Soldier Security and Health Monitoring

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***Abstract*—The paper reports in light of wellbeing observing and following framework for troopers. The proposed framework can be mounted on the warrior's body to track their wellbeing status and current area utilizing GPS. These data will be transmitted to the control room through distributed computing. The proposed frame work involve small wearable physiological equipment's, sensors, transmission modules. Consequently, with the utilization of the proposed hardware, it is conceivable to execute a minimal effort component to ensure the important human life on the war zone.**

***Key Words*— GSM; GPS; Sensors; Micro Controller; Accelerometer; Gyrometer.**

I. INTRODUCTION

Indian military are the third biggest standing armed force in the world with 1,200,225 dynamic troops [1] .The armed force endures a ton because of the inaccessibility of data of wounds of to it is work force which may increment that passing/lasting inability of toll. Soldier entering the foe lines frequently lose their lives because of absence of network. it is extremely imperative for the armed station to referred to the area and in addition well being status of all warrior. In the most recent decades, innovations, for example link based frameworks, RF headset, walkie-talkie and ZigBee based following frameworks where most predominantly utilized techniques for the following of fighters life on the war zone[2]. In any case, every one of these innovations experienced at least one reasons like high establishment cost, loss of flag, high noise as well as the accommodating in the ongoing nonstop observing of officers wellbeing parameters and area. Heartbeat rate, body temperature, Blood pressure, Accelerometer and gyrometer[3] and dangerous gas level in an condition can be observed alone side the area following of the officers utilizing GPS can be observed utilizing the proposed frame work[1]. The transmission of these parameters to the control room is done by cloud computing. The control room gets the position and introduction of officer from GPS. Further, officers can be guided for the right headings amid the activities utilizing GPS.

II. THE LITERATURE REVIEW

Many efforts were reported by researchers and academicians in order to monitor the health condition and track the location of the soldiers during the battle field. One such report of GPS based technology to monitor the soldier location tracking using GPS by Pavan Kumar et.al. There were different approach using different devices like ZigBee based approach for transferring of information regarding the soldiers for limited area Raspberry Pi based approach was proposed to monitor respiration, temperature, and heartbeat of the patient. These collected data were sent /added to cloud-based websites with IoT [1]. Another approach is with the help of Raspberry Pi based approach for the monitoring of data from Temperature, heartbeat, ecg parameters of patients by R.Shaikh et.al. in the above mentioned . LM35 temperature sensor, Pulse Rate sensor and oxygen level detector sensor for continuously monitoring health status of soldier. GPS is used to determine real time position and orientation. Data originating from sensors and GPS receiver is processed and collected using Arduino (ATmega328P) a wrist multi sensor device for continuous monitoring of health status and alert ,integrating biomedical sensors for heart rate, 1-lead ECG, blood pressure, oxygen blood saturation, and skin temperature measurement. One such reference is the use of GSM with GPS in a system to helps to inform the parent s and school to monitoring system about the location of the child through short messaging service[6].

III. ACTUAL 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

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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 other processors.

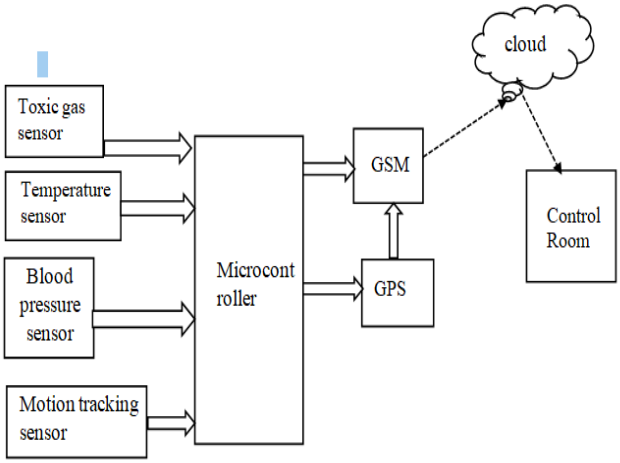

Fig 1. Control Unit

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

IV. HARDWARE DISCRIPTION

A. TEMPERATURE SENSOR

Human body temperature varies over only a narrow range of values[3]. Body temperature can be measured at different parts of the body, but for this project, temperature will be measured at neck. LM35 is a temperature sensor which is widely used to measure body temperature. This device is rated to operation over a −55°C to 150°C range Temperature measurements taken in the ear are accurate and relate closely to true core body temperature[1]. , a threshold value in the range of 300 to 400 C is considered The normal human temperature is around 370C Hyperthermia at or above about 40 °C (104 °F) is a life-threatening medical emergency that requires immediate treatment. Hypothermia is less than 35°C (95.0°F) gives symptoms as Intense shivering and If temperature sensor meets this condition the Arduino micro controller sends the message to the base unit and displays on the PC. The output will be 0.5V at 0 degrees C, 0.75V at 25 C, and 10mV per degree C. with this analog to digital conversion on the signal line will allow to establish the local ambient temperature. Detect physical touch based on body heat and ambient conditions with this small sensor.

B. 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[2] .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.

C. 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[3] .Here the range is from 100-150 ppm (Parts Per Million)[4].Accelerometer sensor

D. 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.

- 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.4

- 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.

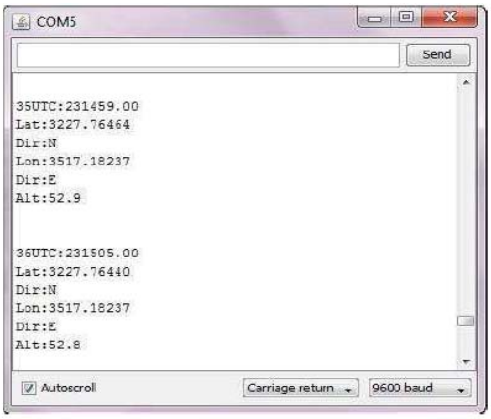

Fig 2 GPS location on serial monitor

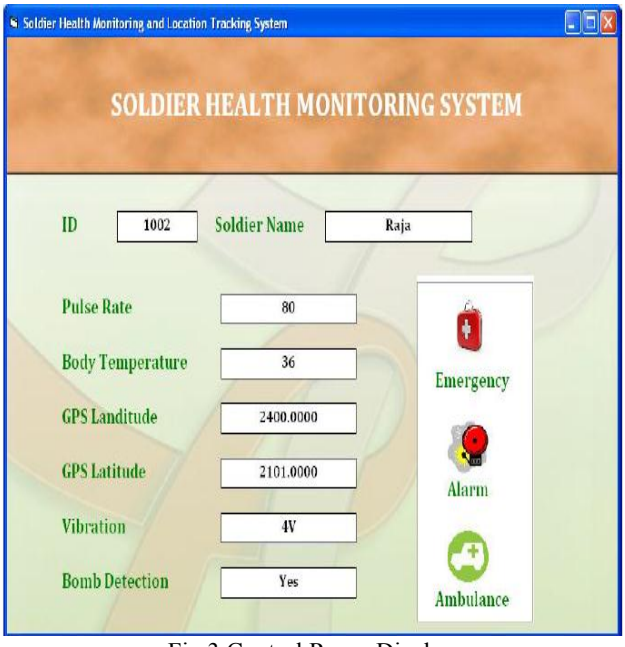

Fig.3 Control Room Display

E. 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 [2]. 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 to the army personnel. As shown in Fig 3.

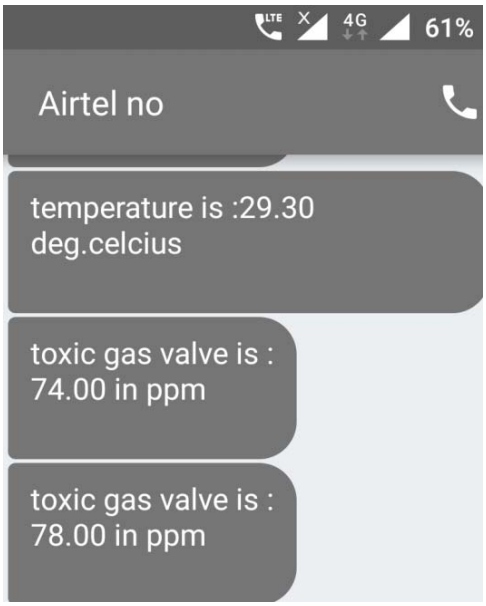

Fig.4 Display the Temperature and Toxic value

Fig.5 SMS display via GSM

V. RESULT

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.

VI. CONCLUSION

The task entitled "Warrior HEALTH MONITORING AND LOCATIONTRACKING SYSTEM" is a compelling security and wellbeing 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.

VII. REFERENCES

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