



# Real Time Health Monitoring System In Military Application Using In IOT

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**Abstract:** War Soldier's tracking is done using GPS and IoT is used to provide wireless communication system. For monitoring the health parameters of soldier we are using bio medical sensors such as sound sensor , Co2 Sensors and heart beat sensor it is essential for the base station to determine the exact location and the health status of the soldier and hence more emphasis should be given to navigation and health monitoring technology for the soldiers in the war torn zone. In this project the exact location and the health status parameters of the soldier can be sent to the base station in real time so that the appropriate actions can be taken in case of crisis automatically with the help of deep learning algorithms using MQTT protocol. This technology helps to minimize the rescue, time and search operation effort of army rescue control unit. This is a wearable technology which is the most important factor of this project.

**Keywords:** , CO2 Sensor, Location Tracking GPS, MQTT,Machine Learning,IOT

## I INTRODUCTION

The nation's security is monitored and kept by 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. India has already lost so many soldiers 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. Recently on 29 September 2016, a military confrontation between India and Pakistan began, Indian soldiers conducted a surgical strike against militant launch pads across the line of control in Pakistani-administered Azad Kashmir, and inflicted "significant casualties". In today's world the security of the nation is depends up on the enemies with warfare and so the safety of the soldiers is considered as vital role in it. Concerning the soldiers safety there are many instruments to view their health status as well as ammunitions on the soldier

## II MACHINE LEARNING

Machine learning is a subfield of artificial intelligence (AI). The goal of machine learning generally is to understand the structure of data and fit that data into models that can be understood and utilized by people. Although machine learning is a field within computer science, it differs from traditional computational approaches. In traditional computing, algorithms are sets of explicitly programmed instructions used by computers to calculate or problem solve. Machine learning algorithms instead allow for computers to train on data inputs and use statistical analysis in order to output values that fall within a specific range. Because of this, machine learning facilitates computers in building models from sample data in order to automate decision-making processes based on data inputs. Any technology user today has benefitted from machine learning. Facial recognition technology allows social media platforms to help users tag and share photos of friends. Optical character recognition (OCR) technology converts images of text into movable type. Recommendation engines, powered by machine learning, suggest what movies or television shows to watch next based on user preferences. Self-driving cars that rely on machine learning to navigate may soon be available to consumers. Machine learning is a continuously developing field. Because of this, there are some considerations to keep in mind as you work with machine learning methodologies, or analyze the impact of machine learning processes. Machine Learning is used anywhere from automating mundane tasks to offering intelligent insights, industries in every sector try to benefit from it. You may already be using a device that utilizes it. For example, a wearable fitness tracker likes Fitbit, or an intelligent home assistant like Google Home. But there are much more examples of ML in use.

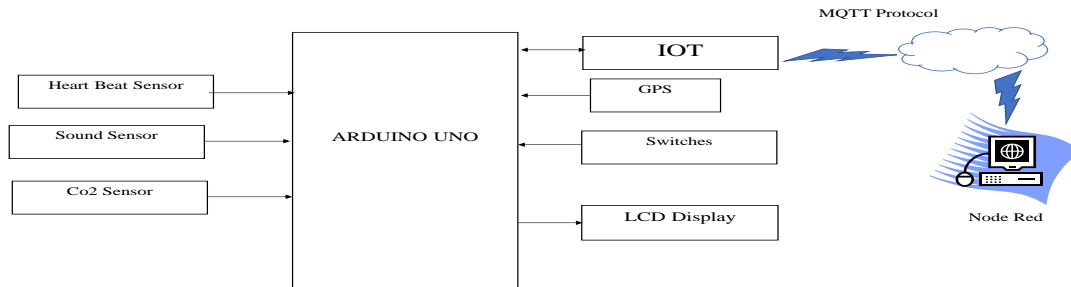
## III PROPOSED SYSTEM

This work deals with the keep track of the soldier parameters such as position, breathing and heart rate. Arduino Uno is used in designing the soldier monitoring system, can be explained as the system used for monitoring physiological



information that includes the parameters like heartbeat, Position, 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 sound

**Block Diagram**

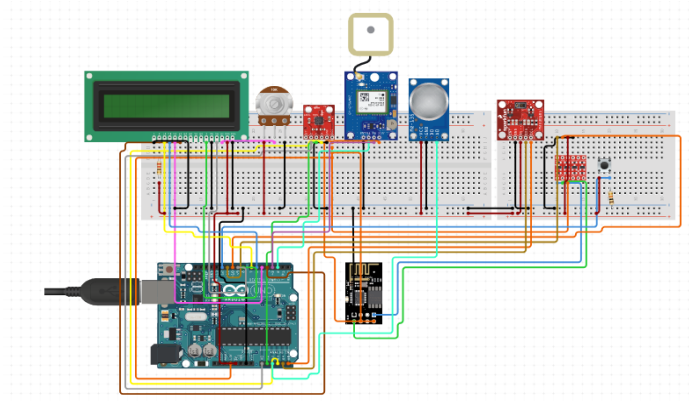


**BLOCK DAGRAM OF THE PROPOSED SYSTEM**

**IV BLOCK DIAGRAM EXPLAINATION**

This is a wearable technology which is the most important factor of this project. This unit is placed on the soldier. It has mainly 4 parts: Environment and Physiological sensors: Here to find the health status of the soldier we are using a pulse rate sensor. These sensors will measure the pulse rate of a soldier and will be stored in microcontroller memory. Emergency Switch: Here we are giving 1 key as a facility to the soldier where he can send 1 predetermined value to the base camp. GPS Receiver: The GPS is used to log the longitude and the latitude of the soldier, which is stored in the microcontroller memory. IoT: The IoT unit sends the all information to the army base camp containing the health parameters and the location of the soldier. MQTT is an OASIS standard messaging protocol for the Internet of Things (IoT). It is designed as an extremely lightweight publish/subscribe messaging transport that is ideal for connecting remote devices with a small code footprint and minimal network bandwidth. . MQTT today is used in a wide variety of industries, such as automotive, manufacturing, telecommunications, oil and gas, MQTT is a Client Server publish/subscribe messaging transport protocol. It is light weight, open, simple, and designed so as to be easy to implement. These characteristics make it ideal for use in many situations, including constrained environments such as for communication

**Block Diagram**



**CIRCUIT DIAGRAM**



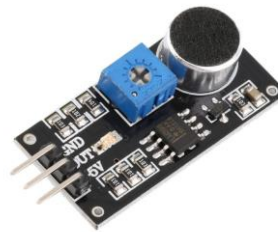
**V SMOKE SENSOR**

A smoke detector is a device that senses smoke, typically as an indicator of fire. Commercial security devices issue a signal to a fire alarm control panel as part of a fire alarm system, while household smoke detectors, also known as smoke alarms, generally issue a local audible or visual alarm from the detector

**VI SOUND SENSOR**

**Sound sensor**

IC Chip	LM393
Operating Voltage (VDC)	3.3 ~ 5
Induction Distance	0.5 Meter
Length (mm)	43
Width (mm)	17
Height (mm)	8
Weight (gm)	3
Shipment Weight	0.105 kg
Shipment Dimensions	8 × 4 × 2 cm



**SOUND SENSOR**

A sound sensor is defined as a module that detects sound waves through its intensity and converting it to electrical signals. Sound detection sensor works similarly to our Ears, having diaphragm which converts vibration into signals. of the system is produced by the sensor

**VII GPS MODULE**

The Global Positioning System (GPS) is a global navigation satellite system that provides location and time information in all weather conditions. The GPS operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of GPS positioning

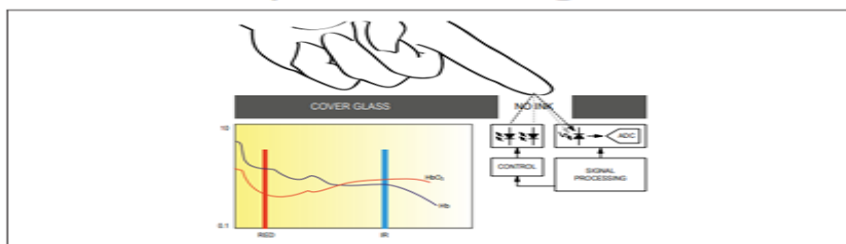


**GPS MODULE**

**VIII HEARTBEAT SENSOR**

It's an optical sensor that derives its readings from emitting two wavelengths of light from two LEDs – a red and an infrared one – then measuring the absorbance of pulsing blood through a photodetector.

**System Block Diagram**



**HEARTBEAT SENSOR**

### IX MQ135 SENSOR

The MQ-135 sensors are used in air quality control equipments and are suitable for detecting or measuring of NH<sub>3</sub>, NO<sub>x</sub>, Alcohol, Benzene, Smoke, CO<sub>2</sub>. The MQ-135 sensor module comes with a Digital Pin which makes this sensor to operate even without a part of the microcontroller and that comes in handy when you are only trying to detect one particular gas. If you need to measure the gases in PPM the analog pin need to be used. The analog pin is TTL driven and works on 5V and so can be used with most common microcontrollers

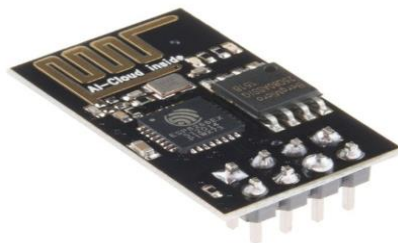
#### PIN CONFIGURATION MQ135 SENSOR.

- From left to right first pins are as follows:
- A0 Analog output
- D0 Digital output
- GND Ground
- Vcc Supply (5V)



### X IOT(INTERNET OF THINGS)

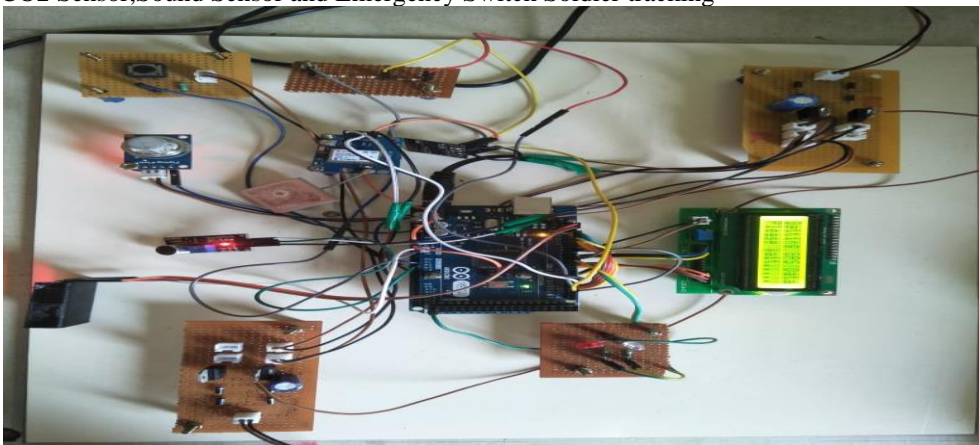
The chip first came to the attention of western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer, Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network. The ESP8265 is an ESP8266 with 1 MB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi.



ESP8266

### XI RESULT AND DISCUSSION

The Below Figure Shows The Final Outcome Of The Proposed System Which Consist of the IOT,GPS,Sensor Unit Such a Heart,CO<sub>2</sub> Sensor,Sound Sensor and Emergency Switch Soldier tracking

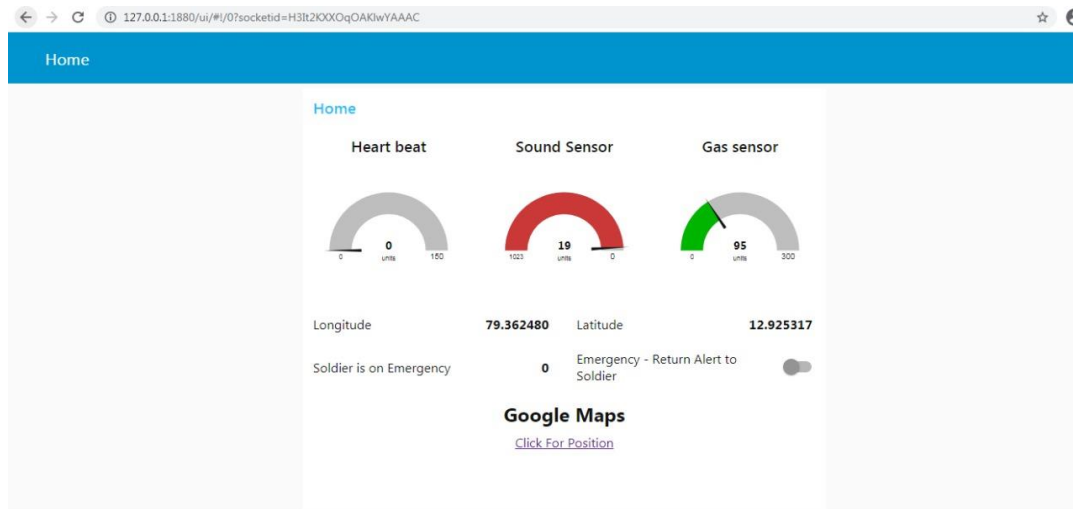


PROTOTYPE OF THE PROPOSED METHODS

The output readings of temperature, longitude, latitude and BPM and other sensor readings are observed on the LCD screen of the soldier unit. The below figure shows the dashboard output of the control room section. The Base station showing the readings as observed on the Node-Red Dashboard. A robust accurate positioning system with seamless indoor and outdoor coverage is highly needed tool for increasing safety in emergency response and military operation. GPS-based positioning methods mainly used to field rescue. The position and orientation of the rescuer and the trapped



is acquired using GPS chip. Using the GPS data of both the units the relative distance, height and orientation between them are calculated from the geometric relationships based on a series of formulas in Geographic Information Science (GIS). Using this technology, we are doing the navigation between two soldier .the data will be send wirelessly by IoT Transceiver. This device can do accurate coordination via wireless communication, helping soldier for situational awareness. GPS module have serial interface. Receiver information are broadcast via this interface in a special data format.



**PROTOTYPE FOR SIMULATION**

## XII CONCLUSION

The major problem in the military is lack of proper communication between the soldier and the control. Conclusion can be retrieved from the above work is that; we are able to transmit the data which is sensed from remote soldier continuously to the army base station by using Internet of things. From the proposed system we can conclude that the various sensors sense the environment and physiological parameters in real time and transmit the data to the control room, there by tracking the current location of the soldier using IoT and GPS technology will help to display digital map which shows the position of all soldiers to the unit, which will help them to locate the target, and attacks can be avoided. It also provides the spontaneous communication with control room and other fellow soldier in a panic situation to get help. The proposed system is an effective security and safety system which is made by integrating the advancements in wireless and embedded technology. It helps for a successful secret mission. This system can be used in critical conditions

## XIII FUTURE WORK

The proposed work can be expanded in the future in many directions. Gyroscope and Accelerometer can also be used together for human activity recognition using machine learning. Blood pressure sensor and electro dermal activity sensor can also be implemented together to classify if the soldier is calm or is in distress.

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