

Smart Monitoring for Soldier Health and Location

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Abstract - The people around the world live a safe life due to the sacrifices of the brave soldiers, in order repay the favour, so we must shield them from risks due to the face in the warfare by equipping them with advanced technology. Equipping people especially soldiers to guarantee the security of the state and its stability. This work designed smart monitoring system for soldiers who protecting the homeland so, it is necessary to help them by using smart monitoring system to avoid any terrorist attack or know their places when the abduction of any one of these soldiers. Supply soldier with modern technological devices makes it easy for us to know the health status and their location and this makes the control rooms in the military full-time to monitor the enemy rather than preoccupation with monitoring soldiers. Wireless communications devices play an important role in monitoring the soldiers through the use of the devices Global Positioning System (GPS) system, and also SOS messages that help the soldier to adapt with different situation. All the data collected from the sensors and send to the web server to make analysis and also statistics depending on these information Base Stations can make the right decision and send it to the soldier to follow.

Keywords - GPS, GSM, Heart rate Sensor, Temperature Sensor, Co2 Sensor, Vibration.

I. INTRODUCTION

The main objective of Smart Monitoring for Soldier Health and Location system is to significantly reduce the effects of problems encountered during the combat. Our system grants the leader the ability to track his troops and monitor their health statuses continuously in battle, even in advanced lines, by accessing the Web page directly from the cloud server. This methodology will help the secure soldier in greater extent in tracing the physical location of soldier and monitoring health condition for every thirty seconds. In today's world, warfare is an important factor in any nation's security. One of the important and vital roles is played by the army soldiers. There are many concerns regarding the safety of soldiers. So for their security purpose, many instruments are mounted on them to view their health status as well as their real time location. The soldier must be integrated with advanced healthcare monitoring, real time GPS (Global Positioning System). Soldier might need wireless networks not only to communicate with control unit but also with side by side military personnel. Apart from the nation's security, the soldier must need safety by protecting himself with advanced weapons and also it is necessary for the army control unit to monitor the health status of the soldier. To serve this purpose, in this paper bio medical sensors and monitoring devices are integrated with the soldiers. The integrated components must be light weight package and must provide desired result without requiring much power. One of the fundamental challenges in military operations lies that the soldiers are not able to communicate with control unit.

II. EXISTING SYSTEM

Apart from the nation's security, the soldier must need safety by protecting himself with advanced weapons and also it is necessary for the army control unit to monitor the health status of the soldier. One of the fundamental challenges in military operations lies that the soldiers are not able to communicate with control unit. Soldiers need wireless networks not only to communicate with control unit but also with side by side military personnel. To strengthen the security system of a nation ensuring the safety, where about and healthy body condition of the soldiers is very important. The soldiers are effective in terms of informing everyone in the network if anyone is missing are suffering from bad health conditions or if someone wants to communicate with others beyond eyesight. This paper describes the design and implementation of a low-cost embedded system developed for smart soldier assistances, the systems incorporate a gesture recognition based visual signaling, and Ultra wide band(UWB)based indoor and short- range outdoor localization and physiological parameter monitoring modules the modules combined together help creating a network which is used to track fellow soldier location and alert message based on the gesture and health parameters.

III. PROPOSED SYSTEM

Soldiers are very essential part of any nation's security system. During wars and search operations soldiers get injured and many of them become lost. As soldiers health is important because they are the savior of our country who protects us from enemy attacks, terrorist activities and from many suspicious activities which can harm us as well as our nation too. This project gives an ability to track the location and soldiers monitor health of the real time who become lost and get injured in the battlefield. It helps to minimize the time, search and rescue operation efforts of army control unit. This

system location enables to army base station to track the and monitor health of soldiers using GPS module and sensors such as heart beat sensor, temperature sensor, etc. Using modern technological tools Internet of Things (IoT) makes the WAN technology used in system. soldier to soldier such as knowing their speed distance, height as well as health status of them during the war, which enables the army personal to plan the war strategies. Internet of things are used to Testing phase is carried out by collecting heart rate, blood pressure and temperature of the person are using . Testing phase estimates the prediction of any abnormalities in the health condition from the sensor data collected through the IoT framework. Statistical analysis is performed from data accumulated into the cloud from IoT device to estimate the accuracy in prediction percentage. Base station gets location of soldier from GPS. The current status of the soldier which is displayed on the phone with the help of GSM and hence appropriate actions can be found.

IV. REALADED WORK

The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware. This software can be used with any Arduino devices. Here comes the most essential and prevalent term in IoT called 'Smart' which means Automation – the process of decreasing human intervention or involvement thereby increasing the machine intelligence to perform every tasks by itself, which could.

A. Arduino sensor

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board.

B. Temperature Sensor

Human body temperature varies within a narrow range of values. Body temperature can be measure from different parts of the body, we are using LM 35 temperature sensor in our project. Temperature measurements taken are accurate and relate closely to true core body temperature. 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 bluish/grayness of the skin also requires treatment. If temperature sensor meets this condition the PIC micro controller sends the value to the server via WIFI Module and displays on the web.

C. Heart Rate Sensor

The MAX30100 heart beat is used to know about the physical status of the soldier. The Polar heart rate receiver wirelessly receives the heart rate signal from Polar transmitter belt. The complete heart rate measurement system consists of two parts; transmitter, receiver. The transmitter, worn around the chest electrically detects the heart beat and starts transmitting a pulse corresponding to each heart beat. The receiver unit that is placed over the jacket of the soldier receives the signal and generates a corresponding digital pulse that is connected to the PIC micro controller. The normal human heart rate ranges from 60–100 bpm. When the heart rate is not regular the controller sends the heart rate along with information (i.e. whether the heart beat is normal or abnormal) to the server of the base station.

D. Internet of Things

Internet of Things [IoT] is a system of interconnected objects, usually called smart devices, through the Internet. The object can be a heart monitor, a remote or an automobile with built-in sensors. That is objects that have been assigned an IP address and have the capability to collect and transfer data over a network. The objects interact with the external environment with the help of embedded technology, which helps them in taking decisions. Since these devices can now represent themselves digitally. The designing of power supply requires the total current that the system. WampServer is a Web development platform on Windows that allows you to create dynamic Web applications with Apache2, PHP, MySQL and MariaDB. WampServer automatically installs everything you need to intuitively develop Web applications. You will be able to tune your server without even touching its setting files. Best of all, WampServer is available for free in both 32 and 64 bit versions. Wampserver is not compatible with Windows XP, SP3, or Windows Server 2003. Using various biomedical sensor health parameters wireless sensor networks and cloud computing will create a new generation of technology in many aspects such as patient monitoring with minimal cost, reducing the number of occupied beds in hospitals, and improving medical staff performance. In addition, applying various data mining techniques help to extract and analyse patients' data. The system introduced in this paper provides decisions based on patients' historical data, real-time data gathering, and thus eliminating manual data collection.

E. Block Diagram

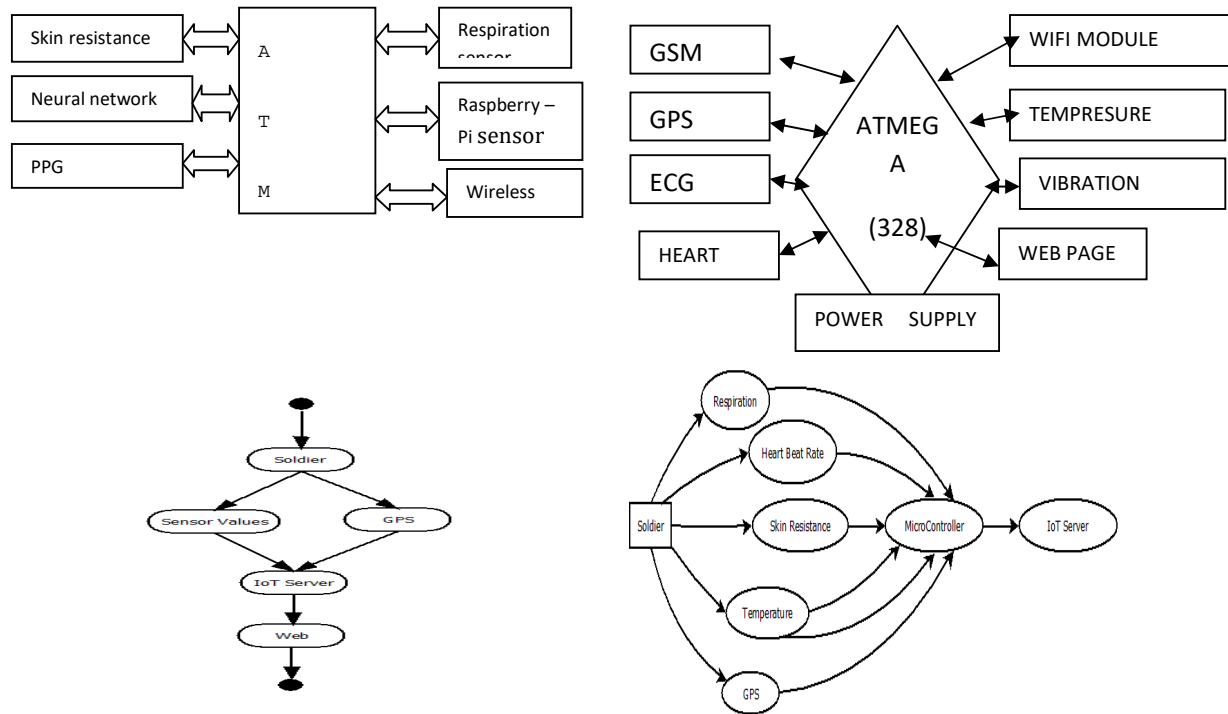


Fig. 1 Block Diagrams

F. ATMEGA Controller (328)

The Arduino Uno board is a microcontroller based on the ATmega328. It has 14 digital input/output pins in which 6 can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button. This contains all the required support needed for microcontroller. A microcontroller is a compact integrated circuit designed to govern a specific operation in an embedded system. A typical microcontroller includes a processor, memory and input/output peripherals on a single chip and it is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. Microcontroller collects the information from heart beat sensor, temperature sensor, GSR sensor and GPS which find location of the soldier for every thirty Seconds. Then it sends those information to be stored in database in cloud server wifi module

G. GPS Work

GPS uses a third generation POT (Patch Antenna on Top) GPS module. This POT 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 date, latitude, and longitude of the soldier to the microcontroller. This is a standalone GPS Module and requires no external components except power supply decoupling capacitors. It is built with internal RTC Back up battery. It can be directly connected to Microcontroller's USART. The module is having option for connecting external active antenna if neccessery.

H. GSM Work

GSM work Data flow diagram (DFD) is a graphical representation of the flow of data through an information system, modeling its process aspects. Often they are a preliminary step used to create an overview of the system which can later be elaborated. DFDs can also be used for the visualization of data processing (structured design).

I. GPS Receiver

Global Positioning System (GPS) will be connected with the soldier to find the location where they are residing. GPS will send the Latitude and Longitude values to the microcontroller. Through WIFI module the Latitude and Longitude values from the microcontroller will be stored in server. The Sensor values and GPS Latitude and Longitude values in the microcontroller will be stored in the cloud database using WIFI module. The values will be updated in the server for every thirty seconds. So that from base station they can able monitor the soldier in the fields.

J. Wi-fi Module

For Wi-Fi connectivity here we are using ESP 12E module. This will act as a Wi-Fi module for data transmission from the microcontroller to the server.

V. CONCLUSION

We can able to transmit data which is sensed from remote soldier to army control room using Internet of Things [IoT]. The system is completely integrated and can track the location of soldier at anytime from anywhere using GPS receiver. This system helps to monitor health parameters of soldier using sensors. This system helps the soldier to get help from army base station and also from another fellow soldier in panic situation. This system provides the location information and health parameters of soldier in real time to the army control room. This system is very useful to military forces during war as it can be used in battlefield without any network restriction.

VI. FUTURE WORK

Our proposed work can be enhanced in different ways in future. Gyroscope and Accelerometer can also be used together for human activity recognition. Blood pressure sensor and electro dermal activity sensor can also be implemented together to classify if the soldier is calm or is in distress.

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