IoT Enabled Location Tracking and Health Monitoring of Remote Soldier using Raspberry PI

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Abstract— The paper reports an internet of things enabled tracking and monitoring of sensors for military applications. The proposed system is specially designed to cater the safety requirements of soldiers on the battlefield. It employs an Arduino board and Raspberry Pi for its operation along with various sensors to gauge the remote human vital sign. With the assistance of global positioning system location tracking can be configured, the sensor provided the accurate location of the human subjected in terms of longitude and latitude of place. Further, the designed sensor accurately provided the body temperature and heartbeat of the subject under test. This sensor are low cost, portable and reliable solution for the military applications.

Key words: Aurdino, Raspberry Pi – Battlefield, GPS – Healthcare, IoT – Security, Soldier – Vital signs

I. INTRODUCTION

This project deals with location tracking and monitoring of soldier health parameter such as body temperature and heartbeat. Here as we have designed a Raspberry Pi soldier health monitoring system can be defined as system used for monitoring physiological signals which includes parameter like heart rate and body temperature, where we are able to monitor the heart rate and body temperature through Raspberry Pi project , the exact health status and location of soldier can be sent to the base station in real time , so that the proper actions could be taken in case of crisis .In hospitals body temperature of soldier must need to be monitored constantly by doctors or paramedical staff, in which they need to observe the body temperature of soldiers constantly and maintain the record of it. The components used in this project includes a power supply unit, arduino uno, a temperature sensor, a raspberry pi, GPS, heart beat sensor. The Raspberry pi is central processing unit for monitoring body temperature of soldiers. This system is explained with block diagram, which consists of a power supply block, which it provides power supply to entire circuit , and a temperature sensor is used to calculate a soldiers body temperature and heart beat sensor is used measure the heart rate of soldiers.

A. Internet of Things (IOT)

The Internet of Things is the network of physical devices, vehicles, home, electronic devices which are embedded with sensor, software, hardware, actuators, electronics and connectivity, it will make enables these objects for connecting and exchanging informations. The IOT will allow the objects to sense and control constantly across existing network infrastructure, it creates more prospects for direct incorporation of the physical world into computer based system ,and which results in improved efficiency , accuracy and economic benefits in addition to reduce human intervention. The IOT collect the data with various existing technologies and automatically transfer the data between other devices.

II. METHODOLOGY

This system uses sensors to measure the health parameters of soldier, where the heart beat rate of soldier is monitored using IR sensor which used to sense the soldiers pulse rate .This method of tracking heart beat rate is more efficient than traditional method which derives the same values from ECG graph.

The device such as thermistor can be used for measuring of body temperature. It is passive transducer and it's resistance depends upon the beat being applied on it. The sensor are arranged in potential divider circuit .This sensor will exhibits a large change in resistance with change in temperature of body. Temperature sensor part is attached to soldier whose temperature has to be measured, as the value will be changing corresponding to change in temperature is displayed on monitor. All temperature measurements are updated in soldier's record.

And also the location of soldier will be tracked using GPS system and all these measured data will be send to army base station through IOT.

A. The proposed Sensor Mechanism

The aim of the proposed sensor is location tracking to assist the soldiers on battlefield. The sensor consist of two unit namely soldier unit and control room unit. Figure 1 depicts the block diagram of the proposed sensor.

The Soldier unit (Fig. 2) consists of ATmega328P microcontroller board. It controls the entire processing and decision initiation part of the system. Various sensors such as pulse rate, body temperature are attached with the processor board. The 16'2 LCD is used to display the values measured by the sensors. A GPS receiver is used to identify the real-time location and orientation of the soldier. The communication between the control room and soldier unit is achieved using IOT with the help of Raspberry Pi which has built in wifi module.
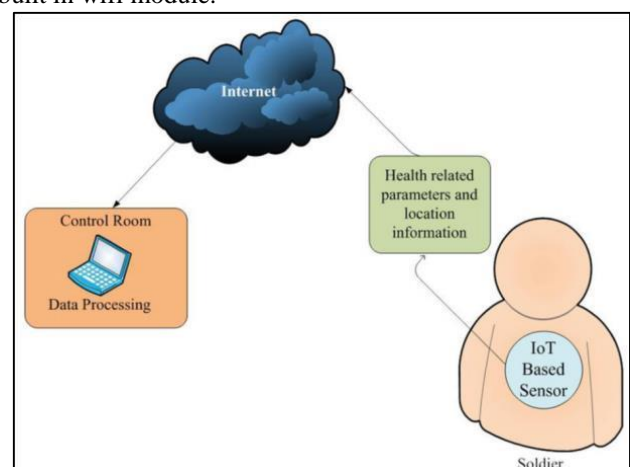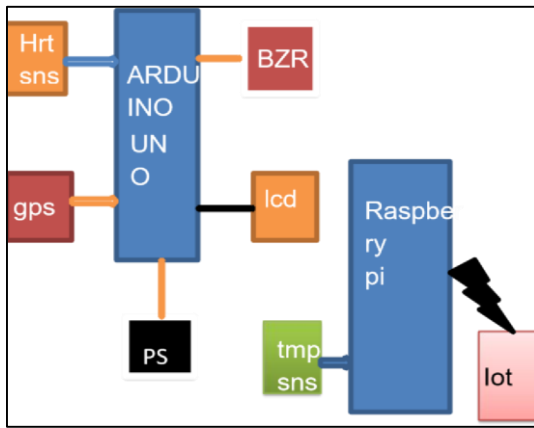

Fig. 1: Conceptual diagram of the proposed sensor

Fig. 2: Block diagram of soldier unit

During the experimental analysis, body temperature and heart beat rate is predefined for the verification purpose. Whenever the temperature and heart beats are deviated from the set threshold value, system gets alert and correspondents the data to the control room with a buzzer beep. At that same time, location and orientation of soldiers are also communicated to the control room.

The current status of the soldiers can be accessed at the base station via IOT based tracking systems. In this system the information is transmitted via Wi-Fi module. This information will be stored on the Cloud and can be extracted on the PC of control room. The
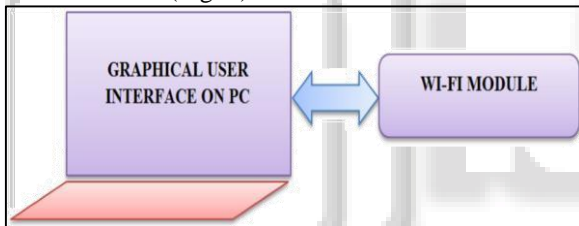
Control room unit (Fig. 3)
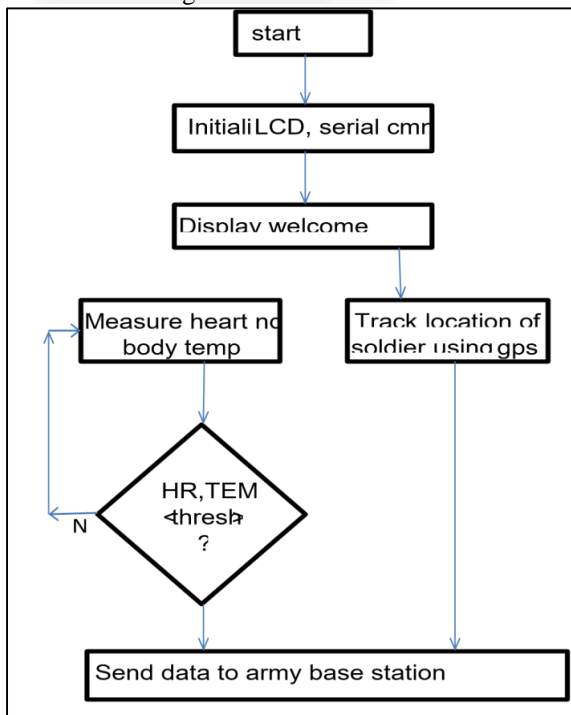

Fig. 3: control room unit

Fig. 4: operational flow chat for the proposed sensor

III. ANALYSIS

This experiment was carried out in the Dr, Ambedkar Institue Of Technology University premises with a human being mounted with proposed sensor . The human subject was placed at a location with longitude and lattitude of 77.50 and 12 96 respectively. The experimentally the parameters for the location tracking of a person on a specific location was calculated and the tracking information is verified with the help of google map navigation tool .The experimentally verified location information in terms of longitude and latitude of the subject under test was accurately matched with the manual information. of the location . Further ,to ensure the feasibility of the location Future , to ensure the feasibility of the proposed sensor , qualitative analysis in sensor is far better option than the similar reported one in the field of battlefield helath monitoring and tracking system
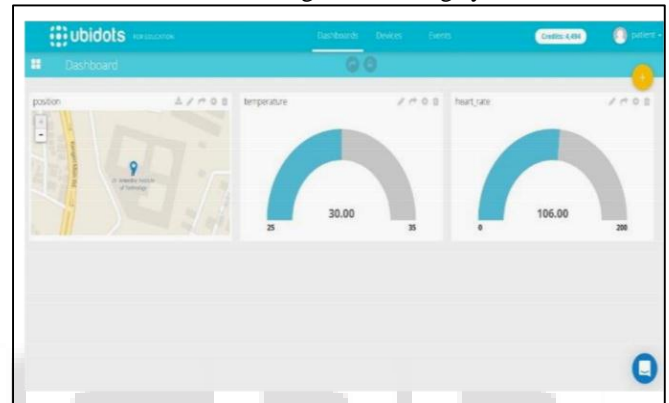

Fig. 5: GUI for proposed sensor

Fig. 6: Hardware setup of proposed system

IV. CONCLUSION & FUTURE SCOPE

The paper reports an IOT based solution for the health monitoring and tracking of the soldiers on the battlefield. This sensor is a low cost and accurate solution for the tracking of the soldiers. Various human vital signs and the battlefield conditions such as body temperature, pulse rate, are used for ascertaining the human life. Further, a buzzer is also provided which may be useful for the solder to avail the instant help on the battlefield. This information is transmitted to control room using IOT.

This sensor is beneficial in two ways i.e. availability of accurate location to the soldiers and correct situation information to the control room. Such information is useful to the control room to initiate effective rescue operations to save many precious lives on battlefield.

REFERENCES

[1] Jasvindar singh chhabral, akshay chhajed1,shaam lee pandital, suchitra wagh2 UG student,2assistant professor, department of electronics and telecommunications, singh gad institute of technology and science, pune, Maharashtra, India.

[2] Gareth Mitchell the raspberry pi single –board computer will revolutionize computer science teaching (for & against) Dohr R modre-osprain ,m drobics, D hayn, G scheir,"the internet of things for ambient assisted living", seventh international conference on information techonology.pp 804.809.2010

[3] krutika patil, 20mkar kumbhar 3sakshi basagnar,4priyanka bagul demonstrate IOT based soldier navigation and health monitoring system. jasvindarsinghchhabra1,akshay,chhajed1,shamlee pandita1,suchitra wagh2 international research journal of engineering and technology(IRJET) e-ISSN 23950056 volume:04 Issue:06\june-2017 www.irjet.net p-ISSN 23950072 @2017,IRJET Impact factor value 5.181||ISO 9001:2008 certified journal page 122 GPS and IOT based soldier tracking and health indication system.

[4] Patchava vamsrikrishna sonti dinesh kumar, shaik riyaz Hussain and k rama naidu "raspberry pi controlled SMSupdate-notification(sun) system".

[5] www.modmypi.com

[6] "things-aware smart pet-caring system with internet of things on wed of object architecture", 2016 international conference on information and communication technology convergence (ICTC), 2016 Raspberry pi foundation https://www.raspberry .org

[7] hao ran chi,"The design of dual radio zigbee homecare gateway for remote patient monitoring",IEEE transactions on consumer electronis,vol.59, N.4,nov 2013.