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Survey Paper on Soldiers Health Tracking System Using Internet of Things (IOT)

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Abstract:- In this paper, we propose soldiers health tracking system using Internet of Thing (IoT). In the last decades, technologies such walkie-talkie, zig Bee and GSM based tracking system were most dominantly used methodologies for the tracking of soldiers life on the battlefield. The proposed system consists of Hardware section and Software section in which Hardware section is divided into sensors and interfacing display, power supply and microcontroller whereas software section consist of Internet, web server, Hardware programming, and server side scripting and Database for storage information of soldiers health.

Keywords:- *PCB, Microcontroller, Sensor, GPS, IOT, OLED Display.*

I. INTRODUCTION

In current world scenario the security of the nation is the most important factor for us. Security of nation depends on the army force. It is impossible to protect the nation without soldier. The soldiers suffers a lots of problem due to the unavailability of information. The soldiers death can be minimized if the real-time information is available at the base station about the health and location of the soldier. Motivated from above issues, a propose system have developed. This system will remove all issues. In the proposed system , there are two sites. One is soldier site and another is server site. The soldier will measures the temperatures, blood pressure and heartbeats. And server site will access the data from soldier site by using IoT. And checks the current location of soldier using GPS. In this proposed system computer hardware is not compulsory. In this proposed system the real time location and health parameter of the soldier are instantaneously sent to the base station. The IoT makes the monitoring process fast and decisions can be taken in less amount of time.

II. LITERATURE REVIEW

Niket patil and Brijesh Iyer [2017] [1] have proposed system which not only monitoring the health but also the tracking location of soldiers using IoT. They have not explained how the communication is established between the client side and server side, since Arduino is connection oriented, i.e it comes with USB port.

R. Shaikh, and et. al. [2012] [15] have proposed a real-time, ARM processor based approach for the monitoring and collection of temperature, heartbeat, ECG parameters of patients. ZigBee and GSM wireless technology were used to send current updates of patients to the doctor and then doctors can take immediate action against that patient. A wireless body area sensor networks (WBASNs) technology using ZigBee to continuously monitor the human health and its location.

G. Raj et. al. [2014] [14] have proposed RF based module to gather the information of soldiers on the battlefield. V. Ashok [2016] [6] has proposed a one-time password (OTP) based system to secure and authenticate the data processing. Jassas et. al. [2015] [8] have proposed an idea of integration of wireless sensor network and cloud computing for the information processing in real-time and speedy manner.

S. Dixit and A. Joshi [2014] [13] have proposed a google map based approach to track the location of the soldiers. However, all these systems are stuck-up by one or more reasons like costly implementation, delay in response and bulky nature.

S. Rajeswari and R. Kalaiselvi [2017] [4] have proposed 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 help to inform the parent s and school to monitoring system about the location of the child through short messaging service.

➢ *Existing System*

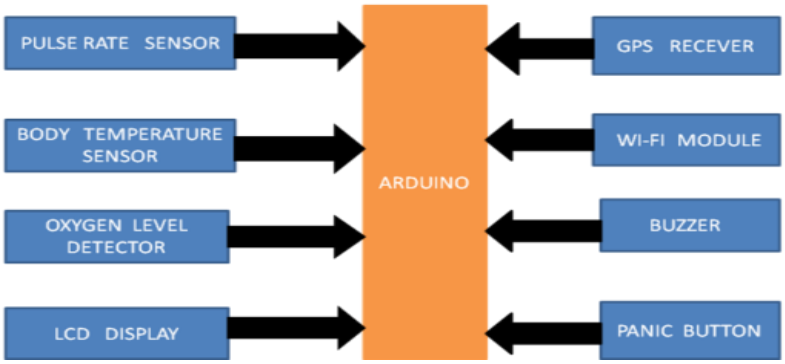

Fig 1:- Existing System

The above figure shows the working of existing system. It contains only one unit i.e. soldier unit. The soldier unit consist of pulse rate sensor, body temperature, oxygen level detector, LCD display, GPS receiver, Wi-Fi module, buzzer and panic button. In above figure they have connected all sensors, GPS receiver, wi-fi module, buzzer and panic button with Arduino. It has been clear that the system can be implemented either at soldier unit or at base unit. They have not explained how the communication is established between the client side and server side, since Arduino is connection oriented, i.e. it comes with USB port.

So we can conclude that the existing system has some flaws which can be eliminated by changing some unit or part of the system. In the proposed system, we are trying to eliminate those flaws and redevelop the system.

III. LIMITATION

A. High Installation Cost

Due to huge amount of hardware and resources cost is high as compared to the hardware used in our proposed system.

B. Loss of Signal

The network range of Radio frequency is limited in Walkie Talkie. We cannot use walkie talkie in long range. As this device worked as trans receiver (Transmitter and Receiver) walkie talkie will allow us to send voice signal at one direction at a time.

C. Communication Problem

Due to limited range of resources Soldier will able to communicate with the base camp resulting communication problem. Due to unidirectional information transfer some time voice signal get lost resulting lack of communication problem.

D. Unavaibility of Medical Facility

If soldier is in battle, he requires emergency health care which is not possible some time.

IV. PROPOSED SYSTEM

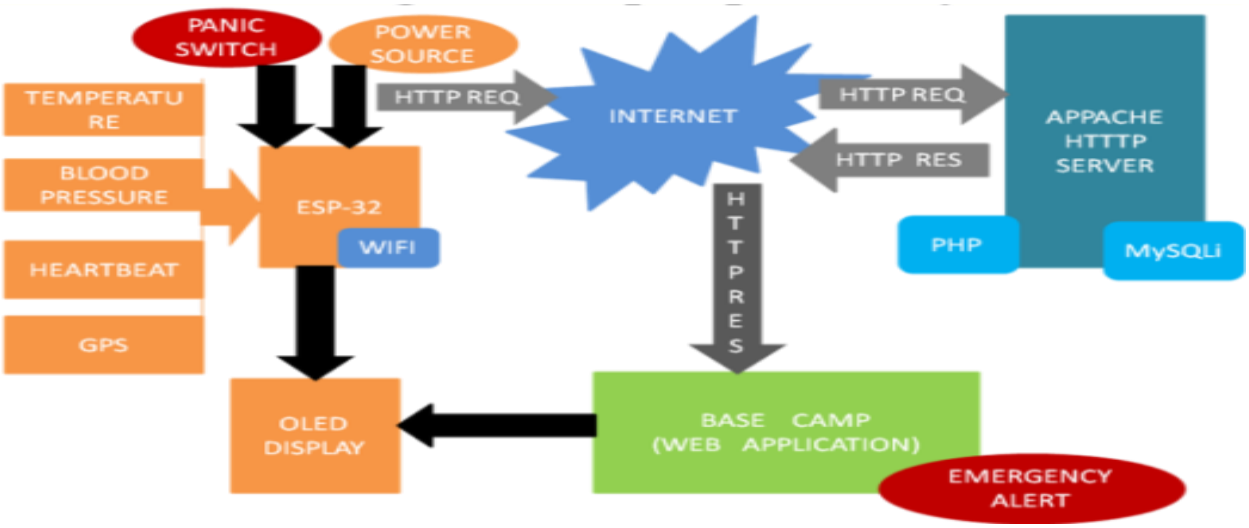

Fig 2:- Block Diagram of Proposed System

The proposed system consists of Hardware Section & Software Section in which Hardware Section is divided into Sensors & Interfacing, Display, Power Supply & Microcontroller whereas Software Section consists of Internet, Web Server, Hardware Programming, and Server Side Scripting & Database for storage information of Soldier's Health.

A. Sensors & Interfacing

The sensors used in this system will be interfaced with ESP-32 Microcontroller in Digital Mode because the type of all sensors are digital. Sensor like DHT11 (Temperature & Humidity), Blood Pressure (BP), Heartbeat (Pulse) & GPS. Interfacing will be done by using Arduino Programming with Sensor Libraries like DHT11 uses "#include<dht.h>" library whereas GPS requires "#include<TinyGps.h>" for performing respective operations. OLED Display works in I2C Protocol with Adafruit SSD1306 Library.

B. Internet & Communication

This system requires active internet connection for functioning information transfer. All the information will transfer through HTTP Protocol over SSL**.** The sensor information will be processed by ESP-32 then it will sync with the Server & stored in Database. We are using open source database "MySQLi" & Programming Language **"**PHP**"** for Backend Development.

C. Apache Http Server & Web Application

Apache Server consists of Web Application & Database. That Web Application will be accessed anywhere from any device through Internet. HTML, CSS, PHP & MySQLi are the open source technologies used to design Web Application.

D. Emergency Alert & Panic Switch

In case of Emergency Soldier will press emergency switch for Emergency Backup in Battle. By using this Switch it will generate the Emergency Alert in a Base Camp through Internet. Also it will send GPS Geo Locations through ESP-32 to the Base Camp. Web Application will contain all the information regarding Soldier Health & GPS location.

E. Power Supply

The whole Hardware system requires 5 Volt DC Supply for functioning each & every component. The current rating should be greater than 500 mA.

V. METHODOLOGY

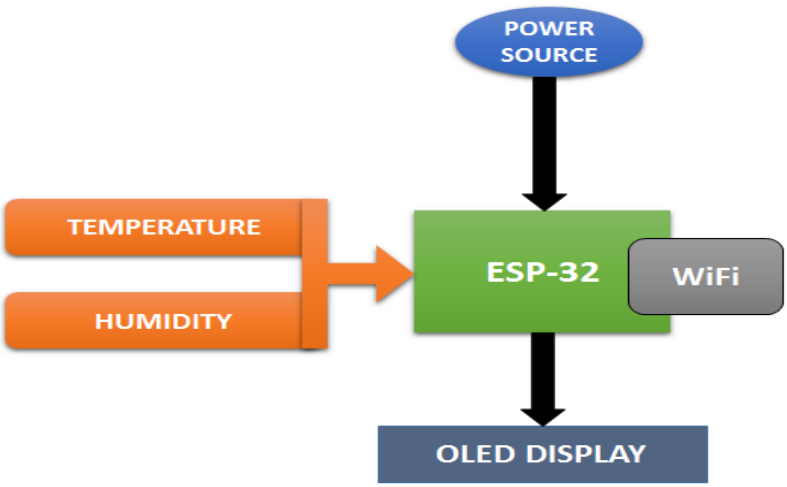

Fig 3:- Block Diagram

Fig. Block diagram of interfacing sensors with ESP-32 The designing methodology of system contain soldier unit. Soldier unit which is positioned on the soldier's body and this unit consist of different parts like Temperature and Humadity sensors, ESP-32 and OLED display.

We interfaced one sensor with ESP-32 along with OLED Display. The Sensor DHT11 is a Digital Humidity & Temperature Sensor which gives Serial Digital information to the ESP-32. Arduino Programming consists of DHT Library & SSD1306 Library for interfacing DHT11 & OLED Display. ESP-32 continuously read Temperature & Humidity from the Sensor & display on OLED Screen.

A. Temperature Sensor

Fig 4:- Temperature & Humidity Sensor (DHT11)

The DHT11is a commonly used Temperature and humidity sensor**.** The sensor comes with a dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data. .The

sensor is also factory calibrated and hence easy to interface with other microcontrollers.

B. OLED Display

Fig 5:- OLED display

An Organic Light Emitting Diode (OLED) is a display device which has self light-emitting technology composed of a thin, multi-layered organic film placed between an anode and cathode.

In contrast to LCD technology, OLED does not require a back-light. OLED offers wide viewing range, almost 180 degree from left to right and up to down and also consumes less power than existing LCD's.

OLEDs have been used in television screens, computer monitors, mobile phones, Personal Digital Assistants etc.

C. ESP-32 Microcontroller

Fig 6:- ESP-32

In our project, we are going to use ESP-32 Node MCU. ESP-32 is a series of low-cost and low-power system-on-chip (SOC) microcontrollers with integrated Wi-Fi and dual-mode Bluetooth. The microcontroller is cheap with low-power consumption and a great number of pins. Handling the Input-Output pins and switching relays on a web page of the local server. We do not require Internet and handling everything over Wi-Fi is possible.

➢ *ESP-32& OLED Display Interface*

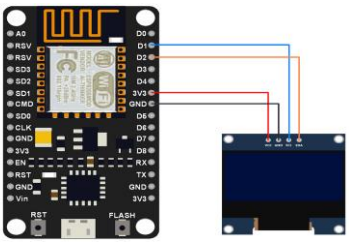

Fig 7:- ESP-32 Interfacing with OLED Display

This figure shows that the interfacing between the ESP-32 and OLED display. OLED display has the I2C bus i.e inter integrated circuit. ESP -32 uses the SSD1306 libraries to communicate with OLED display. This ESP's dedicated I2C pins are on GPIO 5 and 4 for data and clock respectively. ESP -32 has more pins than microcontroller. It has Wi-Fi and Bluetooth chip inside it. And 39 GPIO Pins. It supports all communication protocol like SPI, I2C, UART, etc.

OLED display has the two wires SDA and SCL. SCL is the clock line .it is used to synchronize all data transfers over the I2C bus. SDA is the data line. SDA line for master and slave to send and receive data.

VI. CONCLUSION

We interfaced one sensor and OLED display with ESP-32. DHT11 is our Digital sensor gives digital output of current temperature and humidity resp. We started with Arduino Programming of performing this task. After programming we are able to read sensor data and successfully displayed on OLED display. OLED display will show real time temperature and humidity at the interval of 5 second.

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