

Web-based Patient Monitoring System

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Abstract:

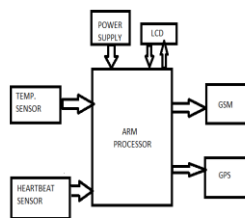
Nowadays, real time monitoring of the physical conditions of a patient is a challenge faced by the medicos. For critical patients, human intervention is frequently needed. The main theme of Web Based Patient Monitoring System is to continuously monitor patient's health parameters like temperature and heartbeat. This Patient Monitoring System measures temperature and heartbeat in real time and in case of alert, sends an SMS which contains the information about the temperature and heartbeat of the patient along with his current location in terms of latitudes and longitudes.

Keywords: GSM, GPS, Sensors, Arm Processor

I. INTRODUCTION

Monitoring Patients at critical stages has become a problem in modern and busy world. Patient Monitoring System can provide timely warning to the attendants of the patients and doctor. Patient Monitoring System aims in sending alert messages in emergency times i.e. when a person is alone at home or travelling and his heartbeat or body temperature rises or lowers then an alerting message will be sent to the mobile. The message consists of location of that person also.

II. BLOCK DIAGRAM



BLOCK DIAGRAM OF PATIENT MONITORING SYSTEM.

III. MODULES

In Patient Monitoring System, we use the following modules for monitoring the health parameters of a patient:

- Power Supply
- GSM Module
- GPS Module
- Heartbeat Sensor
- LM35 Temperature Sensor
- LCD Display

A. Power Supply:

This section needs two voltages viz 12V and 5V as working voltages. Most digital circuits and processors need a 5V supply. To use these parts, we need to build a regulated 5V source. Usually we start with an unregulated power supply ranging from 9V to 24V DC. To make a 5V power supply, we use an LM7805 voltage regulator IC.

B. ARM Processor:

ARM is computer processor based RISC architecture. A RISC based computer design approach means that ARM processor requires significantly fewer transistors than typical processors in average computers. This approach reduces cost, heat and power use. The ARM architecture is the most widely used architecture in mobile devices and most popular 32 bit in embedded systems. ARM processor features include:

- Load/Store Architecture
- An Orthogonal Instruction Set
- Mostly Single Cycle Execution
- A 16x32 bit register
- Enhanced Power Saving Design

C. GSM Modem:

GSM shield (SIM 900a): The SIM900 which is a complete Quad-Band GSM/GPRS solution comes in SMT module which can be embedded in customer applications. Featuring an industry standard interface, the SIM900 delivers GSM/GPRS 800/900/1800/1900 MHz performance for data, voice, SMS in small form factor and with low power consumption. SIM 900 can fit almost all the space requirements in the M2M application with dimension of 24mmx24mmx3mm.

D. GPS Module:

This is a GPS Receiver (5V serial) with high gain having 4 pin 2.54mm pitch strip. The third generation POT (Patch Antenna On Top) is used by the receiver for the GPS module. It can be interfaced with normal 5V ARM7 with the help of in built 3V-5V converter. The interfacing is made easier with the help of low pin count (4 pin) strip. This standalone 5V GPS module does not require external components. It consists of internal RTC backup battery and can be directly connected to the USART of ARM7. The current latitude, longitude are provided by the module.

E. LM35 Temperature Sensor:

The LM35 series are precision integrated circuit. LM35 temperature sensor does not require any external calibration or trimming to provide the typical accuracies. The LM35 series is available packaged in Hermetic TO-46 transistor package, while the LM35C, LM35CA and LM35D are also available in the plastic TO-92 transistor package.

F. Heartbeat Sensor:

The sensor consists of a super bright red LED and light detector. The LED needs to be super bright as the maximum light must pass spread in the finger and detected by the detector. Now, when the heart pumps a pulse of blood through the blood vessels, the finger becomes slightly more opaque and so less light reaches the detector. With each heart pulse the detector signal varies. This variation is converted to electrical pulse. This signal is amplified by an amplifier which outputs analog voltage between 0 to +5V logic level signal. It works on the principle of light modulation by blood flow through finger at each pulse.

G. LCD Display:

LCD is a flat panel display that uses the light modulating properties of liquid crystals. LCD is used to display arbitrary images or fixed images with low information content. In Patient Monitoring System, when heart beat or body temperature rises beyond the threshold, the corresponding temperature and heartbeat rate along with the current location of the patient are displayed on LCD and this information is sent to the registered mobile number via GSM.

IV. WORKING AND SYSTEM DESIGN

In our proposed system various sensors are used to continuously monitor critical parameters of the patient and report to the doctor for timely response in case of critical situations. The sensors are attached to the body of the patients without causing any discomfort to them. Here we get the alerting message from the GSM modem (SMS Message) and the location of that person can be found with the help of GPS. GPS is

capable of identifying the location at which the patient was present in terms of latitudes and longitudes. The GPS receiver gets the data from the satellites. The functioning of this device is based on the truth that blood level circulation during expansion and contraction of heart which can be sensed by the heartbeat sensor. Depending on the rate of circulation of blood per second the heartbeat rate per minute is calculated. The ARM processor takes the responsibility of sending alert messages through GSM modem whenever it is necessary.

V. ADVANTAGES

- Provides better access to health care to patients.
- Effortless surveillance of medicos over patients.
- It can be put to multiple uses over a number of cases in hospitals.

VI. FUTURE SCOPE

Thus the proposed system on which project work has been carried out opens vistas of applicability especially in multi-specialty hospitals where many number of critical care units are present.

VII. CONCLUSION

The present patient monitoring systems require constant vigil by the medicos, however, by implementing a web based Patient Monitoring System, the doctors can measure the physical conditions of the patients with ease. Since it is a continuous monitoring system, the doctor would be able to give clear and best instruction and also within the least time.

ACKNOWLEDGEMENT

The authors would like to thank our project guide Ms. Priya Manhas, Assistant Professor, Department of Electronics and Communication, MIET Jammu to motivate us for this innovative project and also for her support in the overall development of the product.

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