Proceedings of 1st Shri Chhatrapati Shivaji Maharaj QIP Conference on Engineering Innovations
Organized by Shri. Chhatrapati Shivaji Maharaj College of Engineering, Nepti, Ahmednagar
In Association with JournalNX - A Multidisciplinary Peer Reviewed Journal, ISSN No: 2581-4230
21st - 22nd February, 2018

SOLDIER SUITS FOR HEALTH MONITORING SYSTEM

[1]Shivani Sangamnerkar,

[2]Priyanka Unawane,

[3]Geeta Salunke
Email: shivanisangamnerkar29@gmail.com, priyankaunwane43@gmail.com, geetasalunke25@gmail,com

Abstract—The design of an E-uniform which provides better protection to the soldiers who are working in extreme weather conditions.The uniform is operated in two modes,summer mode & winter mode . This project has an extension part which includes the interfacing of GSM,GPS & Health monitoring sensors, which gives the body parameter value & is also messaged to the concern person at the boundaries. Each soldier will have a GPS & GSM module & heartbeat sensor ,temperature sensor & blood pressure sensor which will tells the based headquarter about their position,pulse rate & temperature of the body.

Keywords— GSM module, GPS module, Heart beat Sensor, Temperature sensor, Blood pressure sensor.

INTRODUCTION

There is a suit like this available in market and cost is very high .Because many of that suit parts are mechanical, gripping devices that devices are made with nano fiber technology. This suit consisting of pumps to provide cool and heat. This pumps sprays water on to human body for cooling body. We can provide both cooling and hot service with E-Uniform. Temperature related inconveniences such as heat stroke, heat rash, hypothermia and others have been a persistent problem for people throughout history. These conditions have led to unfortunate deaths.

The current technological solutions made to keep people thermally comfortable such as air conditioning and heating units have come a Long way and have been successful in helping people obtain comfort in their dwellings (e.g. home or plate temperature by varying the variable resister. The suit is very flexible to wear, convenient, cozy, healthy and less in weight. The user wears an E-Uniform as a dress, and also there is a facility to switch on TEC in the E-Uniform. In the present time our soldiers always face a deathly combat everyday no matter a war is on or off, in our country various terror groups whether local or foreign are active in our country which is a big threat to the country. Our project is basically focusing on helping our soldiers by measuring their pulse rate such that it's low or high, by measuring their body temperature, by tracking their position so that if a soldier needs help then the base can help them in the best possible way. Their pulse rate, temperature of the body and their position can be check with the help of GSM module which will send the signals of this information to the base. . This project has an Extension Part which includes the interfacing of GSM and Health monitoring sensor, which gives the body parameter value and is also messaged to the concern person at the war or at boundaries. Each soldier will have a GPS and GSM module and heart beat and temperature sensor which will tell the base headquarter about their position, pulse rate and temperature of the body.

OBJECTIVES

Designing of this system using GPS and GSM gives a wireless system for tracking the location of the soldier and observing the heart beat rate and body temperature of the soldier. The temperature sensor is used to measure the temperature of the body as well as heart beat sensor is used to measure the heartbeat rate of the soldier, car), but are not personal mobility solutions. Both very cold and very hot temperatures could be dangerous to health..In aDineshkumarJaiswar ,Sanjna S. Repal [1]: very hot environment, the most serious concern is heat stroke. Sometimes during search operations soldiers get injured like At very cold temperatures, the most serious concern is the risk of hypothermia or dangerous overcooling of the body

LITERATURE SURVEY:

To develop Body Parameter Sensing Systems for the Soldier, The project is mainly targeted towards safety systems of soldier. For having strong military a nation need advanced technology for its soldiers like advance weapons, advance gadgets and many more. This project will be very useful for our soldiers in many conditions like Surgical Strike. The proposed solution is a battery powered heating/cooling suit, in which the user can control the temperature through controls and thermo-electric Devices that are embedded in the suit The user controls the peltier by hidden mines, hidden enemies, also sometimes they become lost. So to it is very important to keep our soldiers health and their position in check, after all our every soldier life is very important as they put their own life at stake for the sake of our country, its people. GPS, GSM, Heart beat sensor and Temperature can be use together in this project for tracking the position of the soldier and also can do monitor the health status of the soldier body.

Govindaraj A., Dr. S. SindhujaBanu[2]:

In this paper they had focused on tracking the position of the soldier and measuring the various health parameters using different biomedical sensors. The main aim of using GPS is to track the position of the soldier so that the personnel at the base could guide them at the war field and side by side could check the

body temperature of the soldier. Web cam (video camera) is also used. Keypad is used for giving any type of input if needed.

M.V.N.R. Pavan Kumar, GhadgeRasikaVijay ,PatilVidyaAdhikrao, BobadeSonaliVijaykumar[3]:
They found their idea from the mountaineers as mountaineers uses wrist watch for tracking their position, to know the temperature of their surroundings, to know the direction.

Block Diagram:
The Systems consist of controller which is ARM LPC2148 from ATMEL Company. In this project we are going to developed an body The whole setup consists of ARM Micro controller, Temperature sensor, Heart Beat Sensor , Blood Pressure Sensor,GSM ,TEC plate etc The hardware consists of a Temperature LM35. The analog output of Temperature sensor would be given to ADC, which is internally in microcontroller. The advantage of using ADC internally is that hardware becomes more compact.
The micro controller cannot process the analog voltages as it is a digital device; we need a ADC to convert the raw output of sensor to digital voltage. This digital voltage is feed to controller.
The ARM continuously monitors the Temperature parameter and Heart Beat. The final design is a microcontroller based system that heats and cools one side of several TECs by using an H bridge circuit that is enabled and controlled by "hot and cold" by temperature sensor.

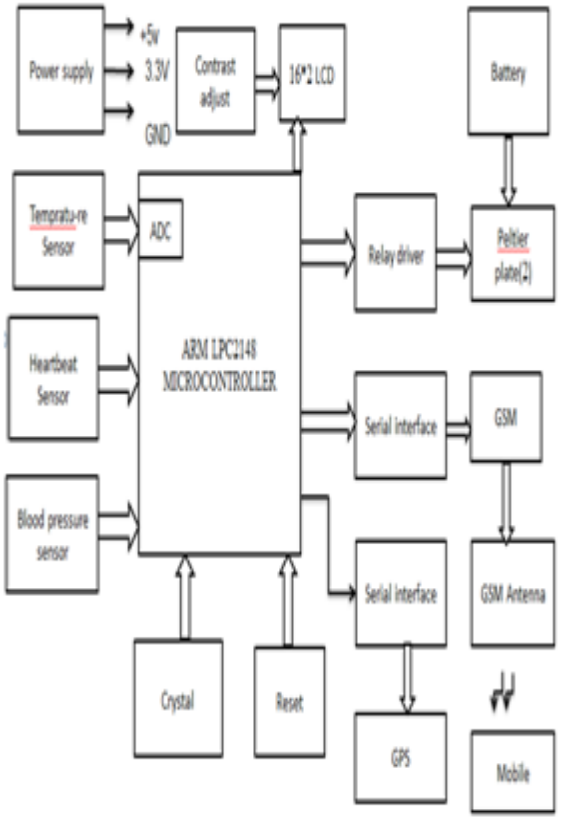

Fig 1:Block Diagram

Temperature Sensor:
The Temprature Sensor can be sensed with the help of the LM35 sensor. This series is accurate integrated circuit sensors, whose o/p voltage is linearly related to the Celsius temperature. A Station, which is pressed directly will aware Base station and thus will not delay for heart beats to go out of the normal range. The LM35 temperature sensor was used and it is connected ADC pin of LPC2148 micro-controller. The LM35 is used to sense climatic temperature and gives analog voltage as output. This analog voltage is converted into decimal form by programming LPC2148 controller and also this will be displayed on the 16X2 LCD

Fig2:Temperature Sensor

Heartbeat Sensor:
The Heart Beat sensor gives an easy way to study the function of the heart This sensor is used to monitor the blood through a finger. As the heart services blood through the blood vessels in the finger, the blood amount in the finger changes with respect to time. Heartbeat sensor indicate a light lobe through the finger to measure the light communicated to the LDR.The signal obtained from the LDR is changed by the amplifier and will be cleaned and provided to the ADC.

Fig3:Heart Beat Sensor

Blood Pressure Sensor:
Blood pressure and pulse reading are shown on display with serial out. .It indicate systolic, diastolic and Pulse Readings . compact design fits over wrist like a watch.easy to use wrist style eliminates pumping.

GSM :
GSM is an digital cellular technology used for transmitting signal to different phase. GSM digities and compress data,then it sends down a channel with two other streams of user data. In proposed system GSM is used for send the suit wearing person body parameter measurements to concern persons

Fig4:Blood Pressure Sensor

Thermoelectric coolers:

Thermoelectric coolers (TECs), also known as peltier coolers or peltier plates. Which works based on principle of thermoelectric cooling The peltier plate is consist of two semiconductors one is P-type semiconductor and another is N- type semiconductor.When voltage applied to the peltier plate then the current passing through peltier plate.

When the current passing through two different semiconductors then there will be produced heat. The electric current flow changed from the electrons less in bound side to electrons more in bound side when the two different semiconductors are in contact. The reason for this is the Fermi level energy of N-type semiconductor and P-type semiconductor are different.so the electrons always move from high Fermi level side to low Fermi level side .This process repeated up to the both semiconductor Fermi level energies become equal

The power supply unit regulates the battery voltage into 5v because to give it to the peltier plate, so it becomes heat or cool depends on the current flow direction. By using peltier plate we can easily create heat or cool.

Fig5:Peltier Plate

Fig6:GSM

GPS:

The term GPS stands for Global Positioning System (GPS) is a space-based global navigation satellite system that offers consistent location and information about the time in all weather conditions from anywhere on the Earth when and where there is a free line of sight to four (or) more GPS satellites. The GPS device continuously transmits serial data to LPC2148 controller through RS-232 serial protocol. UART is anasynchronous serial communication protocol, actually which is used to provide the communication between two off- board devices or modules or microcontroller units.

CONCLUSION

The proposed solution is used for provides safety to our soldier. So using this system we can measure body parameter of soldier. Also tracking the position of soldier and send message to concern person through GSM.

References:

[1] Goldsmid, H. J. ."Timeliness in the development of thermoelectric cooling. "IEEEXplore. N.p., 18Aug. 1998. Web.13 Dec. 2013 .<http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=740310>.

[2]"operation of thermoelectric cooling plate operation" http://www.activetool.com/technotes/thermoelectric.html

[3]"LPC2148 data sheet" http:// www.wvshare.com/ datasheet_html/LPC2148-PDF.html

[4]"Battery powered heating and cooling suit "paper fromhtttp: //ieeexplore .ieee.org/xpl /article details. jsp

[5]"peltier plate operation, construction and usage" https://en.wikipedia.org/wiki/termoelectric_cooling

[6] "LM35 Data sheet and operation"http://www2.ece.ohio- state.edu/~passino/LM35.pdf