for establishing communication over Wi-Fi. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections. It requires +3.3v of power supply.



**Figure: WI-FI MODULE**

#### vi) LCD DISPLAY:

To display interactive messages, we are using LCD Module. We examine an intelligent LCD display of two lines, 16 characters per line that is interfaced to the controllers. 2\*16 line LCD Display



**Figure: LCD DISPLAY**

#### vii) PUSH BUTTON:

A push-button (also spelled pushbutton) (press-button in the UK) or simply button is a simple switch mechanism for controlling some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal. The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily

depressed or pushed. Buttons are most often biased switches, though even many un-biased buttons (due to their physical nature) require a spring to return to their un-pushed state. Different people use different terms for the "pushing" of the button, such as press, depress, mash, and punch.



**Figure: PUSH BUTTON**

#### viii) Buzzer:

Buzzer is the output module for alerting people in the base station whenever there is an Emergency for the warriors in the Battle field



**Figure: Buzzer**

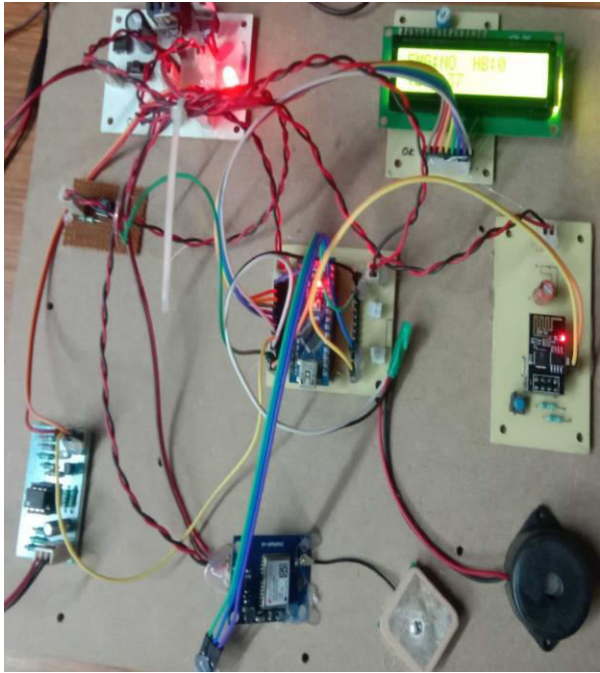
## IV. METHODOLOGY

The health monitoring system is designed to monitor the different parameters of the health using the IOT technology. Here we

use heart beat monitoring module to monitor the heartbeat of the warrior, if there are increase or decrease in the heart beat of the patient it is observed in the LCD and also in webpage. By this way each module is used to monitor each parameter of the health and stored real time values in the Arduino Nano these data can be observed in a LCD and also in webpage with the help of WI-FI module from the above process health monitoring is checked virtually in the webpage. GPS is used to locate the exact position of person when an accident or injury is occurred to the person. Here we use heartbeat, temperature monitoring.

## VI. RESULT & CONCLUSION

The paper reports an IOT based system for the health monitoring and tracking of the soldiers. Arduino board is used which is a low cost solution for the possessing purpose. A biomedical sensor provides heartbeat, body temperature, and environmental parameters of every soldier to control room. This technology can be helpful to provide the accurate location of missing soldier in critical condition and overcome the drawback of soldiers missing in action. The addressing system is also helpful to improve the communication between soldier to soldier in emergency situation and provide proper navigation to control room. Thus we can conclude that this system will act as a lifeguard to the army personnel of all over the globe. In future, a portable handheld sensor device with more sensing options may be developed to aid the soldiers.



[4] Hock Beng Lim, Di Ma, Bang Wang, Zbigniew Kalbarczyk, Ravishankar K. Iyer, Kenneth L. Watkin, "A Soldier Health Monitoring System for Military Applications", 2010 International Conference on Body Sensor Networks, 9780-7695-4065-8/10/\$26.00 © 2010 IEEE, DOI: 10.1109/BSN.2010.58, pp: (246-249).

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## VII. FUTURE SCOPE

This system can be further tweaked to improve its performance. It can be improved by introducing a new communication system using microwave signals with frequencies lower than Wi-Fi band (around 2.4 GHz) which will be only available for military applications.

## VIII. REFERENCES

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