Implementation Paper Soldier Health and Position Tracking System

Palash Tripathi[1], Aadya Apte[1], Prof. Swati Patil[2]

UG Student, Vishwakarma Institute of Information Technology, Pune, India[1]

Assist. Professor, Vishwakarma Institute of Information Technology, Pune, India[2]

ABSTRACT: In today's world the security of the nation is depends up on the enemies' warfare and so the safety of the soldiers is considered as vital role in it. Concerning the soldier's safety there are many instruments to view their health status as well as ammunitions on the soldiers. In soldier's security, bio-sensors systems give different types of small physiological sensors, Biomedical sensor, transmission modules and processing capabilities, and can thus facilitate low-cost wearable unobtrusive solutions for health monitoring. GPS used to log the longitude and latitude so that direction can be known easily. These devices are being added to weapons and firearms, and some militaries such as the Israeli Army which are exploring the possibility of embedding GPS devices into soldiers vests and uniforms so that field commanders can track their soldier's movements in real time. GSM module can be used for effective range of high-speed transmission, short-range and soldier-to-soldier wireless communications that will be required to relay information on situational awareness, tactical instructions, and covert surveillance related data during special operations reconnaissance and other missions. So by using this equipment's we are trying to implement the basic lifeguarding system for soldier in low cost and high reliability.

KEYWORDS- Atmega 328p Micro-Controller, GSM Module, GPS Module, Bio Sensor, Heartbeat Sensor.

I. INTRODUCTION

In today's world the security of the nation is depends up on the enemies' warfare and so the safety of the soldiers is considered as vital role in it. Concerning the soldiers safety there are many instruments to view their health status as well as ammunitions on the soldiers. This system is also used for the patients to monitor their health and track them easily. If the patients' health is disturb and he is far from their home this system monitors it track the patient and send message to the home or hospital, etc. In soldiers security, bio-sensors systems gives different types of small physiological sensors, Biomedical sensor, transmission modules and processing capabilities, and can thus facilitate low-cost wearable unobtrusive solutions for health monitoring. GPS used to log the longitude and latitude so that direction can be known easily. GSM module can be used for effective range of high-speed transmission, short-range and soldier-to-soldier wireless communications that will be required to relay information on situational awareness, tactical instructions, and covert surveillance related data during special operations reconnaissance and other missions. This paper focus on tracking the location of soldier from GPS, which is useful for control room station to know the exact location of soldier and accordingly they will guide them Also High-speed, short-range soldier-to-soldier wireless communications to relay information on situational awareness, such GPS navigation, Wireless communication. The Bio Sensor Consist of the Temperature sensor & Heart Rate Sensor. Designing a soldier tracking and health monitoring system using GSM and GPS to provide wireless system for tracking the soldier location and monitoring the parameters of soldier are as ' Body temperature & Heart beat rate. Biomedical sensors: Here to find the health status of soldier we are using a body temperature sensor to measure body temperature as well as heart beat sensor to measure the heart beat rate of soldier.

Problem Statement

One of the fundamental challenges in military operations lays in that the Soldier not able to communicate with control room administrator. In addition, each organization needs to enforce certain administrative and operational work when they interact over the network owned and operated by other organizations. Thus, without careful planning and

coordination, one group cannot communicate with the other groups. Current problem faced by the military are as follows:

1. Soldier wants to know about location. he can't do that.
2. They will not get help during panic situation.
3. Soldiers are not track able.

II . LITERATURE SURVEY

This project has an idea of tracking the soldier and navigation between soldier-to-soldier such as knowing their speed, distance, and height as well as health status of them during the war, which enables the army personnel to plan the war strategies. This system enables GPS (Global positioning systems) tracking of these soldiers. It is possible by M-Health. The M-health can be defined as mobile computing, medical sensors and communication technologies for health care. This device will improve, not only for the host, but also for placed together/correctly arranged military personnel who will exchange information using wireless networks. One of the basic challenges in military operations lays that the soldiers are not able to Communicate with control room station.

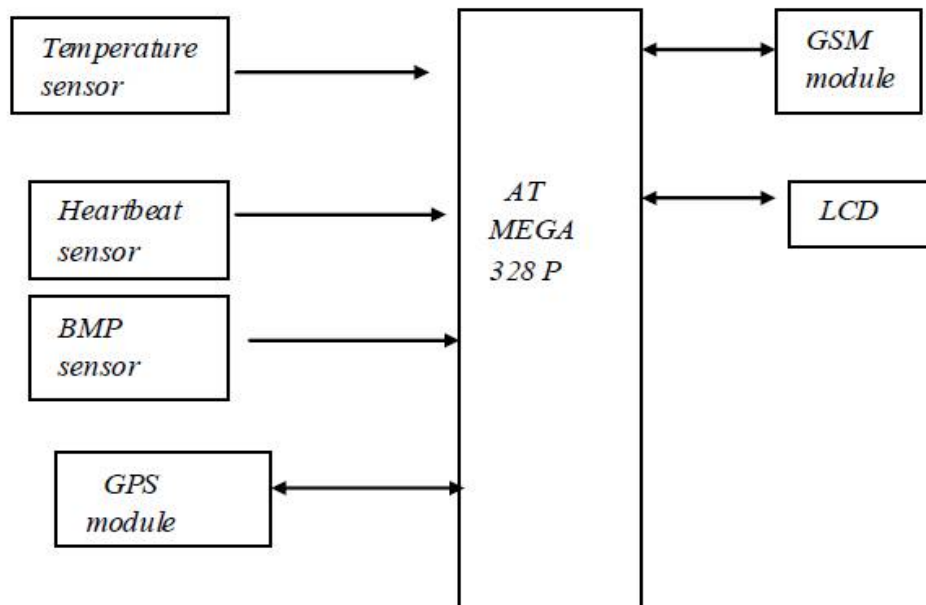## III. OVERVIEW OF THE SYSTEM ARCHITECTURE

Fig.1 Block Diagram of Proposed System

OVERVIEW OF THE SYSTEM
A. Heart beat sensor
The sensor used in this project is pulse sensor-SEN-11574. Heart rate data can be really useful for determining the health status of a person. The pulse sensor amped is a plug and play heart rate sensor for arduino. It essentially combines a simple optical heart rate sensor with amplification and noise cancellation circuitry making it fast and easy to get reliable pulse readings. It sips power with just 4 mA current draw at 5V. To use it simply clip the pulse sensor to earlobe or fingertip.

B. Temperature sensor

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the centigrade temperature. The LM35 device has an advantage over linear temperature sensor calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient centigrade scaling. To find the health status of soldier base station should know the body temperature and pulse rate of the soldier. So we are using LM35 body biosensor as it is a low cost temperature sensor and it does not require signal conditioning. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified. As the temperature increase above the specified value the GSM module will immediately alert the Base station and thus will not wait for heart beats to go out of the normal range.

C. GPS modem

Neo 6 M GPS is a USRT 6 M module. It will be used to track the position of the soldier. It gets connected to at-most 32 satellite and will give the exact longitude and latitude readings. In this way it will track the exact position. While originally a military project, GPS is considered a dual-use technology, meaning it has significant military and civilian applications. It operates in the range -40 degree Celsius to 85 degree Celsius and at 2.7V-5V. Also it has a tracking and navigation sensitivity of -161 dBm.

D. GSM Modem

GSM module is a breakout board and minimum system of SIM900 Quad-band/SIM900A Dual-band GSM/GPRS module. It can communicate with controllers via AT commands (GSM 07.07, 07.05 and SIMCOM enhanced AT Commands). This module supports software power on and reset. It has a quad-band 850/900/1800/1900 MHz and a dual-band 900/1900 MHz. It has control via AT commands, a very low power consumption of 1.5mA (sleep mode).

E. Microcontroller ATmega328p

The ATmega328 is a single –chip microcontroller created by ATmega in the mega AVR family. The Atmel 8-bit RISC-based microcontroller combines 32kB ISP flash memory with read while-write capabilities, 1KB EEPROM, 2kB SRAM, 23 general purpose I/P lines, 32 general purpose working registers, three flexible timers/counter with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, 6-channel 10-bit A/D converter programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1 MIPS per MHz.

SOFTWARE DESCRIPTION

Internet Of Things (IoT):

IoT is simply the network of interconnected things/devices, which embedded with sensors, software, network connectivity and necessary electronics that enables them to collect and exchange data making them responsive.
More than a concept Internet of Things is essentially an architectural framework, which allows integration, and data exchange between the physical world and computer systems over existing network infrastructure.

Internet-of-things frameworks might help support the interaction between "things" and allow for more-complex structures like distributed computing and the development of distributed applications. Currently, some internet-of-things frameworks seem to focus on real time data logging solutions like Jasper Technologies, Inc. and Xively(formerly Cosm and before that Pachube): offering some basis to work with many "things" and have them interact.

Future developments might lead to specific software-development environments to create the software to work with the hardware used in the internet of things. Companies are developing technology platforms to provide this type of functionality for the internet of things. Newer platforms are being developed, which add more intelligence. Foremost, IBM has announced cognitive IoT, which combines traditional IoT with machine intelligence and learning, contextual information, industry-specific models and even natural language processing.

Arduino IDE

The Arduino integrated development environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.

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.

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board -- you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.
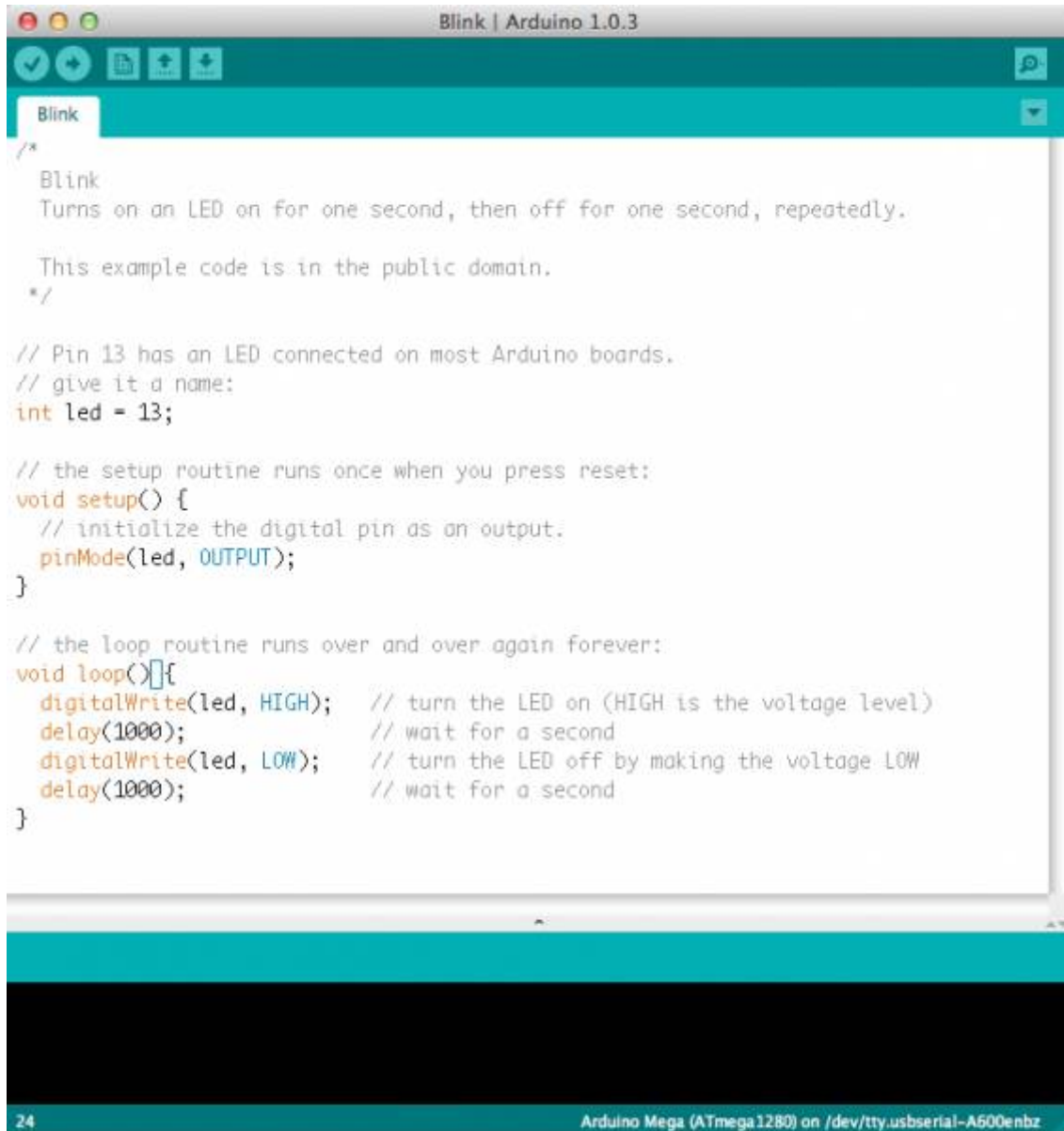

This is an Arduino Uno

The Uno is one of the more popular boards in the Arduino family and a great choice for beginners. We'll talk about what's on it and what it can do later in the tutorial.

This is a screenshot of the Arduino IDE.

Believe it or not, those 10 lines of code are all you need to blink the on-board LED on your Arduino. The code might not make perfect sense right now, but, after reading this tutorial and the many more Arduino tutorials waiting for you on our site, we'll get you up to speed in no time!

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.

ThingSpeak Server

ThingSpeak™ is an IoT analytics platform service that allows you to aggregate, visualize and analyze live data streams in the cloud. ThingSpeak provides instant visualizations of data posted by your devices to ThingSpeak. With the ability

to execute MATLAB® code in ThingSpeak you can perform online analysis and processing of the data as it comes in. ThingSpeak is often used for prototyping and proof of concept IoT systems that require analytics.

IV. CONCLUTION

Following conclusion can be retrieved from above work are:

- Continuous Communication is Possible: Soldiers can communicate anywhere using RF,DS-SS,FH-SS which can help soldier to communicate among their squad members whenever in need.
- Less complex circuit and power consumption. Use of ARM processor and low power requiring peripherals reduce overall power usage of system. Modules used are smaller in size and also lightweight so that they can be carried around.
- Security and safety for soldiers: GPS tracks position of soldier anywhere on globe and also health system monitors soldier's vital health parameters which provides security and safety for soldiers.

FUTURE SCOPE

- This system can provide more safety to soldiers by adding heart rate sensors, temperature sensors and GSM and GPS modules for the purpose of communication and location of soldiers. By using this sensors base station can monitor physical status of soldier. And they can be given medical instruction to overcome the problems. We can add display section to this project. This will help to display digital map, which shows the position of all soldiers to the unit, which will help them to locate the target, and attacks can be avoided.
- Helpful for finding the soldier or Patients.
- Easily monitor the health parameter.

REFERENCES

1. P. S. Kurhe, S. S. Agrawal, "Real Time Tracking & Health Monitoring System of Remote SoldierUsing Arm7" International Journal of Engineering Trends and Technology Volume 4 Issue 3-2013.
2. Pankaj Verma, J.S Bhatia, "Design and Development of GPS-GSM Based tracking System With Google Map Based Monitoring", International Journal of Computer Science, Engineering and Applications. (IJCSEA) Vol.3, No.3, June 2013.
3. Subhani Sk. M. Sateesh G.N.V, Chaitanya Ch. And Prakash Babu G., "Implementation of GSM Based Heart Rate and Temperature Monitoring System", Research Journal of Engineering Sciences ISSN 2278 – 9472 Vol. 2(3), 43-45, April (2013).
4. Ravindra B. Sathe and A.S. Bhide, "GPS based solider tracking and health monitoring system",World journal of Science and Technology 2012, 2(4): 97-99 ISSN: 2231 – 2587
5. Prof. Pravin Wararkar, Sawan Mahajan, Ashu Mahajan, Arijit Banerjee, AnchalMadankar, Ashish Sontakke,"Soldier Tracking And Health Monitoring System", IEEE The International Journal of Computer Science & Applications Volume 2, No. 02, April 2013 ISSN – 2278-1080.