WARRIOR TRACKING AND HEALTH MONITORING SYSTEMS

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Abstract- *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 Global Position System device for locating soldiers, wireless base station to sense health related parameters of soldiers and a wireless transceiver to transmit the data wirelessly. Upon losing in the battlefield it is necessary for the base station to guide the solider. The base station can access the current status of the soldier which is displayed on the Personal Computer. The proposed system can be mounted on the soldier's body to track their health status and current location using Global Positioning System. These information will be transmitted to the control room through Internet of Things. The proposed system comprise of 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- GPS Tracking, GSM Module, M-Health, Nations Security

I. INTRODUCTION

Soldier is always facing death. He never shirks responsibility. He fights in most difficult terrains, on hills and mountain, in plains and forest. The defense of the country is his primary mission. The role of soldier in safeguarding the frontiers of his modest land is unique. He lives and dies for the NATION. It is our responsibility to help our soldier. That's why we are introducing this project which will be very useful for providing health status of the soldiers and provide medical help to them at critical situation in battlefield.

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 GSM modem.

GPS tracker will give the current location of the soldier which will be useful for locating soldier's location and providing medical help as early as possible. In case if soldier is injured then by using the GSM modem attached to the device an SMS will be sent to hospitals in the vicinity or to the base station to provide help.

The goal of this project is to develop a low cost, low power, reliable, non-intrusive and non-invasive signs of health status. To track the location of the soldier i.e. longitudes and latitudes.

The methodology adopted for this project is to use non-invasive sensors to measure heart rate and body temperature. Signal conditioning circuits are designed to filter and amplify signals to provide desired output. 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 Micro controller

II.RELATED WORK

Many efforts were reported by different academicians and researchers to track the location of the soldiers along with their health condition on the battlefield. Technological developments are taking place at an accelerated pace. However, people's awareness of the current situation varies, depending on the information they possess and their ability to interpret it critically, in the specific context of the society or social group they belong to, live and work in. Technological evolution in inevitable, as is the quest for new knowledge about the natural world. Hock et al.[1]had discussed on recent advances in growing technology, and on various wearable, portable, light weighted and small sized sensors 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 sensor, electrocardiogram (ECG) sensor, electro dermal activity (EDA) sensor which can be placed on human body for health monitoring in real time and describe an idea to develop a system for real time health monitoring of soldiers, consisting of interconnected BSNs. The location tracking has great importance since World War II, when military forces realized

its usefulness for navigation, positioning, targeting and fleet management. Kurhe et al.[2] had introduced a system that gives ability to track the soldiers at any moment. Additionally, the soldiers will be able to communicate with control room using GPS coordinate information in their distress. 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 heart beat, body temperature, etc. using body sensor networks. The parameters of soldiers are measured continuously and wirelessly transmitted using GSM. While in another Nikam et al[5] had presented an idea for the safety of soldiers. 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 consists of various types of small physiological sensors, transmission modules have great processing capabilities and can facilitates the low-cost wearable solutions for health monitoring. GPS module can be used to log the longitude and the latitude by which directions and location can be traceable easily[6]. RF module can be used for high speed, short-range data transmission, for wireless communications between soldier to soldier that will help to provide soldiers health status and location data to control room. So by using these devices and modules, we are trying to implement the basic health observing system for soldier in low cost with high efficiency and high reliability. GPS tracking device and RF transceiver module provide the wireless system to monitor the health parameters and location tracking of soldiers. Wararkar et al.[4] had proposed an idea of tracking the position of soldier as well as to give the health status of the soldier, which enables the army base station to plan the strategies according to current situation during war. By using this system, the army base station will come to know the position of soldier and the health parameters such as body temperature and blood pressure of soldiers. However, all these systems are stuck-up by one or more reasons like costly implementation, delay in response and bulky nature. Hence, a portable wireless real-time system based on IoT concept is proposed in this paper which will be an effective alternative to the existing technologies in the area of soldiers health and location tracking on the battlefields.

III.PROPOSED SYSTEM

The proposed system performs the task of health monitoring as well as tracking of soldiers using cloud computing. The control room can acquire the required details about the health status like (temperature, blood pressure, toxic gas, accelerometer) along with position and orientation of soldier from GPS[1]. Even in case of losing their direction, it is the responsibility of the GPS to guide the soldier in correct direction which would be guided by the control room. The control room can access the current status of the soldier using cloud computing [6] the different tracking parameters of the soldier get transmitted via GSM module in our system we have designed in such a manner that the threshold valve is set to individual sensor so that the control room can get the required information of the soldiers during the emergency condition. These information will be stored on the Cloud and can be extracted on the PC of control room, as and when required. Based on these information, the authorities can take 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. The proposed system is consist of two main functions as acquiring the data from the hardware and transfer of the data through cloud computing. LM35 temperature sensor, toxic gas detector sensor, blood pressure, accelerometer oxygen level and GSM for continuously monitoring health status of soldier.GSM is used for transferring of all the data from the above sensors. GPS is used to determine real time position and orientation. Data from sensors and GPS receiver is processed and collected using Arduino (ATmega328P)processor. The specific choice of processor is due to the facts that, as compared to the other data possessors used in existing system. Arduino board is easily available and user friendly in terms of its commends and also with flexible interfacing capability ATmega328P better than otherprocessor

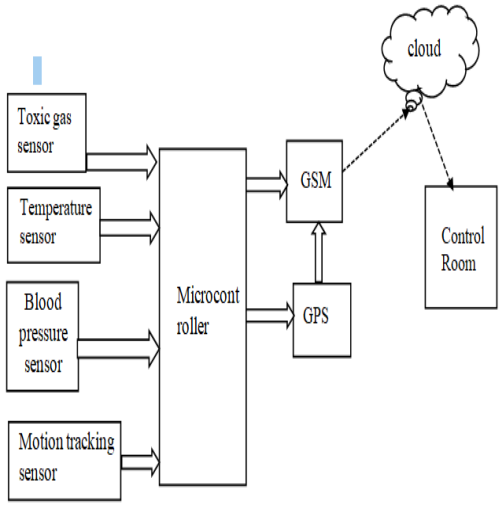


Figure 1.Block diagram of Arduino based solider unit

The actual system is deployed along with the soldier's kit. The ATmega328P processor will act as the brain of the unit. Soldier unit consist of LM35Temperature Sensor, TOXIC - Gas Sensor (CO), Accelerometer Sensor, Blood Pressure sensor, GSM, GPS Transmitter, Arduino, Led Interface, Buzzer.

The threshold values of the desired parameter is set and preprogrammed using the Arduino as per the threshold value and the person under test. In the proposed experiment we have considered body temperature for the verification purpose. Whenever the temperature is deviated from the set threshold value, system gets alert and sends the data to the control room with a buzzer beep

HARDWARE DISCRIPTION

1.Temperature sensor

- 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.

Station which when pressed immediately will alert Base station and thus will not wait for heart beats to go out of the normal range.

TOXIC SENSOR

This senor is used to detect the amount of carbon mono oxide near the body of soldier and guide the soldier with the amount of gas being present in the environment there by guiding him with a buzzer in case of high amount of gas being detected , alerting the crue of soldiers to avoid that particular area of inspection.Here the range is from 100-150 ppm (Parts Per Million).Accelerometersensor

BLOOD PRESSURE SENSOR

This sensor is used to measure the systolic and diastolic valve of pressure exerted by arm cuff-based monitor. The actual process of measurement involves exerting of force by the circulating blood on the walls of blood vessels especially in arteries .Here the usual blood pressure range is from Some of them also measures the Pulse rate with which the information about the physical and psychological condition of the subjects ex stress or a severity of an injury

GSM AND GPS MODULE

Sending messages via GSM network controlled via AT commands. The design of the shield allows driving the GSM and GPS function directly with any computer and Arduino board describes the experimentally calculated parameters for the location tracking of a person[4]. on a specific location and the tracking information is obtained as per the details provided Further, the same is verified with the help of Google map navigation tool. Fig. 2 shows GPS locations on the serial monitor. Fig.5 shows the soldier health monitoring system the sent SMS via GSM contains information regarding soldier health status and GPS location tracked using the GPS modem.

GPS

It uses a third generation GPS module. This GPS receiver providing a solution that high position and speed accuracy performances as well as high sensitivity and tracking capabilities in urban conditions & provides standard NMEA0183 strings in “raw” mode for any microcontroller. The module provides current time, date, latitude, longitude of the soldier to the microcontroller[2]. This is a standalone GPS Module and requires no external components except power supply. It is built with internal RTC Back up battery. It can be directly connected to Microcontroller's UART. Shown in figure 4

Flow chart of GPS

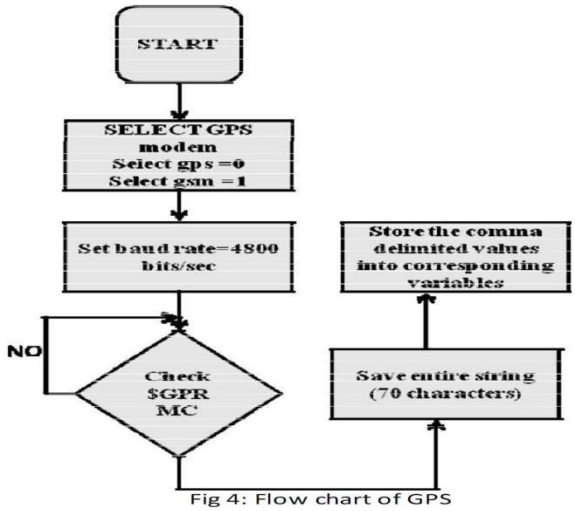


Fig 4: Flow chart of GPS

GSM modem

A GSM modem is specified type of modem which uses a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone[4]. From the mobile operator point of view, a GSM modem resembles just like a mobile phone. A GSM modem can be a dedicated modem device with a serial or USB connection, or it could be a mobile phone that provides GSM modem capabilities. Most of the GSM cellular modems come with an integrated SIM card holder. AT or attention commands are used to interface GSM modem with Arduino. In this project uses the GSM modem at control room to get the information of the soldier.as shown in Figure 5

B. Flow chart of GSM

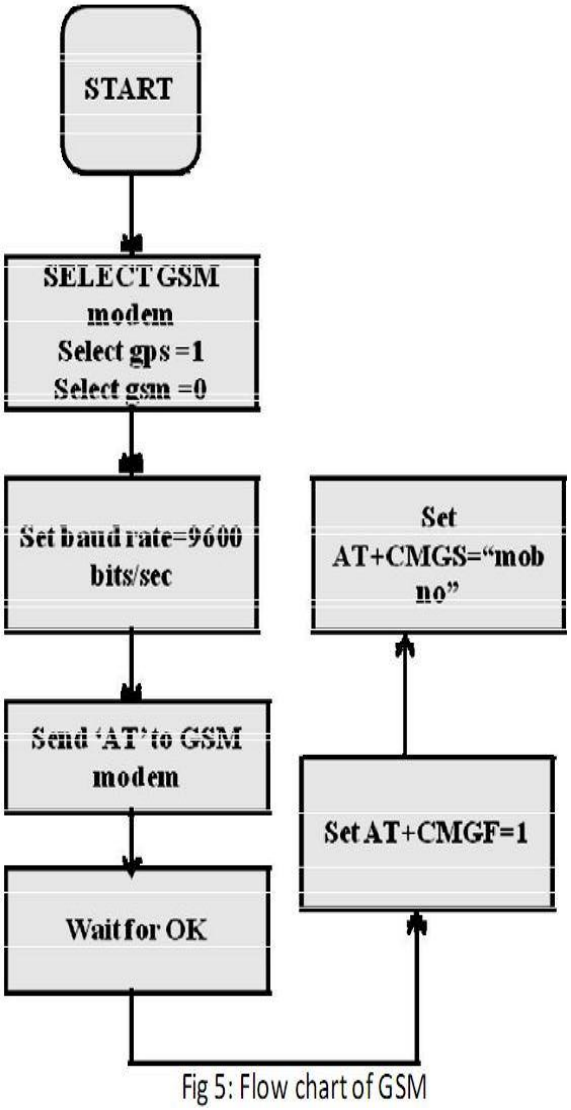
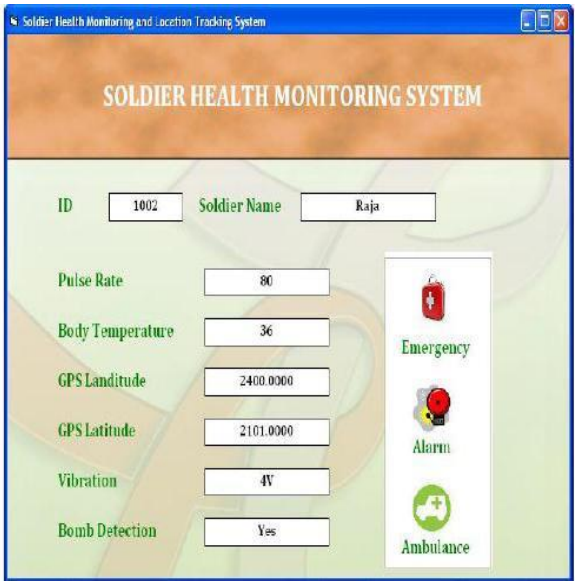


Fig 5: Flow chart of GSM

CONTROL ROOM

The control room is the receiver section of this project. GSM modem is used in control room to receive the data that is sent by army main station . The GSM unit receives the data of soldier heart beat, temperature and the output from the accelerometer. The accelerometer sensor tells about whether the soldier is injured by due to change in the orientation or any other attack by enemy such as injuries in arm, legs can be detected. The GPS used in this project gives the location of the soldier. That can be received by GSM. The server (PC) is equipped with software called Visual Basic6.0. This creates a data base that contains information about the soldier. Server is used to monitor the status of the soldier. And if there is any abnormality in the status of soldier it displays on a monitor and gives Led indication of the required information



LCD Unit

The LCD displays the heartbeat rate and the temperature, current date, time and location of soldier.

IV.RESULTS

Healthcare field is one of most delicate and important fields to be developed and enhanced by Smart systems designed to present sustainable medical interventions at manner time where the smart system should be simple, low energy consumption and real time feedback here we implement such health care in soldier which can helps in the analysis of the soldier The sent SMS including Patients name, heart rate, body temperature, longitude and latitude of the position are exhibit. Soldier health monitoring and location tracking is an effective security and safety system which is made by integrating the advancements in wireless and embedded technology

V.CONCULSION

The task entitled "Warrior HEALTH MONITORING AND LOCATIONTRACKING SYSTEM" is a compelling security and well being framework which is made by coordinating the headways in remote and implanted innovation. It helps for a fruitful mystery mission. This framework can be utilized as a part of basic conditions. It has continuous capacity. The exactness of framework is influenced by a few factors, for example, climate, condition around the portable warrior unit, GPS recipient. The future works incorporate streamlining the equipment framework, picking an appropriate GPS beneficiary.

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