

SMART SOLDIER JACKET

Mrs. Nandini S*, Puneeth U E**, Sudarshan H S***, Sachin H K****, Shivakumar A N*****

* (Electronics & Communication Engineering, BGS Institute of Technology, Karnataka, India, Email: nandinisgowda89@gmail.com)

** (Electronics & Communication Engineering, BGS Institute of Technology, Karnataka, India, Email: puneethue1997@gamil.com)

*** (Electronics & Communication Engineering, BGS Institute of Technology, Karnataka, India, Email: sudarshanhs@gmail.com)

**** (Electronics & Communication Engineering, BGS Institute of Technology, Karnataka, India, Email: sachinhk243@gmail.com)

***** (Electronics & Communication Engineering, BGS Institute of Technology, Karnataka, India, Email: Shivakumar61297@gmail.com)

Abstract:

As the climatic conditions are changing rapidly, the winters are getting much colder, especially in northern region and the western region of India. Since we developed a smart army jacket using control media devices such as GSM, GPS, and SENSORS in the jacket. The smart army jacket aims for providing reliable health monitoring as well as position tracking of soldier. Some of climatically conditions are led to. unfortunate deaths of soldiers. This jacket can automatically sense the temperature inside, outside using temperature sensors. We are using coils for heating purpose and the temperature of the coil will depends on the outer temperature. GPS, GSM are the models used for communication purpose. Hence for monitoring the health and the heart rate of the soldier health monitoring equipment sensors are been establish in the jacket as well.

Keywords — Atmega328 microcontroller, Electric coils, Arduino uno, GPS & GSM modules, LM35 temperature sensor, Heartbeat sensor, battery, etc.

I. INTRODUCTION

Many other jackets existing in the market can provide both cooling and hot service with the jacket. The different climatic conditions such as very cold and very hot temperatures could be dangerous to health. Since in very cold temperatures, the most serious concern is the risk of hypothermia or dangerous overcooling of the body. Henceforth we have developed a smart army jacket as an important resource for the army soldiers as soldiers play a very important role to protect our country in extreme cold conditions. The smart army jacket is proposed in such a way that it could monitor the

health, internal temperature as well as emergency notification in the form of short message service for the soldier

The jacket will be developed in three phases. In the first stage, the fibre of the jacket is been developed as according to the military standards keeping in note the weight, the colour, the finishing, stitching, concerning 20 meters (65 feet) inside and a bigger vary outdoors.

II. METHODOLOGY

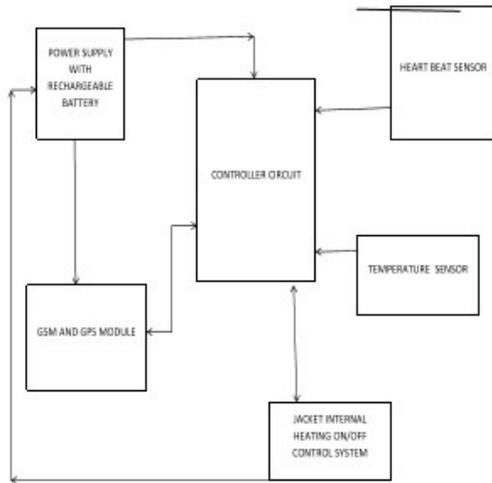


Figure 1: Block diagram of smart soldier jacket

A. GSM Module

A GSM electronic equipment may be a device which may be either a mobile or a electronic equipment device which may be accustomed build a laptop or the other processor communicate over a network. A GSM electronic equipment needs a SIM card to be operated and operates over a network vary signed by the network operator. It is connected to a laptop through serial, USB or Bluetooth affiliation. A GSM electronic equipment also can be a customary GSM portable with the acceptable cable and computer code driver to attach to a interface or USB port on your laptop. GSM electronic equipment is typically desirable to a GSM portable. The GSM electronic equipment has wide selection of applications in dealing terminals, provide chain management, security applications, weather stations and GPRS mode remote knowledge work.



Figure 2: GSM module

B. GPS Module

GPS stands for world Positioning System. The GPS is employed to receive the position information from the vehicles and show on a digital map. It too can have the interface to the communication link. Increased options embody video options, trace mode, history track, vehicle info, network support.



Figure 3: GPS module

C ATmega 328



It is having 1KB EEPROM, 2KB SRAM, twenty three general purpose I/O lines, thirty two general purpose operating registers, 3 versatile timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI interface, 6-channel 10-bit A/D device (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal generator, and 5 package selectable power saving modes. The device operates between 1.8-5.5 volts

D. Sensors Module

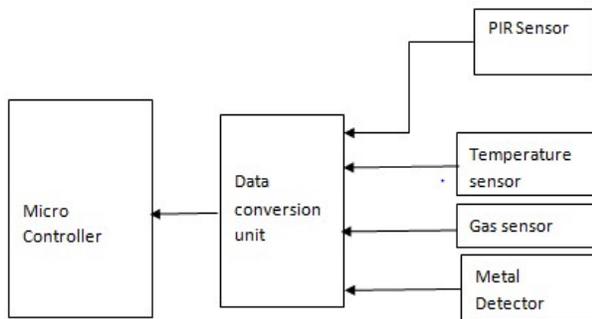


Figure 4: Block diagram of Sensors module

An analog to digital converter (ADC, A/D, or A to D) is a device that converts a continuous physical quantity (usually voltage) to a digital number that represents the quantity's amplitude. The conversion involves quantisation of the input, therefore it essentially introduces a tiny low quantity of error. Instead of doing one conversion, associate degree ADC usually performs the conversions ("samples" the input) sporadically.

1) *Temperature Sensor (LM35)*



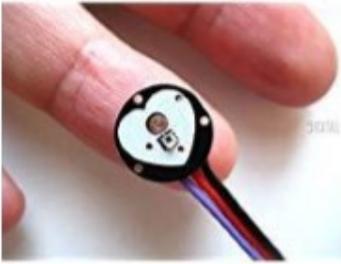
Figure 5: LM35 Temperature sensor

Temperature is one among the foremost ordinarily measured environmental amount for various reasons. There are differing kinds of temperature sensors which will measure temperature, like thermocouple junction, thermistor, semiconductor temperature sensors, resistance temperature detectors (RTDs), and so on. Based on the necessity, differing kinds of sensors ar used for activity temperature in several applications.

2) *Gas Sensor –MQ-2*

This detector module utilizes associate MQ-2 because the sensitive part associated features a protection resistance and an adjustable resistance on board. The MQ-2 gas detector is sensitive to LPG, i-butane, propane, methane, alcohol, atomic number 1 and smoke. It could be used in gas leakage detecting equipments in family and industry. The resistance of the sensitive part changes because the concentration of the target gas changes. When the target flammable gas exist, the sensor's conduction is additional higher beside the gas concentration rising. Please use straightforward electro circuit, Convert modification of conduction to correspond signaling of gas concentration. MQ-2 gas sensor has high sensitivity to LPG, Propane and Hydrogen, also could be used to Methane and other combustible steam, it is with low cost and suitable for different application. In order to form the detector with higher performance, appropriate RL worth is needed: Power of Sensitivity body(Ps): $P_s = V_c^2 \times R_s / (R_s + R_L)^2$.

3) Heartbeat monitoring sensor:



Heart monitoring sensor is such a type of sensor which gives an output of heart beat when finger is placed on it.

While the heart rate detector is functioning, the heart rate LED flashes in unison with each heart beat.

It works on the principle of photoplethysmography modulation by blood flow through finger at every pulse

3) Metal Detector Sensor



Figure 7: Metal detector sensor

A sensor may be a device that responds to metal that will not be without delay apparent. The simplest type of a sensor consists of an associated generator manufacturing associated electrical energy that passes through a coil manufacturing associated alternating force field. If a chunk of electrically conductive metal is on the brink of the coil, eddy currents are elicited within the metal, associated this produces an alternating force field of its own. If another coil is used to measure the magnetic field (acting as a magnetometer), the change in the magnetic field due to the metallic object can be detected.

A gold detector as an example is intended to find gold underground figure shows a gold detector. There are many types of metal detectors with varying degrees of refinement and complexity but they all operate on the same basic principle.

IV. WORKING

Wearable technologies area unit currently pervasive several applications in many fields. The aim of this review paper is to gather and summarize the particular sensible covering within the house and military field wherever conditions may well be vital for health and safety, and description the innovation trend for innovative services to police and troopers. In this project we have developed a jacket including various sensors and modules so that it will be helpful for avoiding the problems which could be faced by army people. First thing is by using the temperature sensors we can sense the outer temperature and so that we can adjust the heating temperature of coils which are placed inside of the jacket. From which we can prevent ourselves from the environmental conditions. Secondly health monitoring sensor will be helpful for monitoring the health status of human being. And as well the heart rate will be providing to the main station due to which the person sitting inside main station will get to know about the health status of soldier. GPS and GSM systems are used for conveying message that is if the soldier is in danger he can send the emergency message as well the exact location of the soldier so that main station can know the exact position of the man and they can find him and can offer help.

Advantages:

- Soldiers will be alerted regarding enemy entry.
- Location of the soldier can be tracked and sent to control room if he is missed.
- High range of security has been provided.
- Soldiers health is monitored continuously.

Applications:

- The project can be used in all the Border security Forces.
- It can be used in the military camps.
- It can be used in the war fields.
- It can be used in the Govt. related secured rooms and lockers.

VII. CONCLUSIONS

This paper tries to summarize the most sensible vesture applications developed within the last decade within the military field.

At the moment, the experience is very limited.

In terms of observance the troopers through a jersey, completely different systems exist on the market.

The U.S. Army, in the collaboration with MIT, is investing to create the uniform of the future.

For the instant, such a sensible vesture uniform isn't out there on the market.

The USA Army Natick Soldier research center is searching to make garments with new textiles and 3D printers. New applications and materials have been developed with the aim to have devices that can monitor the subjects for longer time and harvest

self-energy or solar energy. The next step will be the integration of the existing wearable technologies in usable smart clothing and bring them from the lab to the field.

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