

DESIGN AND IMPLEMENTATION OF PATIENT HEALTH MONITORING SYSTEM

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ABSTRACT

In this paper the main objective is to design and improve a patient monitoring system. One main area of research that has seen adoption of the technology is the healthcare field. The monitoring system can be used only when the patient is lying on bed and these systems are huge and only available in the hospitals. The proposed system is used in any where by patients and focuses on monitoring heartbeat and temperature and detect heart attack if occurs. In the event of a health problem, a text message will be sent and any family member. This paper was implemented by using Arduino, temperature sensor and heartbeat sensor.

KEYWORDS: Arduino, SMS, Temperature sensor, Heartbeat sensor.

I. INTRODUCTION

Healthcare systems are established to meet the health needs of target populations. Their exact configuration varies between national and subnational entities. In some countries and jurisdictions, health care planning is distributed among market participants, whereas in others, planning occurs more centrally among governments or other coordinating bodies. The system which we proposed has the quality of detecting heart attacks with the help of monitoring the heart rate beat based on GSM network. This system is a wearable device which can be placed on the patient's wrist. It contains a sensors that helps to monitor the heart rate and temperature therefore we can detect heart attack occurrence. [1] This idea is to design an electronic circuit to measure the heart pulse to monitor the change impulse to detect the heart attack before it occurs .The use of sensors detects the conditions of the patient and the data is collected and transferred using a microcontroller. Doctors and nurses need to visit the patient frequently to examine his/her current condition. In addition to this, use of multiple microcontroller based intelligent system provide high level applicability in hospitals where a large number of patients have to be frequently monitored.[2]

II. METHODOLOGY

In this system we'll use smart sensors (heartbeat , temperature) connected to Arduino to track the status which is in turn interfaced to an LCD display. Also we have GPS to detect the patient location. Finally we will use GSM network to send SMS (contain patient's heart rate, body temperature and location.) to emergency and relatives phone.



Fig-1: Block Diagram of Proposed System

III. CIRCUITS COMPONENTS

This section contains the details of the components that used in the system.

a) Microcontroller

A Microcontroller is a compact integrated circuit designed to govern a specific operation in an embedded system. A typical microcontroller includes a processor, memory and input/output (I/O) peripherals on a single chip.[3]

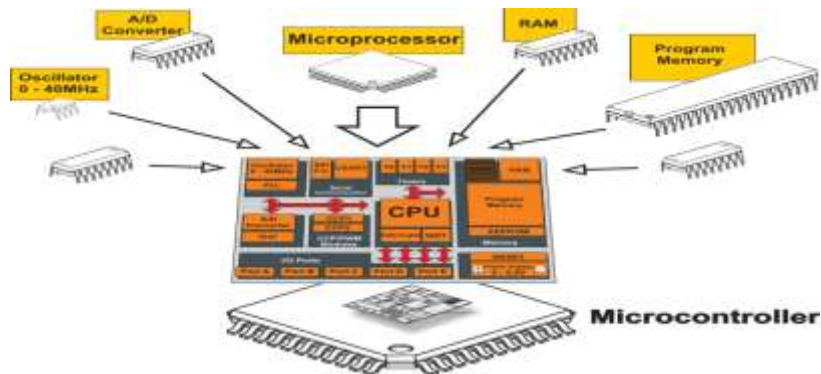


Fig-2: component of microcontroller

b) GSM Module

GSM communication modem; it is refer for global system for mobile communication is the world's most popular standard for mobile telephony systems. The GSM Association estimates that 80% of the global mobile market uses the standard. GSM is used by over 1.5 billion people across more than 212 countries and territories.



Fig-3: GSM Module

c) Heartbeat Sensor

The heartbeat sensor is based on the principle of photo plethysmography. It measures the change in volume of blood through any organ of the body which causes a change in the light intensity through that organ (a vascular region). In case of applications where heart pulse rate is to be monitored, the timing of the pulses is more important. The flow of blood volume is decided by the rate of heart pulses and since light is absorbed by blood, the signal pulses are equivalent to the heart beat pulses. [4]



Fig-4: Heartbeat sensor

d) LCD Display

A liquid crystal display is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). Liquid crystal display screen works on the principle of blocking light rather than emitting light. LCD's requires backlight as they do not emits light by them.

e) LM35 temperature sensor

LM35 is a precision Integrated circuit Temperature sensor, whose output voltage varies, based on the temperature around it. It is a small and cheap IC which can be used to measure temperature anywhere between - 55°C to 150°C. It can easily be interfaced with any Microcontroller that has ADC function or any development platform like Arduino.[5]

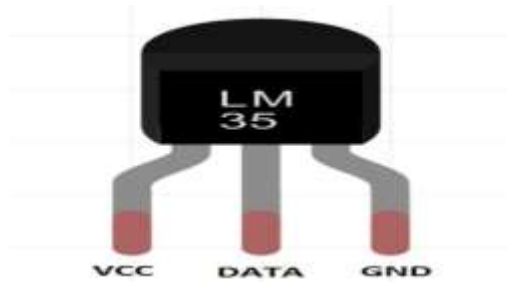


Fig-5: Temperature sensor

f) GPS Module

The GPS, or (GLOBAL POSITIONING SYSTEM) , is a constellation of between 24 and 32 earth orbit satellites that transmit precise radio signals, which allow GPS receivers to determine their current location, the time, and their velocity., GPS module are small, light weight and inexpensive. They're also pretty easy to use.

IV. RESULT

The result of proposed system was simulated by proteus, proteus software a great electrical suite for circuit simulation purposes.

a) Case One

The Results was achieved are enrolled below in Figures according to the tests performed in simulation.

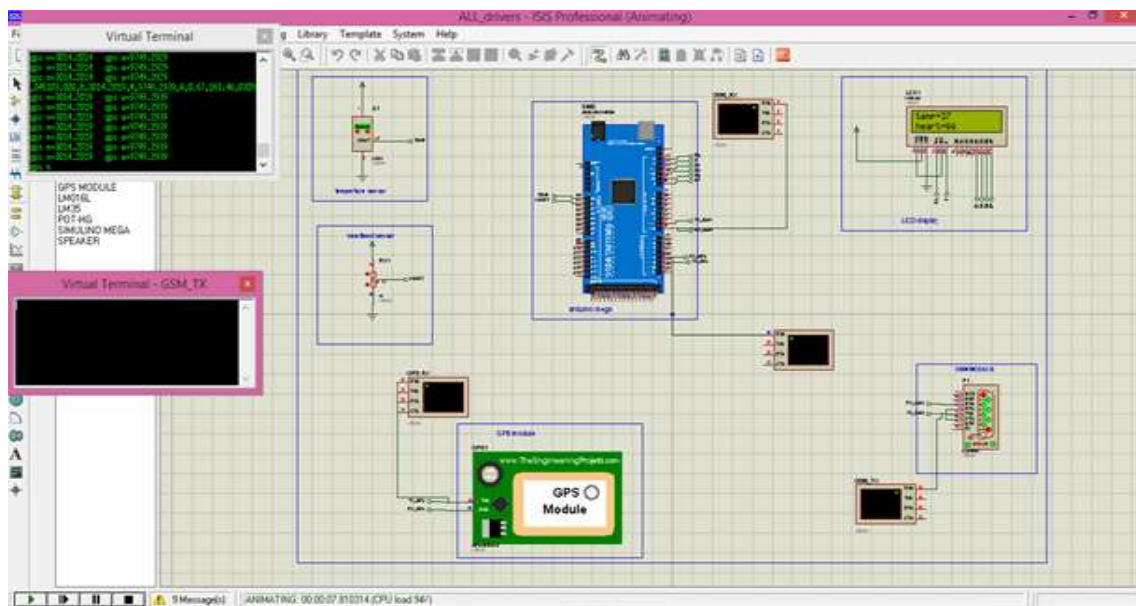


Fig-6: Normal Heartbeat and Body Temperature

This figure Show us the first case in the system when the patient heartbeat in normal (60-100) bpm and normal temperature .In this case the GSM module is not sending SMS to emergence number or patients Relatives.

b) Case Tow

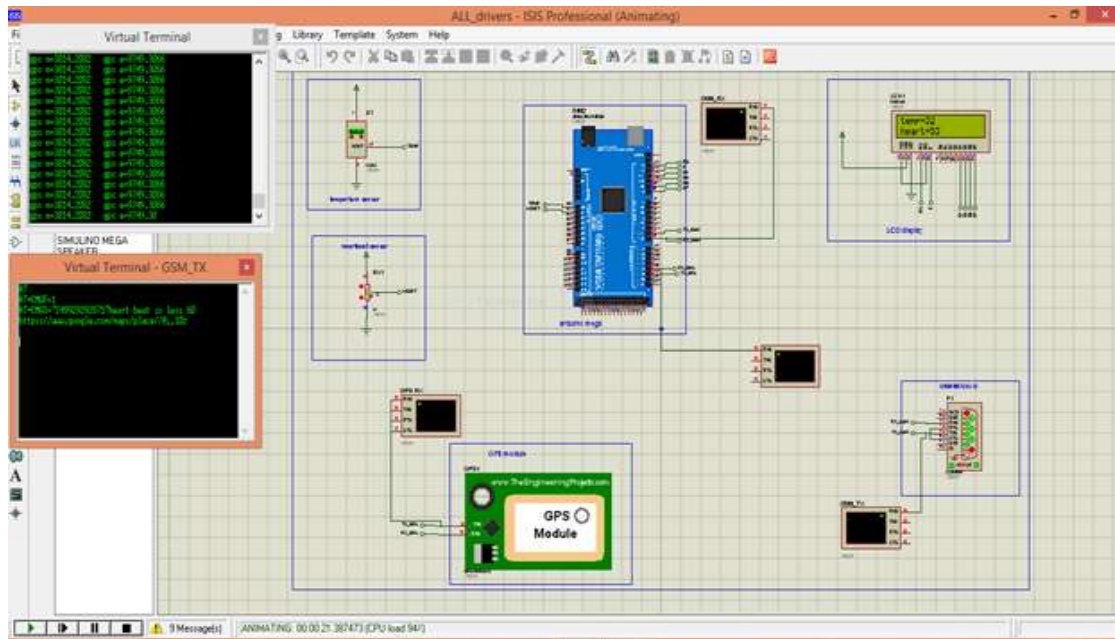


Fig-7: Decreasing Heartbeat and Body Temperature

This figure Show us the Second case in the system when the patient heartbeat is less than normal (<60)bpm or temperature more than 38°.In this case the GSM module is sending SMS to emergence number or patient's Relatives. Including the Heartbeat is less than 60 and a link for patient's Location.

c) Case Three

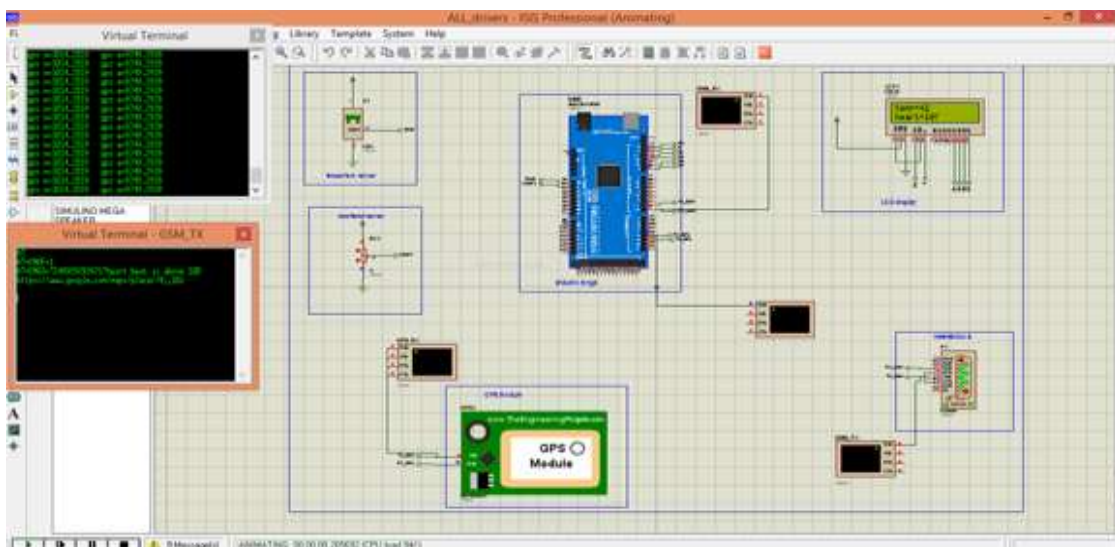


Fig-8: increasing Heartbeat and Body Temperature

This figure Show us the Third case in the system when the patient heartbeat is greater than normal (>100) bpm or temperature more than 38°.In this case the GSM module is sending SMS to emergence number or patient's Relatives. Including the Heartbeat is above 100 and a link for patient's Location.

V. CONCLUSION

As we know Body Temperature and the Heartbeat are very important signs to healthcare of human being and it difficult to keep track on abnormalities in heartbeat count for patient manually. So the system was designed to monitoring temperature and heartbeat of human. When arrhythmia (Heart attack) occurs, it is reported via SMS to the indicated mobile number through GSM technology. The SMS include the Heartbeat rate and patient's location via GPS Technology.

By the end of this paper we were able to keep the patients life from sudden death. and patient can go anywhere without being confined to stay at home or hospital.

VI. REFERENCES

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