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Soldier Tracking and Health Indication System with Environmental Analysis

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Abstract— The soldier plays a vital role in nations security. Many times the soldiers become lost or injured. So it is important to make a system which will help in such situation. This project gives the ability to track the current position and gives the current health status of the soldier using gps and biosensors .So that the rescue operation become easier. With the alert feature to give instructions becomes easier. The camera features adds the advantage of real time video of the site, so the analysis of the site at base station becomes more convenient. This project continuously monitors the health status (body temperature and heart rate)of the soldier and transfer the data wirelessly at base station server using zigbee technology. The gps sensor gives the latitude and longitude so to find the direction becomes easier. The voice instruction module and wireless camera helps the soldier in warfare. So by using this system we are trying to improve the security of soldier and giving additional equipments to the soldiers increasing their power in war.
Keywords— AVR, Tracking, GPS, Biosensors, Camera, Zigbee.

I. INTRODUCTION

The soldiers are the backbone of the nation's security ,day by day they are using more and more advanced technologies .So it was a challenge to developed a system that can be used by the soldiers so that they becomes more advanced in military operations. The miscommunication between the soldiers was the major problem. It was difficult to give some instructions to the soldier. It was difficult for the base station unit to guide the soldier to correct path if he lost the battlefield. Survey of the battlefield was the tough challenge for the base unit. By using this system most of the problems are solved which will help the soldiers in many aspects. This system provides the reliable communication between the soldiers and the base station by means of the GPS system and voice instruction kit provided to the soldier unit.

The gps provides the exact position of the soldier so by using voice instructions it is too easy to guide the soldier to correct path in battlefield. It was a challenge to provide the rescue operation on time for the soldiers .The biosensors are used to monitor the health status of the soldier .So in case of panic situation the rescue team can be provided on time and at correct location which could save the life of the soldier. To analyze the warfield situation the camera is provided on the helmet of the soldier ,so it will provide a real-time video at the base station. This collected data should transfer at the base station by using zigbee system. This system improves the communication between the soldier and the base station which helps to make success mission.

II. BASIC CONCEPT

In this system we have come with an idea which will provide tracking as well as providing the health status of the soldier. With the additional features like camera and alert system provides the base station more easy way to guide the soldier . This system is consist of two units i.e. soldier unit and the base unit. ATmega16 controls and co-ordinates the working circuit. The soldier unit consist of two biomedical sensors .Temperature sensor LM35 provides the body temperature of the soldier. The heart rate measuring system consist of transmitter worn around the wrist which gives digital output.the decreasing of the heart rate may be of the injury by gunshot or any other cause. The gps module provided on the module calculates the exact location of the soldier and display the longitude and latitude on the lcd display.

The voice instruction kit stores the pre-recorded voice instructions which can be given from the base station. The wireless camera placed on the helmet of the soldier provides the real time video of the warfield directly at the base station. The entire data collected by the controller is transferred to the base station by Zigbee transreceiver wirelessly. The base unit consist of zigbee transreceiver which collects the data transferred by the soldier unit. The server is equipped of the visual basic database which displays health status of the soldier. It has a provision that if the parameters cross the limit fixed previously then it alerts by showing the parameters in red colour. The camera receiver and the tuner are connected to the server directly which provides the real time video.

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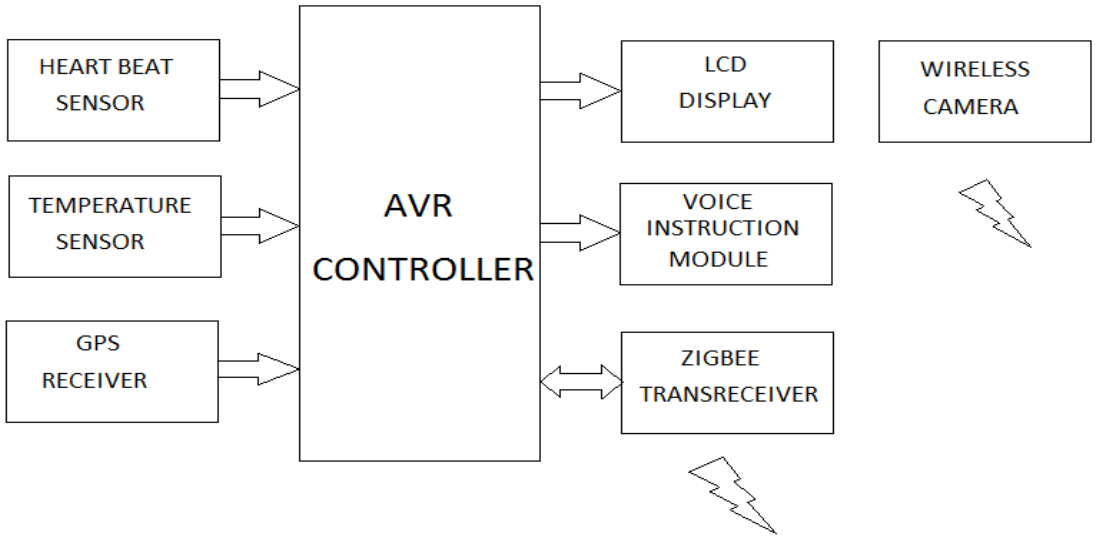
Base Unit



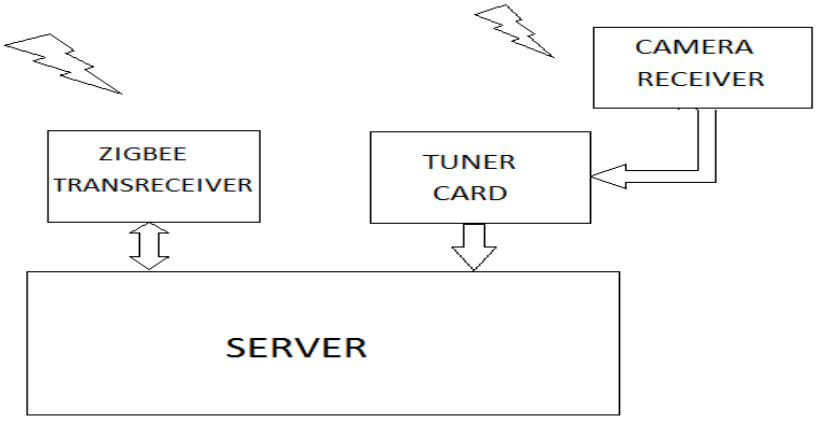
Soldier Unit

III. SYSTEM BLOCK DIAGRAM

Soldier Unit:



Base Unit:



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A. Block Description

1) *ATmega16:* The microcontroller used in this project is an 8 bit high performance microcontroller of Atmel's Mega AVR family with low power consumption. ATmega16 has 16KB programmable flash memory,Static RAM of 1KB and EEPROM of 512 Bytes. ATmega16 is 40 Pin microcontroller there are 32 I/O lines which are devided into 4,8 bit ports designated as PORT A,PORT B,PORT C,PORT D.
2) *Heart Beat Sensor :* The use of heart beat sensor in this project is to measure the heart beat of soldier to know about the physical status of the soldier. The complete heart rate measurement system consists of three different parts; transmitter, receiver and electronics and/or display device that is outputting the heart rate value. The transmitter, worn around the wrist, electrically detects the heart beat and starts transmitting a pulse corresponding to each heart beat.
3) *Temperature Sensor:* The temperature sensor used in this project is to mesure the body temperature of the soldier.The LM35 are Precision integrated circuit temperature sensor whose output voltage is linearly proportional to ^{0}C. The LM35 thus has an advantage their linear temperature sensor calibrated in Kelvin.
4) *GPS Modem:* A GPS modem is used to get the signals and receive the signals from the satellites. The function of GPS modem in this project is used to send the position (Latitude and Longitude) of the soldier from a remote place. The GPS modem will continuously give the data i.e. the latitude and longitude indicating the position of the soldier.
5) *Video Camera:* The video camera is a kind of transducer, which produces electrical energy from light energy. I.e., the input to the video camera is light energy and this light energy is converted into electrical signals. Video converting the complete spectrum of visible light into electrical frequencies. The function of video camera in this project is to provide the real time videos to the base station.
6) *APR 6008:* A voice instruction module APR6008 is used at soldier unit. The pre-recorded instruction are stored in the module. By transmitting signal from base station ,the instructions can be given to the soldier . This module provides facility to give instructions to each soldier.
7) *Zigbee Module:* ZIG-BEE module is used here for wireless transmission between the AVR microcontroller and the server. The function of the ZIG-BEE module at this end is to receive information about location of soldier ,heart rate,body temperature to the server. The 802.15.4 standard specifies that communication can occur in the 868-868.8 MHz, the 902-928 MHz or the 2.400-2.4835 GHz Industrial Scientific and Medical(ISM) bands.
8) *LCD Display:* The LCD display is used to display the parameters measured by different sensors , such as temperarure sensor, heart beat sensor and gps module .LCD used here is 16 x 2 LCD having 16 pins.
9) *Server Unit:* The server is equipped with software called Visual Basic 6.0. This creates a data base that contains information about the soldier. Server is used to monitor the status of the soldier. And if there is any abnormality in the status of soldier it indicates it in red colour.

IV. RESULTS

Body Temperature: 30-35 ^{0}C

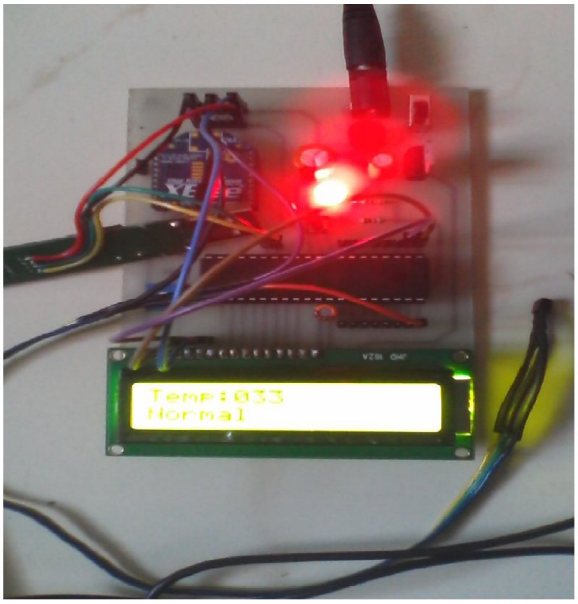
Field	Example	Description
Message ID	$GPLL	GLL protocol header
Latitude	1837.0807	ddmm.mmmm
N/S Indicator	N	N:North or S:South
Longitude	7354.9194	ddmm.mmmm
E/W Indicator	E	E:East or W:West
UTC Time	170221.487	hhmmss.sss
Status	A	A: Data valid or V:Data invalid

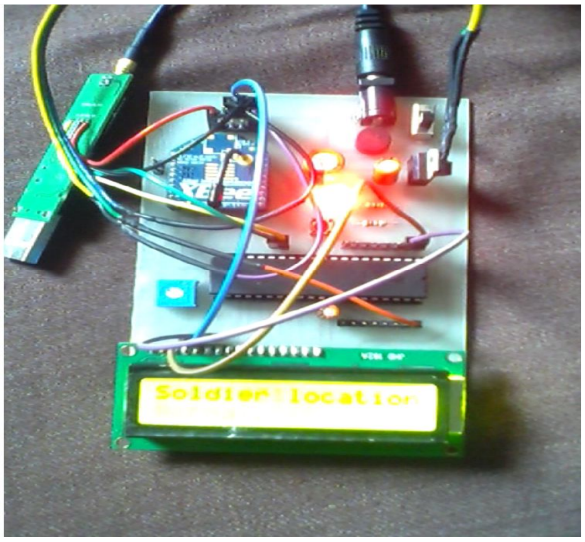
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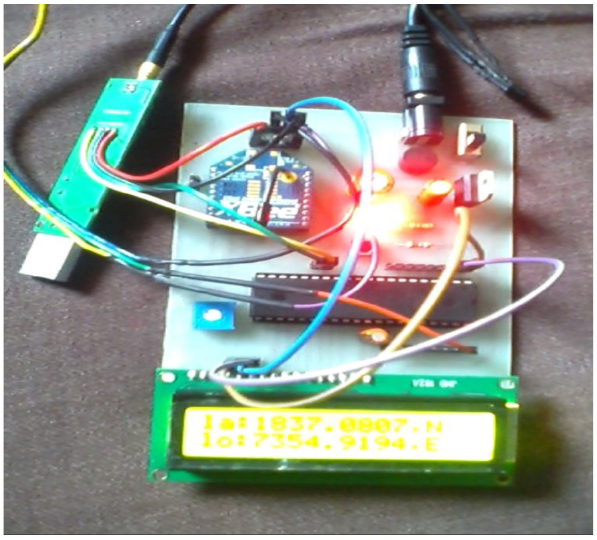
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V. HARDWARE RESULTS









VI. CONCLUSION

The "SOLDIER TRACKING AND HEALTH INDICATION SYSTEM WITH ENVIONMENTAL ANALYSIS" is an effective security and safety system which is made by integrating the advancements in wireless and embedded technology. It helps for a successful secret mission. This system can be used in critical conditions. By implementing this system we can improve the security of our country this also help to improve the safety of the soldier. This system also helps to provide real time video information. Using this system we can reduce casualties of war.It also helps to giving critical information's and warnings to the soldiers and can apply more of them to the current weak locations. This strengthen the defense system.

VII. ACKNOWLEDGMENT

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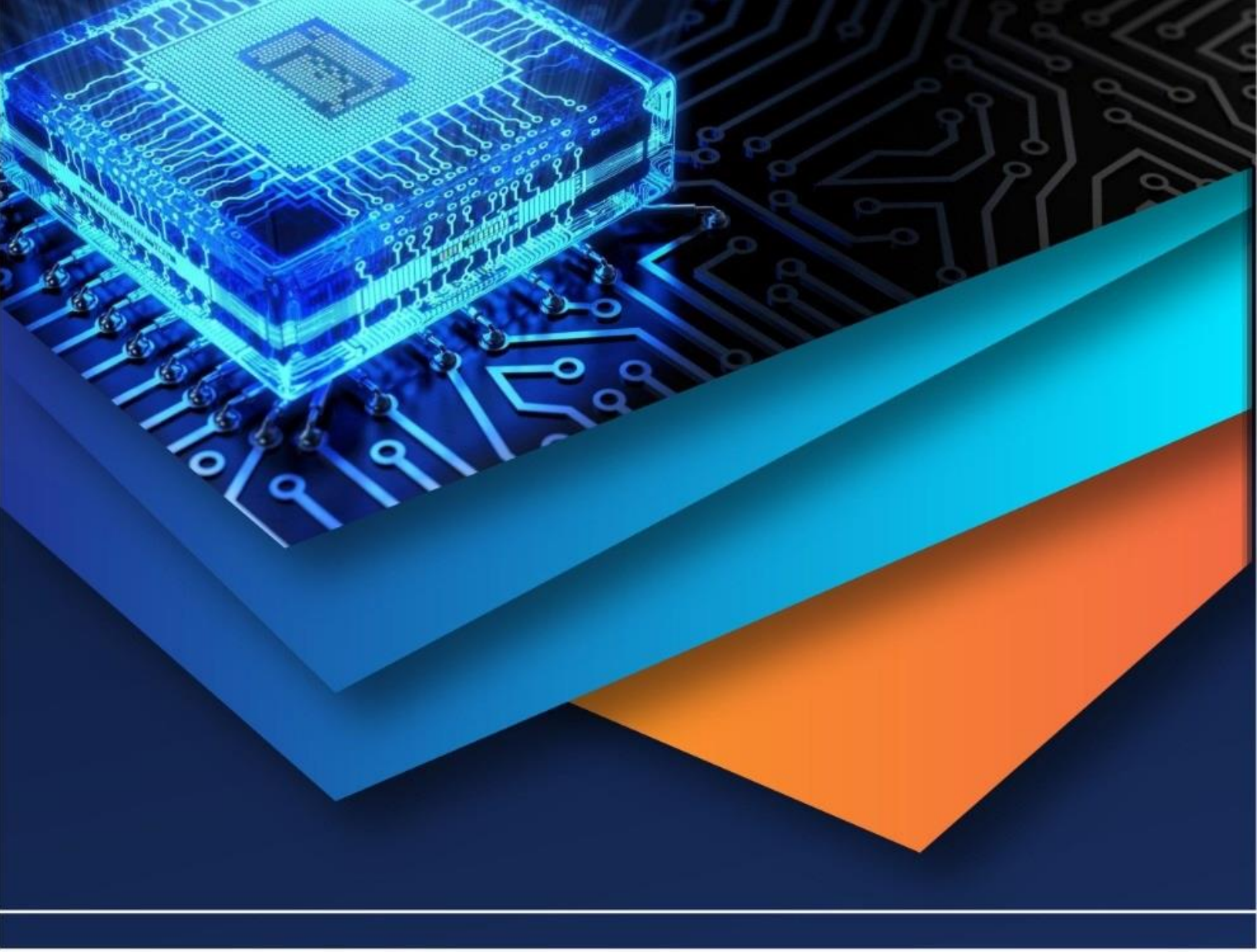
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