"SOLDIER HEALTH MONITORING SYSTEMS USING IOT"

Submitted to

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

***in partial fulfillment of requirement for the award of degree* of**

Bachelor of Technology

In

Computer Science Engineering

Semester VI

By

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We the undersigned solemnly declare that this report on the project work entitled **"SOLDIER HEALTH MONITORING SYSTEMS USING IOT"** is based on our own work carried out during the course of our study under the guidance of **Dr. ARADHANA SAHU, Department of Computer Science Engineering, RCET Bhilai.**

We assert that the statements made and conclusions drawn are an outcome of the project work. We further declare that to the best of our knowledge and belief the report does not contain any part of any work which has been submitted for the award of any other degree/diploma/certificate in this University or any other University.

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C E R T I F I C A T E

This is to certify that this report on the project submitted is an outcome of the project work entitled **"SOLDIER HEALTH MONITORING SYSTEMS USING IOT"**, carried out by the students in the **DECLARATION**, is carried out under my guidance and supervision for the award of Degree in Bachelor of Technology in **Computer Science Engineering** of Chhattisgarh Swami Vivekanand Technical University, Bhilai(C.G.), India.

To the best of my knowledge the report...

i) Embodies the work of the student(s) themselves,

ii) Has duly been completed,

iii) Fulfills the requirement of the Ordinance relating to the B.Tech. degree of the University, and

iv) Is up to the desired standard for the purpose for which it is submitted.

Dr. ARADHANA SAHU

This project work as mentioned above is hereby being recommended and forwarded for examination and evaluation by the University,

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C E R T I F I C A T E B Y T H E E X A M I N E R S

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A C K N O W L E D G E M E N T

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We hope that we will make everybody proud of our achievements.

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ABSTRACT

- In today's era enemy warfare is an important factor in any nation's security. The national security mainly depends on army (ground), navy (sea), air-force (air). The important and vital role is played by the soldiers. This system will be useful for soldiers, who involve in missions or in special operations. This system enables various sensors for health tracking of soldiers using IOT communication . It is possible by M-Health. The M-health can be defined as mobile computing, medical sensors and communication technologies for health care.

- The soldier is the critical unit of the nation and their life is valuable. Lot of soldiers are facing many problems such as communication with the control room and no proper medical help at a proper time which leads to the death of the soldier. To minimize such cases, we have proposed a continuous alert system to track location and monitor the health of the soldier. The proposed system is very useful in detecting location of the soldier in real time using GPS and communicating the health status parameter continuously using GSM module embedded in microcontroller.

- The tiny sensors can be fixed to the Soldier body or dress of the soldier to detect body parameter and transmit the information to the control room and other solider when there is a low body rate or when it falls than the defined threshold value. The soldier can send an alert message to the guardian and control room for the help in the panic situation using an application. The control room/guardian also uses android application to request the location of the solider automatically in the panic situation. The soldier can also request for the nearest hospital information in the emergency.

INTRODUCTION

In the world, the Indian army stands second largest force. The role played by the soldier is very important for the nation security. However, the army is suffering from lot of health issues in the remote place due to unavailability of medical treatment at a proper time which may result in the death/loss of the soldier.

The lack of communication with the control room regarding the health status and location of the soldier would lead to loss of the soldier too. This can be reduced if the real time information is available to control room as well as another fellow soldier who are nearer to the victim soldier. The cost of the soldier life is very important. During the battle the soldier may accidentally land up in the enemy location without his knowledge, so he may need guidelines to know his current location. Other than the battle field injuries, the soldier may also suffer from extreme climate condition and fall sick, in such situation if care is taken then the life of the soldier would be saved. This can be achieved by using the IOT. The health parameter such as heart rate, ECG and body temperatures are monitored continuously and communicated with the control room automatically. When the soldier feels that he is lost, he can send an emergency message voice message alert to the control room and request for location using an android application which provides the longitude and latitude of the soldier using GPS.

- In our system we are basically focusing on Soldier's health in terms of his heartbeats and his body temperature. If soldier gets injured and becomes unconscious 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 project emerges out as best to acknowledge the doctors at server site with the correct and fast information.

- If heart beat either increases above critical level or decreases below the critical level, a message is automatically sent to server with the help of IOT modem.

- In this system, smart sensors are attached to the body of soldiers. 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 IOT 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.

I. LITERATURE

The small amount of idea for the project was reserved from the wrist watch that climbers use. Using this watch they can only get their location and surrounding temperature. Disadvantage of these watches is that it gives information only to the mountaineer. They had no health parameter measuring devices

Warriors carry walkie-talkies that are massive in weight. Therefore, we are making the substitute system by the use of sensors, GPS and key pad which will monitor the soldier. These walkie-talkies are basically Radio devices and work on a particular frequency. Drawbacks of walkie-talkies are that these are required oral communication which can be disturbed by the noise in battlefield it is very difficult to communicate. Sometimes soldier cannot talk to the control room then there is no way to convey message but in our project we are removing the needs of oral communication, control room can get automatic health conditions of soldier and soldier can also send message using code without any voice. Walkie-talkies needed large batteries which make it bulky.
Recently in countries like US and Australia, a number of the foreign students were forced to own a Radio Collar strapped to their ankles, in order that their activities are caterpillar- tracked by the officers.

II. HISTORY

During, wars and military search operations, soldiers gets injured and sometime becomes losses. To find soldiers and provide health monitoring, army base station and need GPS device for locating soldiers, WBASNs to sense health related parameters of soldiers and a wireless transceiver to transmit the data wirelessly. Hong Beng Lim, Di Ma, Bang Wang, Zbigniew Kalbarczyk, Ravishankar k. Lyer, Kenneth L. Watkin has discussed on recent advantage in growing technology, and on various wearable, portable ,light weighted and small sized sensor that have been developed for monitoring of the human physiological parameters .The body sensor network (BSN) consists of many biomedical and physiological sensors such as blood pressure sensors , Electrocardiogram (ECG) sensor, elect dermal activity (EDA) sensor which can be placed on human body for health monitoring in real time.

There are many instruments which can be used to view the health status of soldiers as well as ammunitions on them. The Bio sensor which consist of various types of small physiological sensors, transmission modules have great processing capabilities and can facilitates the low-Cost wearable solutions for health monitoring. The soldiers will be able to communicated with control room using GPS coordinate in their distress. The location tracking has great importance since World War II, when military forces realized its usefulness for navigation, positioning, targeting and fleet management. This system is reliable, energy efficient for remote soldier health monitoring and their location tracking. It is able to send the sensed and processed parameters of soldier in real time. It enables to army control room to monitor health parameters of soldiers like heartbeat, body temperature, etc. using body sensor networks. The parameters of soldiers are measured continuously and wirelessly transmitted using GSM.

HARDWARE DESCRIPTION

In this chapter overview of components used in the project is explained briefly. And we briefly discussed general characteristics of these components. Following are the main components and their general description.

- Microcontroller (PIC18F25K20)
- GPS (NEO6M)
- GSM module (SIM800L)
- Heartbeat Sensor (TCRT1000)
- Temperature sensor (LM35)
- LM7805 (5V regulator)
- Switches
- Resistors
- Battery

III. MICROCONTROLLER

Microcontrollers are amongst the key elements in an embedded system. The microcontroller may be a little laptop on one microcircuit containing a processor, programmable input/output peripherals and memory. Microcontrollers operate in step with the program coded within its program memory. The key use of those single-chip computers are in automatic responding instruments.
The PIC-Programmable Interface Controller may be a family of Harvard design microcontrollers created by microchip. The aim of this section is to gather the knowledge concerning heartbeat of the soldier, temperature of body and placement of the soldier in every minute. Then it sends this info to the main unit.

IV. FEATURES

It is categorized by the subsequent features:
- It has separate data and code spaces (use Harvard architecture)
- It has a limited amount of fixed length instructions.
- Its many instructions are single cycle execution sometimes 4 clock cycles, and with single delay cycles upon branches and skips.
- It has single accumulator (W).
- The RAM locations work as registers.
- It has hardware stack to store return addresses.
- It has properly minor quantity of addressable data space (normally 256 bytes), stretched through banking.
- It has data space mapped CPU, port, and peripheral registers.

The program counter is also planned into data space and writable (and this is used to apply indirect jumps).

V. I/O Ports

• Port A is a 7 bit wide bidirectional port. This port is also used for analog inputs. The corresponding Data Direction register is TRISA. The RA4 pin is multiplexed with the Timer0 module clock input to become the RA4/T0CKI pin. The other PORTA pins are multiplexed with analog inputs and the analog VREF+ and VREF- inputs. The operation of each pin is selected by clearing/setting the control bits in the ADCON1 register (A/D Control Register1). On a Power-on Reset, RA5 and RA3:RA0 are configured as analog inputs and read as '0'. RA6 and RA4 are configured as digital inputs.

- PORTB is an 8-bit wide, bi-directional port. The corresponding Data Direction register is RISB. Each of the PORTB pins has a weak internal pull-up. A single control bit can turn on all the pull-ups. This is performed by clearing bit RBPU (INTCON2). The weak pull-up is automatically turned off when the port pin is configured as an output. The pull-ups are disabled on a Power-on Reset. On a Power-on Reset, these pins are configured as digital inputs.

- PORTC is an 8-bit wide, bi-directional port. The corresponding Data Direction register is TRISC. PORTC is multiplexed with several peripheral functions. Some peripherals override the TRIS bit to make a pin an output, while other peripherals override the TRIS bit to make a pin an input. The TRIS register is not loaded with pin override value. This permits read-modify-write of the TRIS register, deprived of concern due to peripheral overrides.

- PORTD is an 8-bit wide, bi-directional port. The corresponding Data Direction register is TRISD. PORTD is an 8-bit port with Schmitt Trigger input buffers. Each pin is individually configurable as an input or output. PORTD can be configured as an 8-bit wide microprocessor port (parallel slave port) by setting control bit PSPMODE (TRISE). In this mode, the input buffers are TTL. On a Power-on Reset, these pins are configured as analog inputs.

- PORTE is a 3-bit wide, bi-directional port. The corresponding Data Direction register is TRISE. PORTE has three pins (RE0/RD/AN5, RE1/WR/AN6 and RE2/CS/AN7) which are individually configurable as inputs or outputs. When selected as an analog input, these pins will read as '0's. TRISE controls the direction of the RE pins, even when they are being used as analog inputs.

VI. GLOBAL POSITIONING SYSTEM (GPS)

The Global Positioning System (GPS) is radio location using navigation satellites. These systems provide round the clock information on the three-dimensional position, velocity and time for users with the appropriate equipment and are at or near the earth's surface (and sometimes outside it). The first system GPS, widely available to civil users, has become NAVSTAR, serviced by the Ministry of Defense. Applications include portable guidance on the location, trajectory tracking of ships, as well as the system of driving wireless communication devices, which are designed for the car, the driver provides a personalized and promotional information, receive messages, and use the specific local conditions of travel information and services Security. GPS technology is used in a large number of applications, including maritime, environmental, navigational applications for tracking and monitoring.

VII. APPLICATIONS

- Used in Location Based Service (LBS).
- Used in Vehicle navigation system.
- Used in Portable Navigation Device (PND).
- Bluetooth GPS receiver and GPS mouse.
- Timing application.

VIII. GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS (GSM)

GSM (Global System for Mobile communications) originally from special mobile Group, is the most general standard for mobile telephony systems in the world. Everywhere it achieved international nomadic preparations between mobile phone operatives, allowing subscribers to use their phones in everywhere in the world. Global System for Mobile Communication differs from its prototype in that both signaling and speech channels are digital technologies. So GSM is 2nd generation (2G) mobile phone system, which facilitates the utilization and application of a widespread range of data communications applications in the system.

It was everywhere in the implementation of the GSM standard feature for both customers, who may take advantage from the skill to travel and change carriers without changing phones, and network operatives as well. GSM also initiated a application of the Short Message Service (SMS), also called text messaging whose cost is very low, held on other mobile phone ideals as well.

GSM networks operate in very different carrier frequency bands. Mostly 2nd Generation GSM systems operate in the 900 MHz or 1800 MHz bands. Where already been assigned to these bands, it was used 850 MHz and 1900 MHz bands instead. In occasional circumstances it is set ranges of 400 and 450 MHz in few countries because in the past it was used for First Generation systems. Mostly 3G networks in Europe function in the frequency range of 2100 MHz. One of the main features of GSM is the Subscriber Identity Module, called as the SIM card. And SIM is a separate smart card that contain the information related to the user subscription and the phonebook. In this way user keep the information even after the switching of phones. Instead, if user wants to change operators the user should change the SIM without changing the holding device.

IX. SIM800L Overview

It is developed for worldwide market. SIM800L is a quad-band GSM/GPRS engine that works on GSM 850MHz, EGSM 900MHz, DCS 1800MHz and PCS 1900MHz frequencies. SIM800LD structures GPRS multi-slot. It has a tiny shape of 33mm *33mm * 3mm, can come across exactly all the place that is required by any application, such as Mobile 2 Mobile, smart phone, PDA, FWP, and other mobile device. GSM Module used in our project.

A 48-pin SMT pad for physical interface to the mobile application is available, which provides all hardware interfaces between the customers' boards and module.

The 48 pins of hardware array.

- 2 VBAT and 9 ground pins.
- For flexibility to improve reformed applications 2 pins are programmable as general purpose I/O.
- Debug port and Serial port are used to advance applications easily.
- 2 Audio channels which includes two microphone inputs and two speakers' outputs. This can be configured simply by using AT command.

• It is suitable for battery power application because of charge integrated circuits in SIM 800L.

X. PROBLEM STATEMENT

The objective of the system is to provide the real-time continuous monitoring of soldier's health parameters and location tracking using IOT and GSM and GPS module. In emergency situation it helps the solider by providing a panic button which sends and emergency message as well as he voice alert using which he can communicate with command officer and other soldiers. Depending on the message the control room takes the necessary action to save the life of the soldier.

- Our soldiers are constantly protecting our country and playing very important and vital role.
- When the soldier is in the war field it is very difficult for the army base station to track the location of soldier as well as to keep track on his health status also.
- So in this project various sensors are used in order to measure longitude and latitude of location and track the exact position of soldier.
- Whereas IOT modem will communicate with base station and a message will be dropped to the registered mobile number which will contain all the information related to health and position of the soldier.

XI. EASY PULSE

EASY PULSE - HEARTBEAT SENSOR

The new version uses the TCRT1000 reflective optical sensor for photo plethysmography. The use of TCRT100 simplifies the build process of the sensor part of the project as both the infrared light emitter diode and the detector are arranged side by side in a leaded package, thus blocking the surrounding ambient light, which could otherwise affect the sensor performance. I have also designed a printed circuit board for it, which carries both sensor and signal conditioning unit. and its output is a digital pulse which is synchronous with the heartbeat. The output pulse can be fed to either an ADC channel or a digital input pin of a microcontroller for further processing and retrieving the heart rate in beats per minute (BPM).

This project is based on the principle of photo plethysmography (PPG) which is a non-invasive method of measuring the variation in blood volume in tissues using a light source and a detector. Since the change in blood volume is synchronous to the heart beat, this technique can be used to calculate the heart rate. Transmittance and reflectance are two basic types of photo plethysmography. For the transmittance PPG, a light source is emitted in to the tissue and a light detector is placed in the opposite side of the tissue to measure the resultant light. Because of the limited penetration depth of the light through organ tissue, the transmittance PPG is applicable to a restricted body part, such as the finger or the ear lobe. However, in the reflectance PPG, the light source and the light detector are both placed on the same side of a body part. The light is emitted into the tissue and the reflected light is measured by the detector. As the light doesn't have to penetrate the body, the reflectance PPG can be applied to any parts of human body. In either case, the detected light reflected from or transmitted through the body part will fluctuate according to the pulsatile blood flow caused by the beating of the heart.

XII. Operation

The operation of the board is very simple. After powering the board from a 3-5.5V supply, the Enable (EN) pin must be pulled high to activate the IR sensor. Next, place the tip of your forefinger gently over the sensor on its face. Your finger should be still and should not press too hard on the sensor. Within a couple seconds the circuit stabilizes and you will see the LED flashing synchronously with your heart beat. You can feed the output signal (Vout) to either a digital I/O or an ADC input pin of the microcontroller for measurement of the heart beat 28 rate in BPM. The output voltage waveform can also be viewed on an oscilloscope. I connected Digi lent's Analog Discovery tool to check the input PPG and the output waveforms from the two LPF stages. The following pictures show these signal waveforms as displayed on the PC screen.

XIII. Features of TCRT1000

- HRM-2511E uses a sensor called transmission PPG to stabilize measurements.
- MCP6004 Op amp with continues output competence to get extreme swing of signal.
- Distinct analog as well as digital outputs.
- Potentiometer gain used for controlling the analog output.
- Digital output is controlled by pulse width.
- Extra test points on board to analyze signals in multiple levels of instrumentation.

XIV. Circuit diagrams and Working of Circuit

The circuit shown in figure below illustrates the ON/OFF control system to IR light source in HRM-2511E. Keep in mind signal that is enabling must be towed high for turning the IR LED ON. The output of photodetector that is containing the signal of PPG for further processing goes to amplifier and a two-stage filter circuit.

The signal of PPG from the photo sensor is feeble and distorted. To improve and clear the signal we need filter and amplifier circuits. In Stage I, firstly the signal filtered through a passive (RC) high-pass filter (HPF) in order to oppose the DC part of PPG signal. The high pass filter contains 0.5 HZ cut-off frequency that is adjusted by the values of resistor whose value is (68K) and Capacitor whose value is (4.7uF). The output signal from the high pass filter passes to an operational amplifier which is active low-pass filter.

The operational amplifier works as non-inverting amplifier and contains the gain adjusted to 48 as well as cut-off frequency adjusted to 3.4Hz. At the output for attaining a full swipe of the signal of PPG, negative input of Op-amp knotted with a 2V reference voltage.

This reference voltage produced by the use of a zener diode. Potentiometer (P1) at the output is doing the control of gain. Output signal from active LPF sends to circuit of Stage II that is actually a duplication of the circuit of Stage I. The P1 is used to control the amplitude of PPG signal entering to second stage.

The model of Op-amp used is MCP6004 from manufactured by Microchip, which have four amplifiers on single chip and make available continues output swing.

XV. BASIC IDEA

This project has associate implementation of tracking the soldier and to navigate between soldiers like obtaining their rapidity, distance, their health status throughout the fighting that permits the military decision makers to set up the war strategies.
Base unit acquires location of soldier with the help of GPS. The responsibility of base station operators is to help the soldiers in choosing right path, if there is a threat of missing of soldiers. The base unit will contact this standing of the soldier that is exhibited on the computer.
Hence they can yield instant action by directing assistance for the soldier requested by soldiers having soldier unit. By the use of number of biomedical sensors, health constraints of soldiers are monitored, the location and placement of soldier is confined by the use of GPS module.

XVI. PLAN

Our plan was to introduce the cost effective and consistent project which can assist the base unit, regarding the health and security of the soldiers, during war, special operations. Moreover, soldier can send secret messages to base station for some kind of help.

XVII. DESIGN

In order to design our project, we used two units namely soldier and base unit. Soldier unit contains a microcontroller (PIC18F25K20), heart beat sensor (Easy Pulse TCRT1000) is used to calculate the pulse rate of soldier, temperature calculation sensor (LM35) used to calculate the body hotness of the soldier, GPS receiver (SKM53) is used for tracking purpose, a Keypad is used for secret code input, GSM Module (SIM800L) is used to send all the input data to base station and LCD is used to display this data. A Power bank is used to power the circuit. Base unit.
includes a Cell Phone working as GSM connected with PC, which shows data consisting messages as threads on Moborobo android pc suit and save messages as well in .xls format. By With the use of this system, the soldier can send feedback to his concerning base station. The project is mainly divided into four sections 1. Input section 2. Output section 3. Circuit section 4. Sensor section

XVIII. OBJECTIVE

- Our plan was to introduce the cost effective and consistent project which can assist the base unit, regarding the health and security of the soldiers, during war, special operations.
- Soldier can send secret messages to base station for some kind of help.
- The goal of this project is to develop a low cost, low power, reliable, non-intrusive and non-invasive signs of health status.

XIX. PROPOSED SYSTEM

This project provides an IOT based health detection and location tracking of the soldier in a panic situation by using the hardware consisting of the sensor with GSM module for communication purpose and an android application.

The sensor components are mounted on the soldier body which reads the body parameters of the soldier such as heart rate, ECG rate and body temperature and reports to the control room and guardian/other soldier automatically using GSM communication when it is not normal.

The android application is used by the soldier in the emergency to request for the help from the control room and other soldier who are near to him, it is also used by the control room to track the current location of the soldier and take necessary action.

The soldier can also request for medical center details near them using this application. The proposed system is not only used to monitor and track the soldier only during the war time but also when the soldier is travelling from one place to other places and even in the places where extreme weather condition.

XX. RELATED WORK

In [1], the author has worked on the safety of the soldier by tracking his health condition during the war which provides the control room to plan the war strategies and tracks the location if by chance the soldier is lost. When the control room notices the soldier is lost in the battle field then they guide the soldier in the right path.

The soldier's health information is transmitted to the control room and keeps track of the injured soldier and take necessary action to save the life. This system mainly focuses on the soldier who have involved in the warfare and tracking the health of the injured soldier.

In [2], the author has focused to improve the communication of the soldier with the control room people and control plane operation continuously. He has also focused to track and guide the position, direction and the surrounding temperature of the soldier by using the wrist watch mountaineers and by providing headphones to guide the soldier to the right path.

He has also used the technology like the Radio collar strapped to ankles, so the movement of the soldier can be tracked and displays the current location at the base station. Microcontroller is used to record the body parameters of the soldier's and transmitted to the base station.

In [3], the author has focused to provide the embedded wireless system for the soldier and to minimize the time to track the location of the soldier, rescue and search operation and their health status using GPS module and wireless body sensors, the data are collected from the GPS and sensors are transmitted using the ZigBee technology to the base station/control room. It also allows the soldier to communicate with the other fellow soldiers within the wireless transmission range, they can also request help from the control room.

In [4], the author has worked on the location tracking system using GPS with the Google Maps based monitoring for vehicle. This system provides tracking irrespective of weather condition.

It gives the shortest route to track. This idea is deployed in the proposed system to track the current location and movement of the soldier along with the shortest path to him, which is need for the rescue operation.

In [5], here the author focus is on monitoring the ill patient, continuously and reports the changes spontaneously to the concerned person using the ZigBee technology, which helps in protecting the life of the individual.

In this paper only, the ill patient is considered for monitoring. Once the patient is discharged from the hospital, the body sensor is mounted on them to monitor their health condition and take necessary action in case of emergency by reporting to the guardian.

In [6], the author has worked to track the location of the soldier and monitor the health status using an Arduino board. For the transmitting of data to control room he has used WIFI module for connectivity.

In [7], the author focus is to provide a good connectivity between the control room and the soldier by using ZigBee module and Lora WAN module. The monitoring is based on master slave approach by Machine learning concepts.

XXI. Features

- Regulated linearly in degree Celsius.
- Direct 10 mV per °C measuring ability.
- 0.5°C accurateness with assurance.
- It is rated from −55° to +150°C.
- Applicable for applications like remote.
- Has very less cost.
- Less than 60μA current drain
- Has Very small effect of nature heating, typically 0.08°C in air.
- Shows non-linear behavior at only ±1⁄4°C typical

XXII. SYSTEM ARCHITECTURE

A.Hardware: The architecture is comprised of 8051 micro controller, GPS receiver, GSM component, panic button, LCD display and various biomedical sensors such as temperature sensor, Heat beat sensor, ECG sensor and an additional bomb detector senor with buzzer. The GSM and GPS component is used to communicate with the control room regarding the health status and location of the soldier. The soldier normal body parameters rates are recorded in the memory of the micro controller. When it falls certain defined threshold, an alert voice message is sent automatically to the control room. For example, if ECG sensor detects that the ECG of the person is not normal, and then it sends a voice message as ECG abnormal repeatedly for 5times to the control room and also it displays on the LCD. The temperature sensors record the body temperature of the soldier based of the environmental condition. The heart beat sensor initially records the normal heart beat rate of that particular solider and stores in the memory of the controller, once the heart rate falls below or exceeds the threshold value, then a message is sent to the control room. The body rate of the soldier is measured for every 2sec and reports it if it is not normal. On receiving the message, a necessary action can be taken to provide the medical help at a proper time. We have also implemented a button also known as panic button so that when a soldier is in a panic situation like enemy are attacking or if he feels that he is lost, then he can communicate with the control and other fellow soldier by pressing the panic button which in turn sends an alert voice message to the concerned control room/other soldier as EMERGENCY. Once the control room receives the Emergency message they track the location of the solider and communicate with them to provide the required help.

RESULTS

The final results of project are described here. However the main focus is on base station results that how these results are used to the health status and location of the soldier as well.
BASE STATION RESULTS At base station, Android smartphone is used, working as GSM and connected with laptop via data cable. Moborobo for android is used to display results on laptop. There is an option to export all messages record in laptop in .xls and .txt format Fig. 4.1 Results to the base station Green play button is to enable colors and blue undo button is to clear coloring.

- ACCURACY
- Increasing accuracy in this project is done by using much accurate modules like easy pulse TCRT1000 for heart beat and GPS module of SKYLAB.

SAFETY

• To ensure that there were no electrical hazards, all the wires were taped together for a zero human contact.
• The components and batteries were enclosed in the box to be placed in a bag, to ensure the safety of both the user and the circuit boards.
• There were holes made aside case and bag to ensure air moment through the circuitry i-e no heat ups would occur during operation.
• The external sensors wires we insulated

CONCLUSIONS

The design was way more effective than we originally thought off at the start of our project. We tried following ethics in designing and implementation of the project. We won't claim that our circuit had 100% efficiency, as it did show some variance that we minimized to some extent.
The good thing, we noted that there is a lot of possibility to make enhancements in this project. Our system is for one soldier. The communication between soldiers to soldier can be established.
This system gives strength to the defense system of our country. So, we can accomplish that these types of strategies are very supportive for certifying security of the soldiers.
The design was way more effective than we originally thought off at the start of our project. Initially our plan was to design a soldier unit that could be placed on wrist of the soldier but we couldn’t do this because of soldering performed by hand, large battery (16 batteries) and a LCD.
But still we have created a reasonable unit which can be placed in a bag on back of soldier.
We have still got some recommendation that we wanted to implement, but couldn't do it cause of budget and time constraints.
We tried some ethics in designing and implementation of the project. We won't claim that our circuit had 100% efficiency, as it did show some variance that we minimized to some extent.
All the circuit components have been bought by us on cash payments, and we aren't indebted for any kind of monetary matters.
We have credited everyone with reference as to where we had used the circuit from. At all times we had been helpful to other groups as well, especially in relation to the programming and circuit debugging. We did this because

FUTURE SCOPE

FUTURE ENHANCEMENTS

The good thing, we noted that there is a lot of possibility to make enhancements in this project. Our system is for one soldier. The communication between soldier to soldier can be established.

The betterment of base station unit can also be done by making proper GUI at base station PC and officials at base station can also send feedback or any order to soldiers via base unit.

FINAL CONSIDERATIONS

By the use of this system, we can condense casualties of battle. It assists to give critical information's and cautions to soldiers so that they can survive for long and aim of war or secret operation can be obtained.

This system gives strength to the defense system country. So, we can accomplish that these types of strategies are very supportive for certifying security of the soldiers.

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