



# Development of Soldier Tracking with Real Time Health Monitoring and Control System

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## Abstract:

In world different countries soldier every year lakhs of peoples died during the war places. In today's era enemy warfare is an important factor in any nation's security. The national security mainly depends on Army, Navy, and Air-Force. The important and vital role is played by the soldiers. There are many concerns regarding the safety of these soldiers. The defense department of country must be effective for the security of that country. This system will be useful for soldiers, who involve in missions or in special operations. This system enables GPS (Global Positioning systems) tracking of these soldiers. It is possible by Health. The M-health can be defined as mobile Computing, medical sensors and communication technologies for health care. In this system, smart sensors are attached to the body of soldiers. Bio-sensors systems give different types of small physiological sensors, biomedical sensor. This is implemented with a personal server for complete mobility. This personal server will provide the Connectivity to the server at the base station using a wireless connection. Each soldier also has a GSM (Global system for Mobile communication) module which enables the communication with the base station in case of injuries. As soon as any other soldier enters the enemy lines it is very difficult for the army base station to know about the location as well as the Health status of all soldiers. In our project we have come with an idea of tracking soldier as well as to give status of the soldier during the war.

**Keywords:** Nations Security, Biomedical Sensor, Physiological Sensors, GPS Tracking, GSM Module

## 1. INTRODUCTION:

In the world Soldier is always facing death. He never shirks responsibility. He fights in most difficult terrains, on hills and mountain, in forest. The defense of the country is his primary mission of soldier. The role of soldier in safeguard the frontiers of our land are unique. He lives and dies for the NATION SECURITY. It is our responsibility to help our soldier. So here we introducing project which will be very useful for providing health status of the soldiers and provide medical treatment to them at critical situation in Warfield areas. In INDIA one of the famous cold Warfield is SIACHEN GLACIER. The Siachen is average altitude is 18000 ft. above sea level. is temperature is -35 to -25degree Celsius & the THAAR DESERT is the also one of the highest temperature its 50 to 55 degree Celsius by considering those two different Warfield zones we are introducing this defense project, our project we are basically focusing on Soldier's health in terms of his heartbeats and his body temperature. In terms of high temperature and also lowest temperature. If soldier feels unconscious due to low temperature or high temperature or gets injured becomes by gunshot or due to any other reason, then his heart beats start increasing or decreasing gradually. In this type of situation where the information about current heart brat rate becomes the indispensable part of soldier, this system merges out as best to acknowledge the doctors at server site with the correct and fast information. If heart beat either increases above threshold reference level or decreases below the threshold reference level,

the message is automatically sent to server system with the help of GSM module[1][2][3]. The GPS tracker will give the current location of the soldier which will be useful for locating soldier's location and providing medical treatment help as early as possible. In case if soldier is injured then by using the GSM modem attached to the device an SMS will besent to military hospitals in the vicinity or to the base station to provide medical help to injured soldiers. To track the location of the soldier's longitudes and latitudes. All the components used in the circuit are low powered and cheap. The acquired data is real time and is sent through ADC and into PIC Microcontroller.[4][5] Existing Technologies: 1.WristWatch 2.Radio Collars with GPS Tracking 3.Tracking of Tigers

## 2. BIOMEDICALPARAMETERS:

There number of temperature sensors like thermistor, thermocouple, RTD, but all these sensors require signal conditioning and are difficult to caliber. The signal conditioning for these sensors increases the size of the kit, hence these are not able to use.

### 2.1HEART BEAT SENSOR:

Heart beat sensor is designed to give digital output of heat beat when a finger is placed on it. This sensor monitors the flow of blood through the finger. As the heart forces blood through the blood vessels in the finger, the amount of blood in the finger

changes with time. This digital output can be connected to PIC 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 sensor shines a light lobe (small High bright LED) through the finger and measures the light transmitted to the LDR. The signal obtained from the LDR is amplified by the amplifier and will be filtered and provided to the ADC.

**2.2 TEMPERATURE SENSOR (LM35):**

It is a low cost temperature sensor and it does not require signal conditioning, calibration is also done by software. Hence LM35 may be use. The Temperature can be detected with the help of a temperature sensor LM35. The LM series are precision integrated circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature.

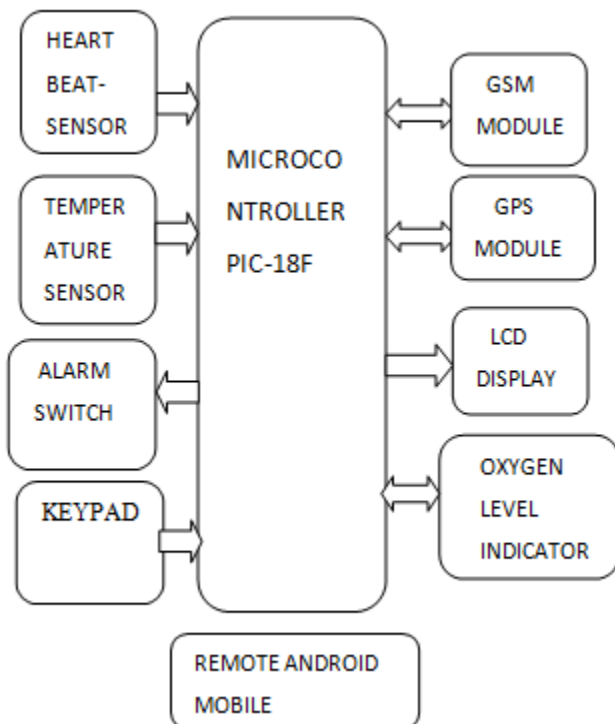
**2.3 GPS MODULE:**

The location of the soldier can be tracked with the help of a GPS MODEM. The GPS modem receives the signals from the satellite and calculates the Latitude and Longitude of the location of soldier and sends it to the controller in the form of the serial data.

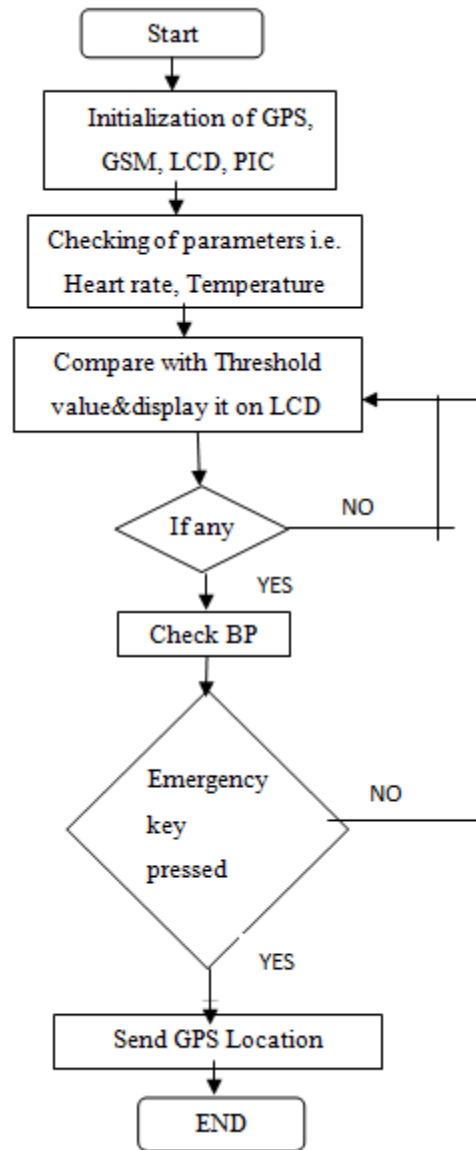
**2.4 LCD UNIT:**

The LCD unit it is output of system. The LCD displays the heartbeat rate and the temperature, current date, time and location of soldier.

**2.5 ALARM SWITCH:** The alarm switch it sounds when the air oxygen reference level is minimum i.e. 35% & Siachen temperature is reaches to the above -25degree Celsius & the Thar Desert temperature is above +50 degree Celsius.



**Figure.1. Block Diagram of System**



**Figure.2. Flowchart**

**2.6 GSM MODULE:**

The GSM MODEM is used to provide the information of the soldier like the heartbeat rate and the body temperature to a remote location. It is similar to a mobile which requires a SIM card for its operation but the advantage of GSM modem over mobile is that it has a serial connectivity that can be directly connected to the Micro controller for sending the AT(Attention) commands for sending SMS. The GPS unit contains a GPS module along with a GPS receiver antenna. The module functions according to its built and the antenna receives information from the GPS satellite. This data is then sent to the micro controller wherein it is decoded to the required format and sent further.

**2.7 KEYPAD:**

In this system the keypad plays vital role for the soldier while the soldier is in the crucial condition. Keypad have total four buttons that are used for different purpose. If key one is pressed it send the message to the base station soldier's food is over he need the food contain. If key two is pressed the soldier loss the direction. If key three is pressed the system sends message to

base station the soldier has injured during the war field. Then if he need the treatment for him then the soldier has to press the

key four. So base station team provides the medical treatment for that injured soldier.



Figure.3. Base Camp Unit

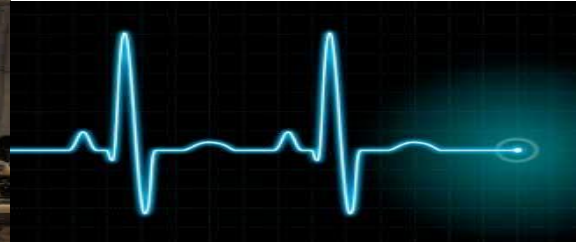


Figure.4.Heart Beat Pulses

**3. OPERATION:**

The soldier unit consists of an infrared (IR) LED, a photo-transistor sensor, high and low-pass filters, and amplifier, comparator and output LED. An oscilloscope is included to display the signal. The IR-LED is used to illuminate a person finger with infrared light. The light intensity is modulated by blood pressure changes within the finger before striking the photo transistor. The sensor then converts the changing light intensity into a proportional voltage containing two components a large DC off-set corresponding to the average light intensity as well as a small varying signal caused by changing blood pressure.[1][2] The voltage signal is then passed through a

high pass filter to remove the DC component and then light is amplified. Low-pass filtering is then applied to remove any high frequency noise before displaying the signal on an oscilloscope. The signal is compared to a reference voltage using a voltage comparator, and an output LED is illuminated if the voltage signal is greater than the threshold voltage, indicates a heartbeat. The rectangular pulses which we get from this procedure are applied to the counter pin of the micro-controller. Counter of the Micro-controller counts the number of pulses for duration 10 sec. multiplies it by 12 and displays as a heartbeat rate per minute because in order to obtain the results in BPM (beats per minute).[3][4]

**4. RESULTS:**

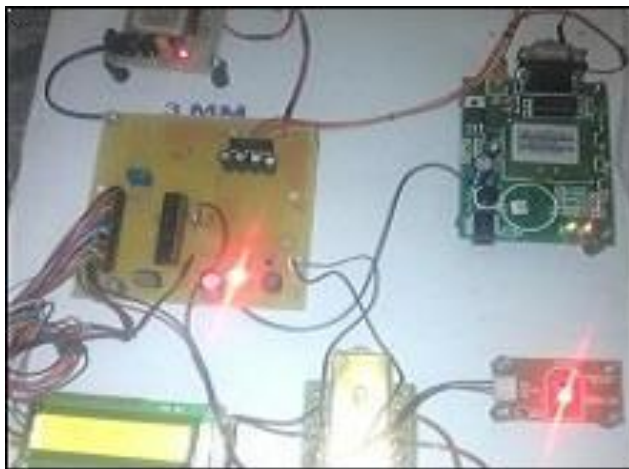


Figure.5. Prototype Module



Figure.6. Recived Messege to Basestation

**5. CONCLUSION:**

The “SOLDIER TRACKING WITH REAL TIME HEALTH MONITORING AND CONTROL SYSTEM” project module is effective security and safety module. It used in secret missions. This system can useful for critical conditions of soldier units also. The significance of this project module is of Health and air oxygen level indicator. By implementing this system we can improve the nation border security& also for soldier security. We include for good security to provide real time video information. Using this project we can reduce casualties of soldier. It also helps to give critical information’s and warnings to the soldiers and they apply more of them to the current locations. This strengthens the defense system. Thus we can

conclude that these kinds’ project module devices are very helpful for ensuring security to the soldiers.

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