JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

WSN BASED MOUNTAIN CLIMBER HEALTH & GPS TRACKER

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Abstract : Advanced wearable biosensors for vital-signs monitoring (physiologic cipher) are available to improve quality of healthcare in hospital, nursing home, and remote environments. The objective of this study was to determine reliability of vital-signs monitoring systems in extreme environments. Main outcome measures (location, heart rate, skin temperature, core body temperature, and activity level) all correlated through timestamped identification. Climbers were monitored continuously in real-time from Mount Everest to Yale University for more than 45 minutes. Heart rate varied from 76 to 164 beats per minute, skin temperature varied from 5 to 10°C, and core body temperature varied only 1–3°C. No direct correlation was observed among heart rate, activity level, and body temperature, though numerous periods suggested intense and arduous activity. Field testing in the extreme environment of Mount Everest demonstrated an ability to track in real time both vital signs and position of climbers. However, these systems must be more reliable and robust. As technology transitions to commercial products, benefits of remote monitoring will become available for routine healthcare purposes.

Key Words: Arduino, LCD, GSM, Buzzer, Power Supply, GPS, Temperature Sensor, Switch, Heartbeat Sensor

I. INTRODUCTION

Physical education is an integral part of the society, not only because it is a source of recreation, but also it is beneficial for maintaining a good heath. Earlier, the source of monitoring physiology and body kinematics of sports person was the coach's observation. It is quite obvious that human observations and monitoring accompany a lot of error, so with the help of the proposed Embedded System, it is possible to monitor body kinematics, sweat pH levels, heart rates, etc easily with accuracy.

I. LITERATURE SURVEY:

The advent of wearable textile-based sensors has paved, an easy and efficient, way for physiological monitoring. Athletes are not required to carry monitoring devices separately. Instead, the technology of using fabrics as sensors, enable them to be monitored with the help of garments that they wear. In the present paper, we tend to propose an embedded system design to monitor physiology and body kinematics in a cost effective manner with minimum energy conservation. Also, we aim at proposing a system which is small in size. For that purpose, our proposed Embedded System consists of Xadow micro-controller (dimension 25mm*20mm) with sensors and actuators useful for health monitoring in physical education. In this paper 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.

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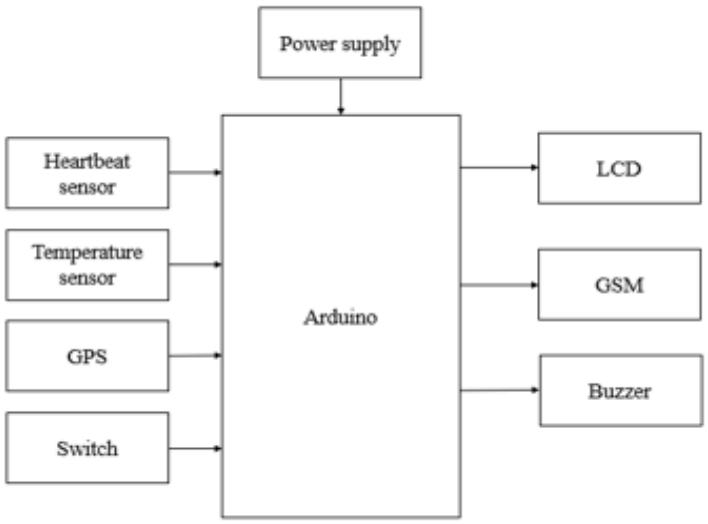
III. PROPOSED SYSTEM

Here we proposed a system aims for providing reliable health monitoring as well as position tracking of mountain Climber. Some of climatically conditions are led to unfortunate deaths of mountain climbers. This system can automatically sense the temperature inside, outside using temperature sensors. We are using push buttons for emergency purpose, it will send an SMS alert to the official or another Climber. And the buzzer will be ON when the heartbeat lessens. GPS, GSM are the modules used for

communication purpose. Hence for monitoring the health and the heart rate of the climber health monitoring equipment sensors are been establish in the system as well.



. **Fig 1. Block diagram**

IV. HARDWARE REQUIREMENTS:

ARDUINO:

The Uno with Cable is a micro-controller board base on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs); 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button.

It contains everything need to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

"Uno" means one in Italian and is the name to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards.

Note: The Uno R3 reference design can use an Atmega8, 168, or 328, Current models use an ATmega328, but an Atmega8 is shown in the schematic for reference. The pin configuration is identical on all three processors.

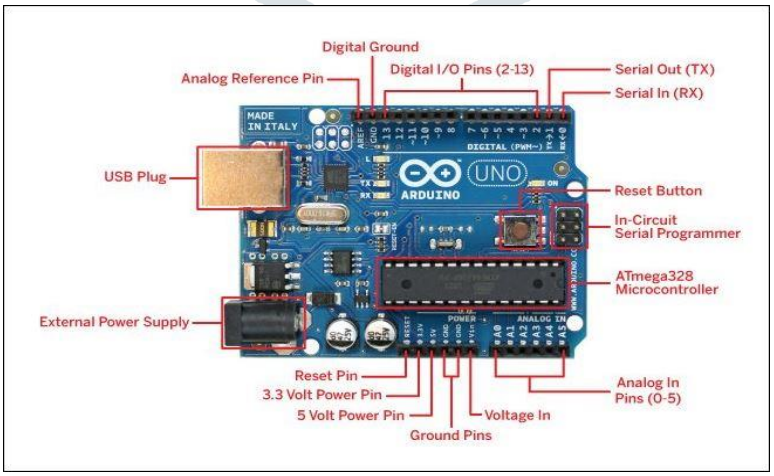


Fig 2. Arduino

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

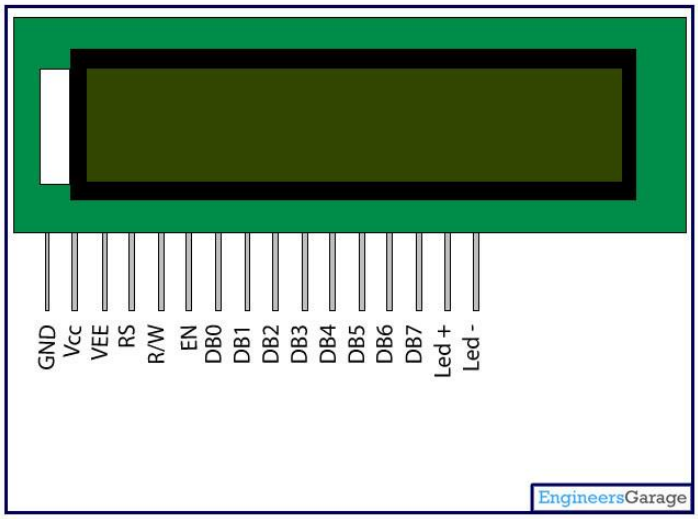


Fig 3. LCD

GSM:

A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. It can be connected to a computer through serial, USB or Bluetooth connection.

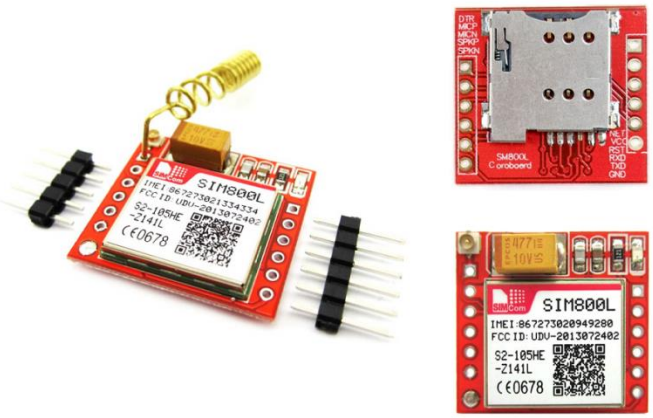


Fig 4. GSM Module

GPS:

- Global Positioning System (GPS) is a satellite-based system that uses satellites and ground stations to measure and compute its position on Earth.
- GPS is also known as Navigation System with Time and Ranging (NAVSTAR) GPS.
- GPS receiver needs to receive data from at least 4 satellites for accuracy purpose. GPS receiver does not transmit any information to the satellites.
- This GPS receiver is used in many applications like smartphones, Cabs, Fleet management etc.

Fig 5. GPS Module

SWITCH:

- A Push Button switch is a type of switch which consists of a simple electric mechanism or air switch mechanism to turn something on or off.
- Depending on model they could operate with momentary or latching action function.

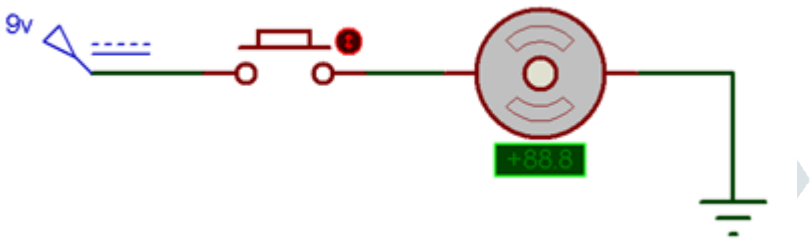


Fig 6. SWITCH Module

DS18B20 TEMP SENSOR:

The DS18B20 is one type of temperature sensor and it supplies 9-bit to 12-bit readings of temperature. These values show the temperature of a particular device. The communication of this sensor can be done through a one-wire bus protocol which uses one data line to communicate with an inner microprocessor. Additionally, this sensor gets the power supply directly from the data line so that the need for an external power supply can be eliminated. The applications of the DS18B20 temperature sensor include industrial systems, consumer products, systems which are sensitive thermally, thermostatic controls, and thermometers.

Fig 7. Temperature sensor

HEARTBEAT SENSOR:

- Monitoring heart rate is very important for athletes, patients as it determines the condition of the heart (just heart rate). There are many ways to measure heart rate and the most precise one is using an Electrocardiography
- But the more easy way to monitor the heart rate is to use a Heartbeat Sensor. It comes in different shapes and sizes and allows an instant way to measure the heartbeat.

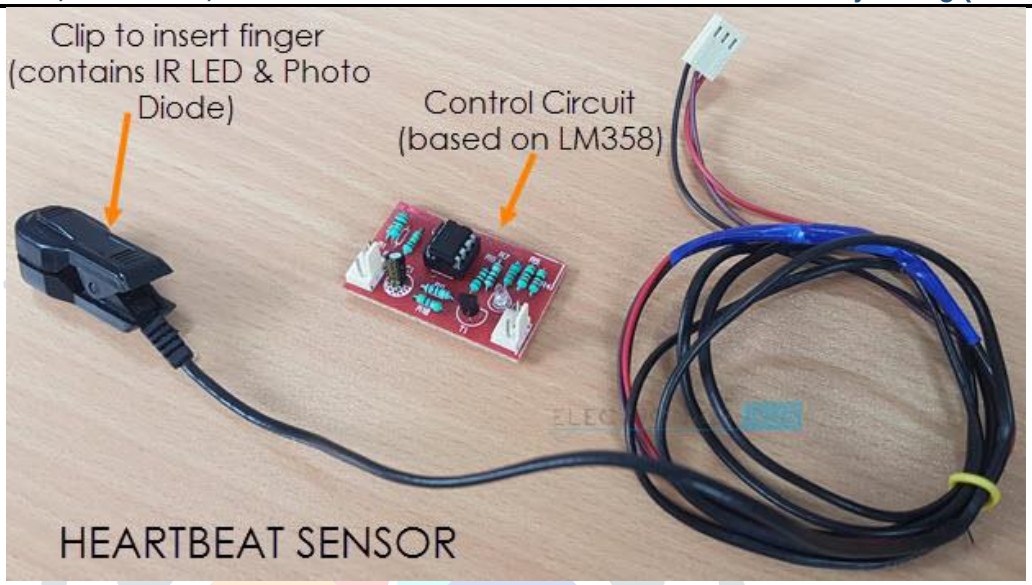
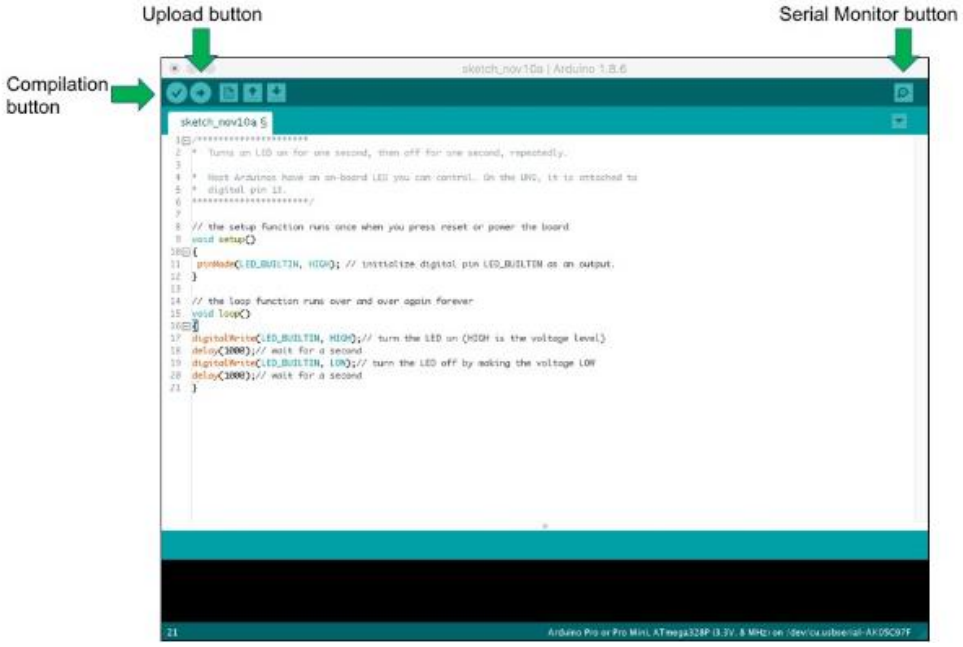


Fig 8. Heart beat sensor

ARDUINO IDE:

- The Arduino IDE (Integrated Development Environment) is used to write the computer code and upload this code to the physical board. The Arduino IDE is very simple and this simplicity is probably one of the main reason Arduino became so popular. We can certainly state that being compatible with the Arduino IDE is now one of the main requirements for a new microcontroller board.



SPECIFICATIONS:

Model Type	UNO Rev R3
Microcontroller Chip	ATmega328
Operating Voltage	5 V
Input Voltage(Recommended)	7-12V
Input Voltage (limit)	6-20V
Analog I/O Pins	6
Digital I/O Pins	14 (of which 6 provide PWM output)

PWM Digital I/O Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Clock Speed	16 MHz
SRAM	2 KB (ATmega328)
EEPROM	1 KB (ATmega328)
Flash Memory	32 KB (ATmega328) of which 0.5 KB used by bootloader
On Board LEDs	On/Off, L (PIN 13), TX, RX
Dimensions in mm (LxWxH)	75 x 54 x 12
Weight (gm)	28 (without cable) 54 (with cable)
Shipment Weight	0.04 kg
Shipment Dimensions	9 x 6 x 4 cm

V. CONCLUSION:

The sensors presented here provide a low-cost solution to physiological sensing with the added benefit of being able to function in any setting where the wearer may choose to train. This is not only valuable for the elite athletes but also for amateurs who wish get the most from their training period and assess their progress, Main outcome measures (location, heart rate, skin temperature, core body temperature, and activity level) all correlated through timestamped identification. Climbers were monitored continuously in real-time from Mount Everest to Yale University for more than 45 minutes. Heart rate varied from 76 to 164 beats per minute, skin temperature varied from 5 to 10°C, and core body temperature varied only 1–3°C.

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