DEPLOYING ADVANCED HEALTH MONITORING AND ALERTING SYSTEM FOR MILITARY PERSONNEL IN COMBAT ZONES

B.Sushma, Assistant Professor , Department of Electronics and Communication Engineering Potti Sriramulu Chalavadi Mallikarjuna Rao College of Engineering and Technology,Kothapet,Vijayawada,Krishna District , Andhra Pradesh , India

D.Priyanka Devi,J.Mounika,B.Durga Mounika,K.Lakshmi Vaishnavi, Students, Department of Electronics and Communication Engineering Potti Sriramulu Chalavadi Mallikarjuna Rao College of Engineering and Technology,Kothapet,Vijayawada,Krishna District , Andhra Pradesh , India

ABSTRACT

One of the fundamental challenges in the military operations is that the soldier is not able to communicate with the control room at different geographical conditions and also health monitoring is very important in terms of preventing the health issue before getting severe by early detection. The system also consists extra features which soldier can ask for help, when his health condition gets imbalanced automatically a signal is sent through cloud which says that he is in need for a medical help. In order to realize the fusion of battlefield redeem, command and alerting system for soldiers, the proposed system can be organized on the soldiers body to track their health status and current location using GPS and alerts voice message to the control room. The system comprises of a miniaturized wearable equipment, bio-medical sensors, transmission module, voice controller, video monitoring to track their health status and current location. The GPS module sends the latitude and longitude positions with the link patterns with the help of that military can track the current position of the soldier. RF module is used for wide range of transmission of information about the soldier to control room. Solar panel capture sunlight as a source of radiant energy and produce continues power supply to device. The control room can also monitor the live video of soldier surroundings. This technology can be helpful to provide the accurate location and live video of the soldier at critical conditions to the base station. The system is very helpful in getting health status information of soldier and track the exact position of rescuers.

Keywords: Arduino**,** tracking, sensors, camera, Arduino IDE

INTRODUCTION

The countries' safety is monitored and kept by military force and navy force. The main function is the death of soldiers in battle field, who sacrifices their life for his or her country.

There are many troubles regarding the safety of the soldier. Due to lack of connectivity, many soldiers lose their lives in the battle area, so it is very important for the army base station to confess the area as well as health of all soldiers. India has lost many such soldiers in battle field due to improper connectivity and health backup at war place.

In every aspect of our daily activities, bio medical, business, as well as military the Iot plays an important role. Mainly the sensors are responsible for specifying the significance of its use in determining the health condition of a person and taking necessary action. Now a days these sensors are mostly used in medications that means the patient's health abnormalities can be easily known to a doctor by implementing different types of sensors on the body.

In our project to determine the location of of the soldiers in a battle we are using GPS to track the location. Also we are using different types of sensors which can be mounted on a soldier's body which gives the health parameters of the soldier. To send the data from soldier to base station we are using RF communication.

SYSTEM ARCHITECTURE

In this method, all the inputs of different sensors are connected to Arduino uno controller,where it is a board based on ATMega328P. It contains 14 Digital pins and 6 Analog pins.The controller saves information and sends accordingly.

The system collects data on the soldier's health, location, and environment, and transmits that data to a control unit for analysis. The system includes a MAX30102 sensor for monitoring heartbeat, SPO2, and temperature, as well as a metal detector and smoke sensor for detecting toxic gases in the environment. A camera provides live video of the soldier's surroundings, and a GPS tracks their exact current location. All of these inputs are connected to the analog pins of an Arduino Uno controller, which saves and transmits the data to the control unit using an RF module.

The system includes various alerts to notify the control unit of any fluctuations in the soldier's health or environment. A buzzer sounds and a voice assistant reads out the soldier's health condition if there is a problem, and the control unit can monitor the data and video feeds on a PC or system. The system is designed to help the control unit take quick action in case of an emergency.

The system is also equipped with a backup battery charger to activate immediately if the camera's power source fails. A solar panel battery charger provides backup charging. This system aims to reduce the amount of time and energy required for the army control unit to search and rescue operations. By monitoring soldiers' health and location in real-time, the control unit can take quick actions when necessary.

Overall, this system will help for monitoring soldiers in the field, and could be an effective tool for improving their safety and well-being.

PROPOSED METHODOLOGY

The designing of the system mainly consists of the two modules one is at the soldier, and another is at base station.

Module 1

The module at the soldier comprises of biomedical sensors, GPS, metal detector, camera. Biomedical sensors are heartbeat sensor, temperature sensor, oxygen analyzer is placed in max30102 with a specific threshold value. This module also contains smoke sensor for the detection of toxic gases in the atmosphere. The metal detector is used for detecting the land mines and weapons which is made of metal. Camera is used to provide continues live monitoring of the soldier surrounding .

The GPS is used to track the exact location of the soldier. The sensors, camera, metal detector and GPS connected to the Arduino and coded with the Arduino software. If there are any unusual values are monitored in the sensor the device alerts in base station. The data is transmitted from the soldier to base station through RF module. solar panels are used for generating power supply to the module at the soldier and rise up with the solar battery.The module is coded with some instructions for the performance of the sensors. And it is used to analyses of values monitoring at the soldier. The module works based on the information given to the sensors and calculated. The base station can reach the soldier if there exist abnormal readings in the module. These can helpful to save the soldier life if there are any issues arises.
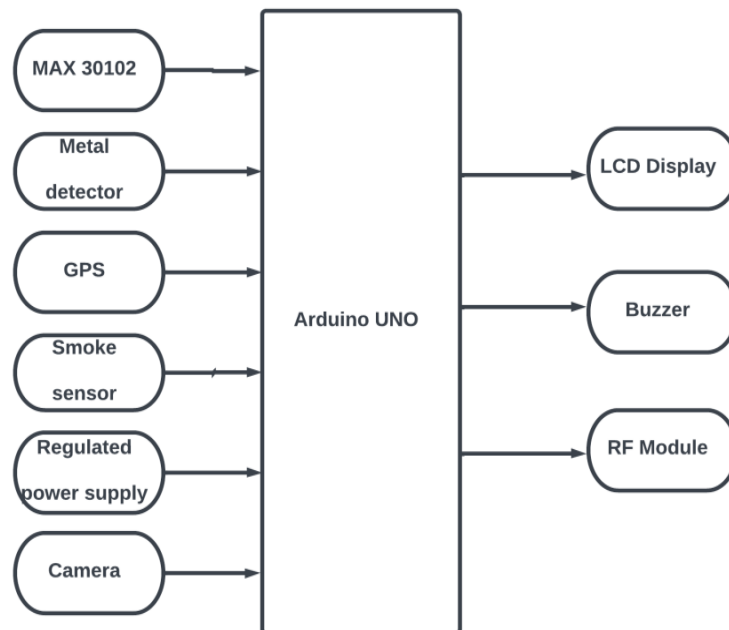
Figure 1: Module 1

Module 2

The module at the base station comprises of LCD display, buzzer, voice, video. The data monitored at the soldier is transfer to the base station through RF module. The LCD display allows to expose the values monitored by the sensors at base station. The buzzer is used to rise alert in the base station based on the sensor's values noticed at the soldier. Camera provides continuous live video monitoring of soldier surroundings.

Voice assistance provides information about the soldier in form of voice. Module at the base station is connected to the laptop or computer for providing the voice assistance and video.In these modules is continuously observe the health of the soldier make immediate action which makes an alert to save the soldier life so it is helpful to save the life of soldier. the system includes alerting system to make rise in the base station with help of buzzer and notify through voice assistance.
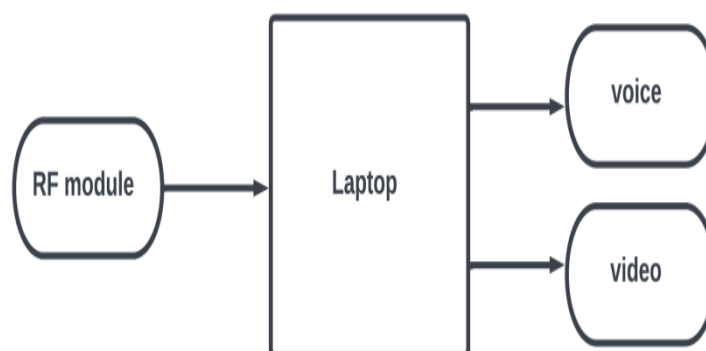
Figure 2: Module 2

TYPES OF SENSORS AND RANGES

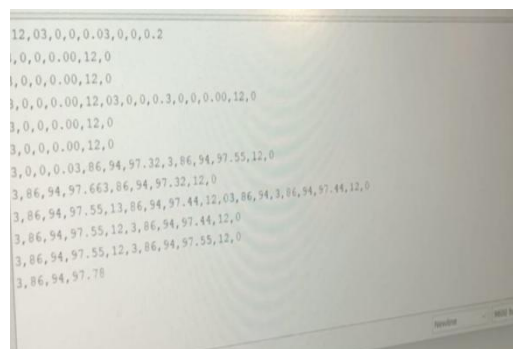| S.NO	TYPES OF SENSORS AND RANGES		
	Sensors	**Range**	**Crossed range**
1		55°C to +150°C	100F
2	Temperature sensor	72	90
3	Heartbeat sensor	100	<80
4	Oxygen analyzer sensor	200 to 10000ppm	>500ppm
5	Smoke sensor	0	1
	Metal detector sensor		

RESULT

Fig.1 LCD Display Values

Fig.2 Output of sensors

Fig.3 GPS Location Tracking

CONCLUSION

This paper reports an IOT based system for Real-Time Analysis of Health Monitoring and Alerting System for Soldiers Liberation. In this we use Arduino board which is low-cost purpose. This technology can be helpful for Soldiers if there are any abnormal changes are appeared in few positions during the battle field, in that case it is easily communicate anywhere with the base station using GPS tracker to detect the exact location and their vital health parameters, which provides security and safety for soldiers were placed in a gadget which is a wearable tool. When the parameters of threshold value cross it give's information to control room with help of RF. In a wearable jacket there is camera which shows the live video of soldiers. We are using solar panels to give power supply for battery. This system is useful for military for better communication during any fusion of battle field. We conclude that it develops the communication between soldier and control room whenever in need.

FUTURESCOPE

For future increment we can develop as artificial intelligence. Rf module having only limited range by this we can change into lora module it gives long distance range.

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