PULSE MONITORING AND EMERGENCY SYSTEM

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Abstract : The advancement of sensing technologies, wireless communication technologies and miniaturization makes it possible to develop smart systems and necessary help can be provided in times of emergency. For this purpose there is need to have a system that would help human to alert their dear ones in case of emergency. The main objective of the project is to design an Emergency System for Human being to make their life easier and secure also. The first part in this system consists of a button which can be pressed by the human, when human is in problem or when a person feels insecure. As the button is pressed by the person, the ATmega328 microcontroller gets the command and with the help of GPS module sends emergency message using GSM to the registered mobile number. In Second part a pulse sensor which senses the pulses of a person if the pulses rise above the threshold level then the emergency message is send. In the last part, to make this system more efficient and reliable we are using a voice module which will design using MATLAB software.

Keywords - **ATmega328 Microcontroller, Pulse Sensor, GSM and GPS module, MATLAB.**

I. INTRODUCTION

In today's world, human safety becomes an important thing. There had been many situations and incidences where human safety becomes a major issue. The device mainly consists of microcontroller ATMega328 which programmed using the ARDUINO programming language. The microcontroller interfaced with GPS, GSM and Pulse Sensor. The main Working of this project is that anytime a person senses danger and medical help, the person has to do is that hold on the button of the device. Once the device is activated it tracks the place of a person using GPS and sends emergency messages using GSM, to already registered mobile number. By pressing switch person also get help as well as through voice module by saying the HELP word location and message send through GPS and GSM. One of the major factor of this project is some of people has health related issues. Sometime they did not get proper medication on time. In some situation it might leads towards the death that person if did not get any kind of help from any one. For this the Pulse sensor checks the pulse of person and in abnormal health situation the device also sends Current GPS location to relatives in form of SMS. This safety device works for self-defense and prevention of crime as well. This system plays a major role by providing human a safe environment in all situations.

II. LITERATURE SURVEY

Paper [1], Proposes descriptive details about the design and implementation of prototype for an electronic gadget which has the potential to serve as a safety band. The women safety device incorporating GSM, GPS and a health monitoring. In which ATmega328, Emergency button, Buzzer, GPS, GSM and a pulse sensor is used. The main advantage of the system is that the device is small and easy to carry. Due to the use of buzzer criminal get alert of that victim have any system with him. To make this system reliable it should include a voice recorder.

Paper [2], proposes a quick responding mechanism that helps women during trouble. The system includes women security having GPS and GSM. In which Arduino, GPS, GSM, LCD technology is used. In future, system can be interface in the camera for capturing image and recording live video also. Paper [3], proposes a women safety device is successfully able to fetch heartbeat and temperature reading of women's body where Atmega328, GPS-GSM, Shock, Siren and LED is used. Sometime use of Shock can harm victim also. Further an android app can be developed for women safety and security purpose.

Paper [4], proposes a system which is based on human intervention which collect images, send the messages and streams live video to the controlled room for the security. The system is design using ARM7 microcontroller and can also be use as an alert system during medical emergencies. It consist of arm processor camera flex sensor and accelerometer. This system can improve for future scope for military application. It can be incorporated with small device which provide electric shock to person who tries to attack and also gives time for the victim to react.

Paper [5], proposes a device is more like a safety system in case of emergency, this device can fitted in a jacket. It is an easy to carry a device with more features and functions. The main purpose of device is to intimate the parents and police about the current location of women. Self-defense system is developed using PIC16F877, GSM, GPS, Speech circuit. This design will deals with most of the critical issues face by the women and will help them to be secure. This system is helps to decrease the crime rate against women.

Paper [6], proposes a complete working model using a ARM7. It include the study of GSM-GPS modems using sensor this system will help it users in difficult situations. This system would be highly sensitive and easy to handle. It's quick action response will provide safety and security to individual user.

Paper [7], proposes a smart device which is having a combination of multiple components basically a wearable smart device which continuously communicates through the internet with a smart phone. Technology used Microcontroller temperature sensor, pulse sensor, Bluetooth, GPS, SMS Gateway.

Paper [8], proposes a system architecture for a smart health care based on GPS-GSM technologies consisting of miniaturized body sensor units which can measure bold pressure, heartbeat rate and body temperature and communicate the in cases of extra ordinary behavior entities.

Paper [9], proposes a system which ensures complete women safety during public transport and system provides self defense to the women by giving shock to the attacker and by GPS we can find the position of women in the form of longitude and latitude.

The system is a protective kit for human being, consisting of Arduino, GPS-GSM, Shock generator with the help of software modification system become more reliable.

Paper [10], proposes a smart system to monitor patient current health condition as a smart health care system based on the widely spread available technologies namely GSM and GPS. The objective is to provide effective system model that will track, trace and monitor patient vital readings in order to provide efficient medical service in time.

Paper [11], proposes an Arduino application is used to find the location and send the location to the group f people to stored in the phone, SOS message, track your phone. Design of women safety device and application where ARM controller, GPS-GSM, Bluetooth, Android application technology is used. By using further research and innovation it can be used as wearable device.

Paper [12], proposes a new model for women security in public places which aims to provide the hundred percent safe environments. The proposed system provides tool for intrusion detection The proposed system is intelligence system for security of human being, which is android app based having SOS button, Voice recognition system and spy camera detection. This device works without internet connectivity.

III. PROPOSED SYSTEM

The main concept of this project is to developed and biomedical monitoring and an Emergency system using voice module. Therefore proposing the user friendly architecture using MATLAB software for voice purpose makes system so reliable and efficient to all the age group of human being. This project is an attempt to solve a health care problem and the emergency situation which is currently society facing.
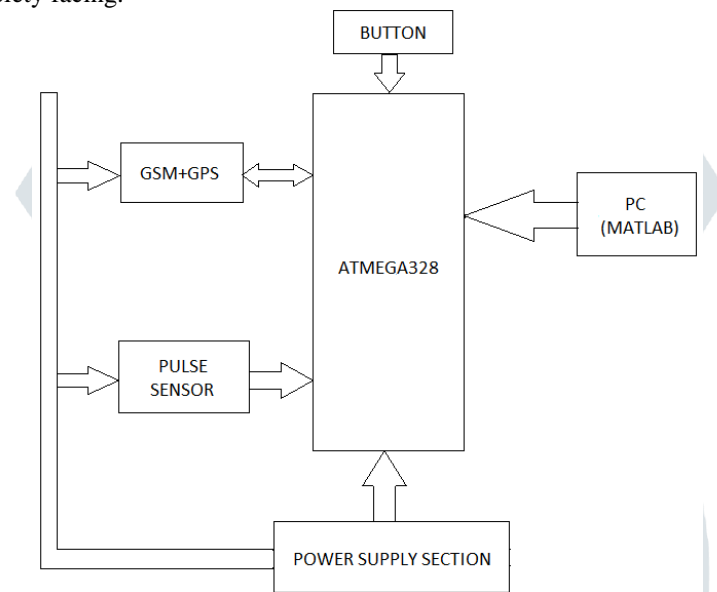

Fig (1): Block Diagram

ATmega 328 Microcontroller

The Atmel AVR core combines a rich instruction set with 32 general purpose working registers. The ATmega328/P provides the following features: 32Kbytes of In-System Programmable Flash with Read-While-Write capabilities, 1Kbytes EEPROM, 2Kbytes SRAM, 23 general purpose I/O lines, 32 general purpose working registers, Real Time Counter (RTC), three flexible Timer/Counters with compare modes and PWM, 1 serial programmable USARTs , 1 byte-oriented 2-wire Serial Interface (I2C), a 6- channel 10bit ADC (8 channels in TQFP and QFN/MLF packages) , a programmable Watchdog Timer with internal Oscillator, an SPI serial port, and six software selectable power saving modes The ATmega328/P is supported with a full suite of program and system development tools including: C Compilers, Macro Assemblers, Program Debugger/Simulators, In-Circuit Emulators, and Evaluation kits. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1 MIPS per MHz.

GPS+GSM

SIM808 module is a GSM and GPS two-in-one function module. It is based on the latest GSM/GPS module SIM808 from SIMCOM. It has high GPS receive sensitivity with 22 tracking and 66 acquisition receiver channels. The module is controlled by AT command via UART and supports 3.3V and 5V logical level.

Pulse sensor

It is an Open Source heart rate monitor which considered as a PPG device used to monitor the non-invasive heart rate. It measures the real-time heart beats and calculates BPM with the aid of algorithms implemented by ATMega328.The Pulse sensor converts the physical PPG into electrical signals. The sensor outputs a raw signal of analog voltage fluctuations amplifies it and normalizes the wave at V/2. With every beat of the heart, a pulse wave travel along all arteries to the tissues where the Pulse Sensor is attached.

Power Supply

To make the DC power supply of 5volt we used step down transformer, bridge circuit, filter circuit and finally fixed voltage regulator. In this system we used step down transformer in which primary voltage is greater than secondary voltage. In this

system we used 5-0-5 step down transformer. So at the transformer output we got 5 volt AC. Then we used bridge circuit whose job to perform to convert AC into pulsating DC. Then filter is used to remove the noisy pulses and convert pulsating DC into pure DC.

IV. RESULTS

In this paper, we have discussed various systems and techniques that can be used for an emergency purpose. After, observing all the situation we proposed a system from which we get simulation result for system. Simulation result is as follow:
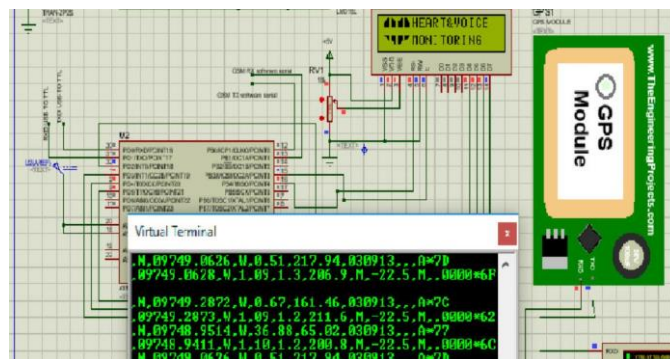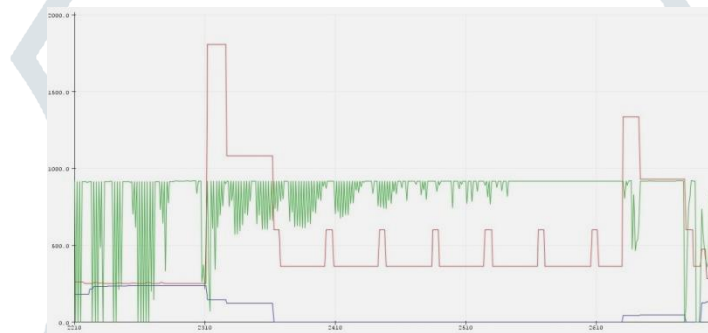

Fig (2): Simulation of GPS

Fig (3): Simulation of Pulse Sensor

Abbreviations

GSM- Global System for Mobile
GPS- Global Positioning System
MATLAB- Matrix Laboratory

V. FUTURE SCOPE

- In future as the technological changes or new requirement from user to enhance the functionality of product may requires new version to introduce. Although the System is complete and working efficiently, new modules which enhance the system functionality can be added without any major changes to the entire system. Which are as follows: To gather the evidences of crime for this purpose, the system can be interface with the camera and voice recorder and also by adding the electric shock it gives time for victim to react. That can be improved for military application.
- By Interfacing System with Smart Phone Android app can be developed which helps to make the system more reliable. This system can be implemented as a portable device. The system can be made more reliable by using cloud to update the data continuously. Wireless technologies cloud can be used to avoid wired connections which somehow limit the patient mobility.

VI. CONCLUSION

The Proposed system is designed to present sustainable medical interventions at manner time and for emergency situations, by a smart system which is simple, using worldwide technologies, with a real time feedback. The design can improve quality of health services and ensuring that those who need urgent care get it sooner. In our design we did a modification in which we are using a voice module which will work with help of MATLAB software. This system would be highly sensitive and easy to handle. Its action response will provide safety and security to individual user. Thus, we are designing a system that will ensure the security of people which is one of the major issues now a day.

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