EFFICIENT SUIT WITH SUPERIOR SAFETY FOR SOLDIERS IN BORDER USING IOT

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ABSTRACT

In today's world, enemy 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 weapon's present with them. Bio-sensor systems comprise various types of small physiologicalsensors, transmission modules and processing capabilities, and can thus facilitate low-cost wearable unobtrusive solutions for health monitoring. These devices are being added to soldier's jackets and uniforms so that field commanders can track their soldier's movements in real time.

Keywords : Internet of Things, ESP8266 module, Arduino, Health Monitoring, Encryption.

I. INTRODUCTION

The aim of creating fully integrated combat systems for soldiers. Alongside vast improvements in protective and weaponry subsystems, another major aspect of this technology will be the ability to provide information superiority at the operational edge of military networks by equipping the dismounted soldier with advanced visual, voice, and data communications. Capable of displaying maps and real-time video from other squad members, ranges of physiological sensors monitoring heart rate, core body temperature etc. These devices will improve situational awareness, not only for the host, but also for collocated military personnel who will exchange information using wireless networks. The challenge was to integrate these piecemeal components into a lightweight package that could achieve the desired result without being too bulky and cumbersome or requiring too much power, also High-speed, short-range, soldier-to-soldier wireless communications to relay information on situational awareness.

SYSTEM MODEL

With recent advances in technology, various wearable sensors have been developed for the monitoring of human physiological parameters. The various sensing technologies are available, which can be integrated as a part of health

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monitoring system, along with their corresponding measured physiological signal. There are a number of medical parameters of soldier that can be monitored. We therefore use two simple parameters temperature of the soldier and Blood Pressure of the soldier, which does not require too complex circuits and can be easily fitted into a small device that can be carried by the soldier. We are using LM35 as it is a low cost temperature sensor. Pulse rate sensor is used or pulse rate measurement it works on the principle of light modulation by blood flow through finger at each pulse. Fall detection is monitored by the vibration sensor and mems (accelerometer) Panic switch is proposed to know the soldier's emergency situation.

ADVANTAGE

- ✓ Modules used are smaller in size and also lightweight so that they can be carried around.
- ✓ Panic switch make communication between soldiers with control room
- ✓ Soldiers can be monitored via mobile app using IoT

ARDUINO UNO

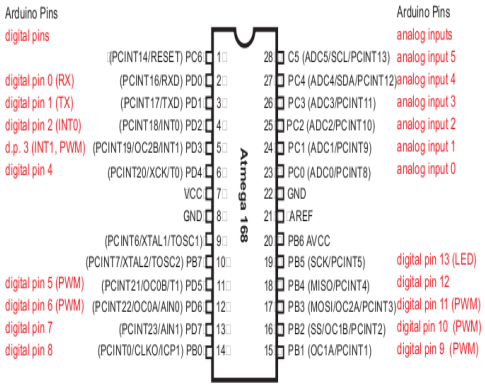

Fig. Pin diagram Arduino Uno

Arduino is a single-board microcontroller to make using electronics in multidisciplinary projects more accessible. The hardware consists of an open-source hardware board designed around an 8-bit AtmelAVR microcontroller, or a 32-bit Atmel ARM. The software consists of a standard programming language compiler and a boot loader that executes on the microcontroller.Arduino boards can be purchased pre-assembled or as do-it-yourself kits. Hardware design information is available for those who would like to assemble an Arduino by hand. It was estimated in mid-2011 that over300,000 official Arduino had been commercially produced.

IOT (ESP 8266)

The **ESP8266** is a low-cost Wi-Fi microchip, with a full TCP/IPstack and microcontroller capability, produced by Espressif Systems in Shanghai, China. The chip first came to the attention of Western makers in August 2014 with the **ESP-01** module, made by a third-party manufacturer Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at first there was almost no English-language documentation on the chip and the commands it accepted.

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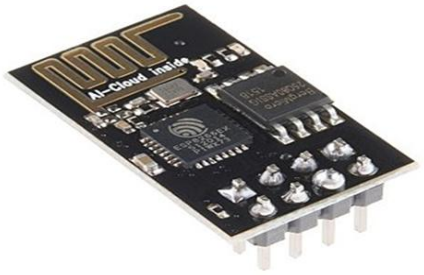

The pin-out is as follows for the common ESP-01 module:

1. VCC, Voltage (+3.3 V; can handle up to 3.6 V)
2. GND, Ground (0 V)
3. RX, Receive data bit X
4. TX, Transmit data bit X
5. CH_PD, Chip power-down
6. RST, Reset
7. GPIO 0, General-purpose input/output No. 0
8. GPIO 2, General-purpose input/output No. 2

HEART BEAT SENSOR

The sensor consists of an Infrared transmitter and Receiver. The Infrared ray emits from the transmitter and received in the receiver. When the blood is pumped in between the fingers correspondingly to the beats of the heart, the infrared rays are blocked in between and released accordingly. With each heart pulse the detector signal varies. This variation is converted into the electrical signals and given as output voltage as 0 or 5 Volts DC. The output signal is indicated in LED which blinks on each heartbeat.

TEMPERATURE SENSOR (LM35)

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1/4°C at room temperature and ±3/4°Cover a full -55 to +150°C temperature range.

VIBRATION SENSORS

Vibration sensors have proven to be versatile tools for the measurement of various processes. They are used for quality assurance, process control and for research and development in many different industries. Since then, this measuring principle has been increasingly used and can be regarded as a mature technology with an outstanding inherent reliability. It has been successfully used in various applications, such as in medical, aerospace, nuclear instrumentation, and as a pressure sensor in the touch pads of mobile phones

ACCELEROMETER

This sensor works on 12v. It gives Digital high (5V) output whenever vibration is detected. The Vibration Sensor Detector is designed for the security practice When Vibration Sensor Alarm recognizes movement or vibration, it sends a signal to either control panel developed a new type of omnidirectional high sensitivity Security Vibration Detector with Omni-directional detection. It works on electromechanical principle Vibration velocity sensors operate in accordance with the electrodynamics principle and are used for measuring the bearing absolute vibration based on the piezoelectric effect. Change in resistance due to the force acting on it and convert it into 4 - 20 mA.

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BUZZER

A buzzer or beeper is an audio signalling device,which may be mechanical, electromechanical, or piezoelectric. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound.

CONCLUSION

This project proposed the development of IoT based system for soldier monitoring. This system perform continuous real-time monitoring. In this work, an initial prototype has been developed three basic modules. First, using sensors, the internal body vital signals, and the external environment are monitored and data is fetched from them. Next, the data acquisition module for data gathering. Finally, secured storage of data with the help of clouds. In order to incorporate cost-effective, low-cost sensors and Arduino and Embedded boards are used. Biomedical sensors provide body vital signals such as heart pulse rate, body temperature, and etc., authentication code coordinates of every soldier to the computer in the base station.Then data is protected by encryption techniques wherever needed, and the system successfully stores the acquired data.

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