



# IoT Based Real Time Soldier Health Care Monitoring System in Battlefield

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**Abstract - All nations keep its security as high precedence. Wars are being fought for land, water and acquiring the position of nation. A country's arm forces correspond of three professional uniformed services that are army, navy, and air force. Soldiers are being the backbone of any armed force. They generally lose their lives due to lack of medical help when in emergency, also soldiers who are involved in operations or in special operations get straggled on war fields and lose contact with the authorities. To overcome this concern, we made this design in which wireless body area sensor network (WBANS) such as temperature sensor, heartbeat sensor and oxygen level sensor are used. These will monitor the health status of the soldier and also using IoT we can track the soldier's exact position whenever needed. Using oxygen level sensor, we can also monitor the environmental condition due to that the authorities can give essential aids. The communication is established between the soldiers and authorities via IOT. Any abnormalities in the readings of wireless body area sensor network (WBANS) are considered as a trigger for IOT to establish the connection between the soldier and base unit then it sends the current location and health status to the receiver.**

**Keyword:** wireless body area sensor network, IOT, oxygen level sensor

## I. INTRODUCTION

The nation's safety is checked and maintained by military, navy and air-force. The essential and important functions of soldiers are to compromise their life for the nation. There are lots of issues concerning the security of the soldier. Soldiers going into the enemy lines frequently, and they lose their lives because of the lack of connection. It is really significant for the military base station to understand the soldier location in addition to health and wellness condition. India has currently lost a lot of soldiers in war-fields as there was no appropriate wellness back-up and connection between the soldiers on the war-fields and the authorities at the military base terminals. Just lately on 29 September 2016, an armed forces conflict in between India and Pakistan started, Indian soldiers performed a medical strike versus militant launch pads throughout the line of control in Pakistani-administered Azad Kashmir, and brought upon substantial casualties. Indian soldiers are primarily understood for their guts, despite limited ammunition and precaution, they have lots of triumphs to their credit scores. All should be actually concerned about the security of the soldiers, so we have decided to develop a job which will effectively maintain a check on the health and wellness condition of the soldier, and his accurate place to furnish him with required clinical therapies immediately. Soldier's monitoring is done by utilizing GPS as well as GSM, and it is utilized to offer cordless interaction system. For tracking the health criteria of soldier we are utilizing biomedical sensors such as temperature level sensor and heart beat sensor. An oxygen level sensor is utilized to check atmospheric oxygen so if there are any type of weather modifications the soldiers will be geared up appropriately. The infantry soldier of tomorrow assures to be one of the most technically progressed modern war has ever seen. Worldwide, different research study programs are presently being carried out, such as the Unified States' Future Pressure Warrior and the Unified Kingdom's Future Infantry Soldier Innovation, with the objective of producing completely incorporated fight systems. Along with large enhancements in safety and weaponry subsystems, another significant element of this innovation will be the capability to offer details superiority at the operational edge of armed forces networks by furnishing the dismounted soldier with advanced visual, voice, and data interactions.

Helmet placed visors, with the ability of showing maps and real-time video clip from various other team participants, ranges of physical sensors display the heartbeat, body temperature level, environment stress, bordering oxygen degree and so on. These gadgets will enhance understanding for security military workers in addition to that will trade info utilizing cordless networks together with hold. The difficulty was to incorporate these piecemeal elements into a light-weight bundle that might accomplish the preferred outcome without being as well large and troublesome or needing excessive power. Interacting with the base (manage space) terminal ended up being the essential difficulties in armed forces procedures likewise the appropriate navigating in between soldier's companies plays essential function for cautious preparation and co-ordination.

Therefore, this paper concentrate on monitoring the area of a soldier from GPS, which is useful for a control room to understand the particular place of a soldier as well as appropriately they'll direct all of them. Likewise, fast, short-range, a soldier-to-soldier cordless interactions to communicate information on situational recognition, like Bio-medical sensors, GPS navigation, Wireless communication. The soldier should be included with advanced health care monitoring, real time GPS as well as data communications to deliver and also to get information from the control system. For that soldier may require cordless systems certainly not just to interact along with control system however likewise along with side-by-side armed forces personnel.

Apart from the nation's protection, the soldier should require security by safeguarding themselves along with advanced weapons, and it is actually required for the military control system to screen the health and wellness condition of the soldier. To perform this function, within this particular paper biomedical sensors as well as monitoring devices are actually incorporated along with the soldiers. The incorporated elements should be actually lightweight package as well as it should offer desired outcome without demanding a lot of energy. Among the essential difficulties in armed forces operations lies that the soldiers are actually unable to interact along with command system. Additionally, the proper navigation in between soldiers plays an essential function for careful preparation as well as co-ordination.

The proposed function concentrates on monitoring the place of soldier which is useful for control space station to understand the particular place of soldier and also appropriately they'll direct all of them. Control system obtains place of soldier utilizing GPS. It is actually required for the base station to direct the soldier on appropriate pathway if he lost in the battleground. This paper will certainly work for the soldiers, that associate with unique procedures or even objectives. Wise Bio health care sensors consisting of Heartbeat sensor, ECG module, Temperature level and Moisture sensor are actually connected to the jacket of soldiers. These are actually implanted along with the soldier for finish mobility. This system will certainly offer connection to the web server at the foundation terminal utilizing a cordless link. The information acquired at the base station could be utilized for additional forecast making use of K-Means Clustering formula. This might assist the control station to know about the circumstance at the objective area.

The soldier Health and wellness as well as Setting Monitoring Body enables armed forces to monitor the present GPS position of soldier and examinations the health and wellness condition consisting of body system temperature level as well as heartbeats of soldier. The Body likewise consists additional feature along with the assist of that soldier can easily request help by hand or even send out a distress signal to armed forces if he remains in need. The GPS modem sends out the latitude and also longitude position along with link style with the assist of that armed forces can easily monitor the present position of the soldier. The system is extremely useful for obtaining health and wellness condition information of soldier and also offering them instantaneous assist.

## II. LITERATURE SURVEY

Lots of initiatives were actually stated through various academicians as well as scientists to monitor the place of the soldiers together with their health and wellness problem on the battleground pavan kumar eta stated a GPS located innovation to screen the soldier health and wellness specifications as well as location monitoring using GPS AT89C51 microcontroller was actually utilized to gather health and wellness specifications and after that these specifications are actually moved with GSM to the base unit [3] a ZigBee located approach movements and heartbeat of the person the acquired information were actually then added to the cloud-based sites along with the assist of IoT a real-time arm CPU based method for the monitoring and collection of temperature level heartbeat ECG specifications of clients by r shaikh et al [6] ZigBee and GSM cordless technology were actually utilized to send out current updates of clients to the doctor and after that doctors can get immediate action against that patient a wireless body area sensor networks WBASNS technology utilizing ZigBee was stated in [7] to constantly monitor the human health and wellness as well as its own place rf located component to collect the live information of soldiers on the battleground was actually made a proposal through g raj et al in [8]

Additionally a one-time password OTP based system was proposed in [9] to protect and reauthenticate the information handling jassaset et al suggested a concept of combination of cordless sensor network and cloud computing for the information handling in real-time and fast manner [10] a google map based method was actually recommended in [11] to monitor the place of the soldiers nevertheless all of these systems are actually stuck-up through several factors like expensive application delay in response and large nature thus a portable cordless real-time system based upon IoT concept is actually designed and recommended within this particular paper which will certainly be actually an efficient option to the current modern technologies in the location of soldiers health and wellness as well as placemonitoring on the battlegrounds the base station can easily access the current status of the soldier using IOT as the different monitoring parameters of the soldier obtain transmitted via wi-fi module this information will certainly be stored on the cloud and can be extracted on the pc of control room as and when extracted based upon this information the authorizations can easily start instant activity through releasing a clinical saving group or even any type of back-up pressure for their assist utilizing different biomedical sensors health and wellness criteria of a soldier is actually noted together with its own neighboring atmosphere problem observed the proposed system is separated into two unit i.e. soldier and control space unit. Temperature sensor pulse rate sensor and oxygen level detector sensor for continually

monitoring health condition of soldier GPS is actually utilized to identify actual time setting and also positioning information originating from sensors and GPS receiver is refined and gathered using arm processor.

Health and wellness observing and tracking of soldiers using GPS communicating along with the base control room station become the fundamental challenges in military operations also the proper navigation between soldiers organizations plays essential role for careful planning and co-ordination therefore this paper focus on tracking the place of soldier from GPS which is useful for control room station to understand the precise place of soldier and appropriately they will direct all of them likewise fast short-range soldier-to soldier cordless interactions to communicate information on situational understanding like bio-medical sensors GPS navigation cordless interaction one of the absolute most importance in this is actually implementation of m-health application of this particular system improves the safety and safety of our nation and help to improve the security of the soldier this system also helps to provide real time video info the casualties of battle are actually decreased along with the assist of this particular body it likewise assists to providing crucial information and also alerting to the soldiers and can easily use more of them to the current weaker places this enhances the defense system.

An actual time self-governing soldier health and wellness and health keeping track of cordless sensing unit units are actually really the collection of a good deal of affordable low-power multifunctional sensing unit nodes that are actually really little bit of in measurement and communicate untethered simply put varies they might be an important element of armed forces C4ISR bodies this report suggests a method to ensure the safety and safety and self-respect of every armed forces employees of the geared up needs of the world with providing all of them together with a device that constantly displays the well really truly worth of the pulse rate of the wearer and along with the help of the GPS component existing together with the transmitter configuration current at the resource helps in preserving a tab on the immediate location information latitude and longitude of the wearer in those unfavourable situations where the pulse rate and even heart rate decreases below the scientifically authorized worth of 60 beats every minute for that reason it helps to screen observe and keep in mind the place of every soldier the study likewise recommends extra mix together with present gadgets being actually utilized effective interfacing was actually accomplished as well as outcomes recommend appropriate intimation of rhythm price as well as place as quickly as rhythm worth shed listed below pre-decided restrict and even on recipient need.

An IoT based client keeping track of system among the essential knowing systems for IoT is actually the raspberry pi the raspberry pi is actually a prominent system since it provides a total LINUX web server in a small system for an extremely inexpensive the Raspberry Pi likewise enables interfacing solutions as well as actuators with the basic function IO pins within this particular paper specific sensing unit is actually utilized to screen patients heart rate physical body temperature level physical body motion and taking a breath rate the combination of raspberry pi and IOT becomes a brand-new development innovation in health care body raspberry pi serve as a little center after linking these temperature level respiration accelerometer heartbeat sensors raspberry pi works as little center in lots of locations raspberry pi gathers information coming from sensing units and after that it move wirelessly to IOT site raspberry pi panel is actually linked to the web that panel may deal with is actually signed up to the web afterward in IOT site include may deal with of this particular panel after that the sensing units outcome is actually linked to the IOT site one is actually straight linked to the screen keyboard and computer mouse to the raspberry pi panel and obtained outcome in screen display another technique is actually raspberry pi panel is actually linked to a laptop computer or even computer system utilizing information cable television afterward set up putty software application to the particular system alter IP deal with subnet mask entrance to that body after that available that putty software application outcome will certainly screen because display.

A wise body connecting e-health noticing systems and the shadow cloud calculating is actually really a fundamental expression for any type of kind of technological services deal along with the internet shadow calculating provides appropriate as well as on-demand system ease of access for different calculating resources like bodies requests as well as solutions additionally shadow calculating are actually really using modern as well as flexible methods to deal handle as well as spend for infotech services together with hardly any management effort in addition to cost shadow calculating development has actually really a variety of advantages like flexibility incredibly auto-mated affordable fast services providing as well as a huge keeping ability the cord-free health and wellness as well as health sensing units are actually really connected to a Raspberry Pi this Raspberry Pi is actually responsible for event info originating from sensing units in addition to transferring this info along with cord-free communication systems to body services hung on the shadow the mix between cord-free noticing system bodies in addition to shadow calculating will certainly definitely create a new age of development in great deals of aspects like customer maintaining monitor of together with hardly any cost reducing the range of inhabited bed cushion in clinical centres as well as improving medical workers' effectiveness furthermore utilizing various info mining techniques help to significance as well as assess clients info the body system provided within this specific report provides options according to clients historical info real-time info occasion in addition to for that reason eliminating manual information compilation.

Offering privacy as well as stability on information kept in shadow storing through hash and meta-data method safety and safety is actually the security of relevant information possessions with using innovation procedures and educating cloud storage is actually a solution that consists of fundamental susceptibilities however these have actually never ever dissuaded individuals coming from benefiting from its own economic climates and flexibility along with fostering of a shadow design individuals blow up over bodily safety and safety individuals increased issues whether their information are actually accessed through unapproved individual because certainly there certainly are actually lots of individual discussing the sources over the shadow discussing the shadow along with various other individuals has dangers as well as issues over protection security general deals with primarily three elements privacy stability and accessibility CIA these elements are actually the upper factors to consider in developing a safety and security determine to guarantee optimum security privacy safeguarding information as well as info coming from disclosure to unapproved individual stability safeguarding information and information coming from being actually customized through unapproved individual accessibility licensed individuals have the ability to accessibility as well as utilize information as well as info whenever need

GPS located soldier monitoring and health and wellness indicator unit along with ecological evaluation this paper has actually a concept of monitoring the soldier and also navigating in between soldier to soldier health and wellness condition together with understanding their rate range elevation in addition to ecological circumstance of all of them throughout the battle which allows the military workers to strategy the techniques of battle the command space obtains place of soldier coming from GPS also in the event of shedding the battleground it is actually the obligation of the GPS to direct the soldier on appropriate course if he is actually shed in the battleground the foundation terminal can easily accessibility the present condition of the soldier which is actually shown on the pc as well as thus can easily get instant activity through sending out assist for the soldier or even sending out back-up for risk in advance utilizing different biomedical sensing unit health and wellness specifications of soldiers are actually noted in addition to bordering environment stress oxygen degrees are actually noted the setting as well as positioning of soldier is actually caught utilizing GPS.

A study of verification of RFID gadgets utilizing cryptography a protected ECC located RFID verification procedure along with id verifier this peperinos schema suggests an ECC located shared verification formula that satisfies the essential demands in RFID body [2] within this particular formula label thinks that the ID verifier zt is actually safely transferred to the web server and the other way around this formula offers shared verification privacy ahead protection scalability this formula withstanding replay assault label masquerade assault web server spoofing assault place assault cloning assault [2] to execute this schema effectively an effective web server gadget required [2] certainly there certainly are actually likewise a few other schema [3-6] which are actually more effective after that this schema in label computational opportunity [2] cryptanalysis and enhancement of an effective shared verification RFID plan based upon elliptic contour cryptography this paper is actually enhanced variation of chous procedure [7] based upon ECC which is actually cannot offer shared verification and cloning assault [8].

### III. METHODOLOGY

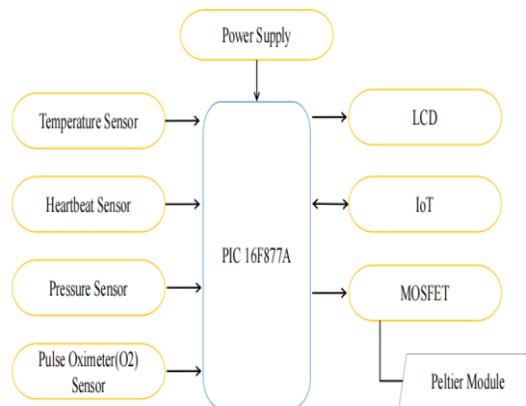


Figure 1. Block diagram

Temperature sensor LM-35 is just one of the body's important specification sensing units which provides outcome in analog type which is actually symmetrical to the temperature level of the environments atmosphere additionally it doesn't need any type of kind of outside calibration the fundamental LM35 is actually a direct circuit which provides occur of 10mv when the rearisise of 1-degree Celsius temperature level it can easily determine for complete -55c to 150c.

Variety pulse oximeter sensing unit MAX30100 utilized to determine the SPO2 degree or even oxygen degree of the body it is actually an incorporated rhythm oximetry circuit it has actually fundamental elements like LEDs a picture detector op-amp and so on the fundamental idea to FMAX30100 is actually that oxygenated blood stream takes in IR illumination as well as passes more reddish illumination while deoxygenated blood stream takes in reddish illumination and passes more infrared illumination this is actually the fundamental concept of the functioning OFMAX30100 is shown in Figure 1.

The PIC microcontroller PIC16F877A is just one of the most popular microcontrollers in market this is actually extremely practical to utilize the programming or even programs of this particular operator are actually likewise simpler among the primary benefits is actually that it could be write-erase as often times as feasible since it utilizes flash moment innovation it has actually an overall variety of 40 pins and certainly there are actually 33 pins for input and output.

Heart beat sensors are actually developed to provide electronic outcome center defeat when a hand is actually put on it when the center defeat detector begins functioning the illumination producing detector led blinks at the same time for each heartbeat.

A pressure sensing unit is actually a gadget or even tool which has the ability to determine the stress in gases or even fluids a stress sensing unit includes a pressure-sensitive aspect which can easily identify the stress being actually been applicable and elements to transform the information into an outcome indicator a stress sensing unit will certainly produce an indicator based upon the dimension of the stress been applicable.

An energy source is actually an element that materials energy to a minimum of one electrical ton generally it transforms one kind of electric energy to another however it might likewise transform a various type of power like solar technical or even chemical into electric power.

The internet of things explains bodily items that are actually installed along with sensing units handling ability software application and various other innovations that link and also trade information along with various other gadgets and bodies over the internet or even various other interactions systems.

LCD fluid crystal screen is actually a kind of level board screen which utilizes fluid crystals in its own main type of procedure LEDs have actually a big and differing collection of utilization situations for customers as well as companies as they could be typically discovered in mobile phones TVs computer system screens and cockpit console.

The MOSFET metal oxide semiconductor area impact transistor is actually a semiconductor gadget that's commonly utilized for changing functions and for the boosting of digital indicators in digital gadgets a MOSFET is actually either a center or even incorporated circuit where it is actually developed and produced in a solitary potato chip since the gadget is actually offered in extremely little dimensions the intro of the MOSFET gadget has actually brought a modification in the domain name of changing in electronic devices allow our team choose a comprehensive description of this particular idea.

Peltier component thermoelectric component is actually a thermal command component that has actually each warming as well as cooling down impacts through death an electrical present with the component it is actually feasible to modify the surface area temperature level as well as maintain it at the aim at temperature level by utilizing all of these devices our team possessed attempted to execute the fundamental protecting body for the soldier in inexpensive illumination weighted mobile as well as accurate gadget.

#### IV. RESULT

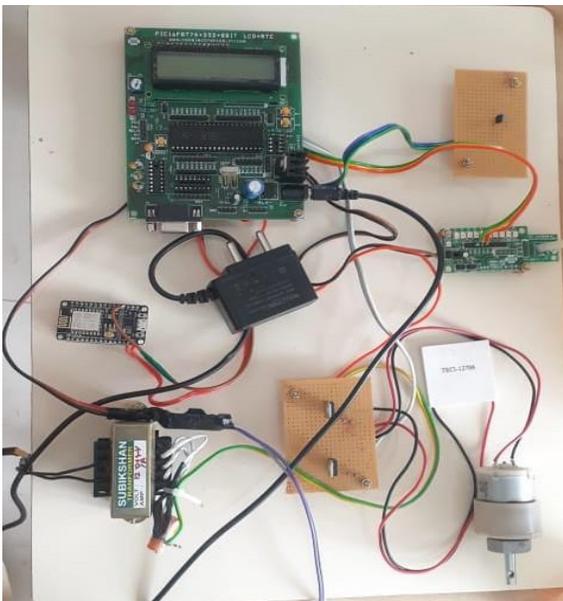


Figure 2. Hardware Setup



Figure 3. Graphs of sensor output on the thing speak

- Use the Think speak platform to send data to the cloud from any Internet-enabled device.
- Then configure actions and alerts based on the real-time data and unlock the value of your data through visual tools.
- Use Think speak platform for developers that enable them to easily capture sensors data and turn it into useful information
- Thing Speak server is an open data platform and API for the Internet of Things that enables you to collect, store, analyze, visualize, and act on data from sensors.

#### V. CONCLUSION

The proposed system certainly not just does the task of health and wellness keeping track of however likewise performs the monitoring of soldiers using IoT the control room can easily obtain the information around the setting and positioning of soldier coming from IoT the base station can easily access the current condition of the soldier utilizing IoT as the different monitoring specifications of the soldier obtain transferred through wi-fi component this information will be actually kept on the cloud and could be drawn out on the pc of control space as when drawn out based upon these relevant information the authorizations can easily start instant activity through releasing a clinical saving group or even any type of back-up pressure for their assist utilizing different biomedical sensing units like heartbeat sensor temperature sensor stress sensor health and wellness specifications of a soldier is actually noted together with its own bordering atmosphere problem noted all the sensors information keeping track of Thingspeak site along with assist of IoT component esp8266.

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