

A SECURE GSM- BASED MODERN HEALTHCARE SYSTEM USING BODY SENSOR NETWORK FOR INMATE

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Abstract: To design the modules which can monitor basic health conditions and give the message alert to the doctor wherein he can prescribe the medicine in the abnormal conditions and temporary medication is made available to the person. The specific goals to monitor health conditions are :

A module to monitor the heartbeat based on counting the pulses. A module to find out the temperature, A module to analyze the breathing capacity of lungs and determine the healthy and unhealthy conditions, A module to check out the ECG waveforms which is displayed on PC.

Keywords: *Micro Controller, GSM, temperature sensor, ECG*

INTRODUCTION

This project uses LPC2148 microcontroller which acts as both input and output. Inputs to the microcontroller are the output results from heartbeat, temperature and lungs analysis. These outputs act as input to the microcontroller and the outputs of microcontroller are displayed on LCD. The pulse sensor is connected to fingertip and uses the amount of infrared light reflected by the blood circulating inside to do just that. ..When the heart pumps, blood pressure rises sharply, and so does the amount of infrared light from the emitter that gets reflected back to the detector and the value is displayed on the LCD. In case of abnormal condition immediately the

message is sent to the corresponding doctor where he can reply back with the temporary medication to save the critical state of the person. The other sensor is to know the temperature where in the temperature rise is manually done by giving external heat to the sensor so that it displays the abnormal condition and then the medicine is received to the person in the case when he is suffering. The way how lungs function is observed from the lungs health analyser where the persons inhales and holds the balls in the tubes. The cc range is given as per the age of a person where in there are switches to select ages of the person before he/she inhales and the case where it differs is displayed as unhealthy condition. The other parameter that is measured is about the heartbeat of the person through monitoring the graphical representation on the pc. The ECG is recorded and displayed on the pc. This is measured by placing the electrodes on the skin where there is connection between the blood that is flowing in the heart and the impulses that are carried by it.

METHODOLOGY

Micro controller: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the

devices being interfaced and communicates with the devices according to the program being written.

ARM7TDMI: ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

WORKING PRINCIPLE

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HARDWARE SYSTEM

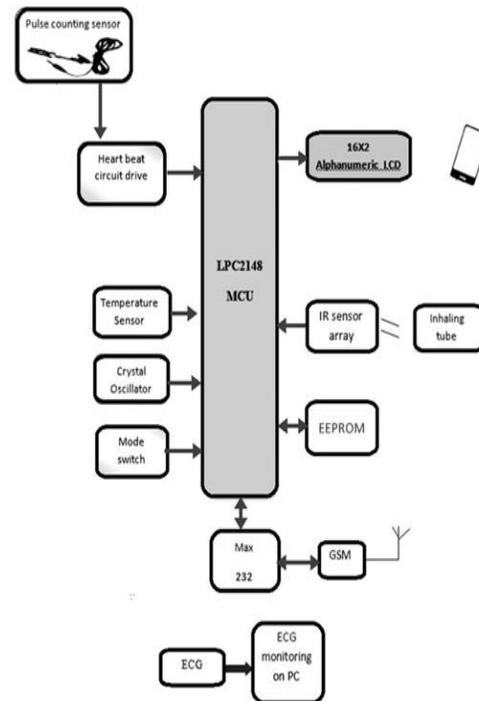


Fig 1: Block Diagram

Liquid-crystal display (LCD) is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can

be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

GSM: Global System for Mobile Communication (GSM) is a set of ETSI standards specifying the infrastructure for a digital cellular service.

The network is structured into a number of discrete sections:

- Base Station Subsystem – the base stations and their controllers explained
- Network and Switching Subsystem – the part of the network most similar to a fixed network, sometimes just called the "core network"
- GPRS Core Network – the optional part which allows packet-based Internet connections
- Operations support system (OSS) – network maintenance



Fig 2: GSM Module

GSM was intended to be a secure wireless system. It has considered the user authentication using a pre-shared key and challenge-response, and over-the-air encryption. However, GSM is vulnerable to different class of attacks, each of them aiming a different part of the network.

Temperature sensor: A thermistor is a type of resistor whose resistance is dependent on temperature. Thermistors are widely used as inrush current limiter, temperature sensors (NTC type typically), self-resetting over current protectors, and

self-regulating heating elements. The TMP103 is a digital output temperature sensor in a four-ball wafer chip-scale package (WCSP). The TMP103 is capable of reading temperatures to a resolution of 1°C.

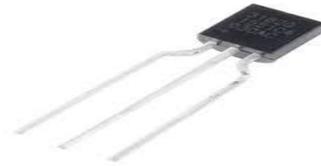


Fig .3: Temperature sensor

ECG Sensor: The electrocardiogram (ECG or EKG) is a diagnostic tool that is routinely used to assess the electrical and muscular functions of the heart. The electrocardiogram (ECG) has grown to be one of the most commonly used medical tests in modern medicine. Its utility in the diagnosis of a myriad of cardiac pathologies ranging from myocardial ischemia and infarction to syncope and palpitations has been invaluable to clinicians for decades.



Fig .4: ECG Sensor

EEPROM: EEPROM (also written E²PROM and pronounced e-e-prom or simply e-squared), which stands for Electrically Erasable Programmable Read-Only Memory, is a type of non-volatile memory used in computers and other electronic devices to store small amounts of data that must be saved when power is removed, e.g., calibration tables or device configuration. When larger amounts of more static data are to be stored (such as in USB flash drives)

other memory types like flash memory are more economical. EEPROMs are realized as arrays of floating-gate transistors. In 1983, Greek American George Perlegos at Intel developed the Intel 2816, which was built on earlier EPROM technology, but used a thin gate oxide layer so that the chip could erase its own bits without requiring a UV source. Perlegos and others later left Intel to form Seeq Technology, which used on-device charge pumps to supply the high voltages necessary for programming EEPROMs.

PC Monitor: The HDMI-VGA cable is attached updated raspberry-pi and the LJ R interface of the cable is attached updated. The face of the character getting captured can be visible on up-to-date. The Raspberry Pi has a HDMI port which you can plug without delay into a display or tv with an HDMI.

IR Tx and Rx: Transmitter and receiver are incorporated in a single housing. The modulated infrared light of the transmitter strikes the object to be detected and is reflected in a diffuse way. Part of the reflected light strikes the receiver and starts the switching operation. The two states – i.e. reflection received or no reflection – are used to determine the presence or absence of an object in the sensing range. This system safely detects all objects that have sufficient reflection. For objects with a very bad degree of reflection (matt black rough surfaces) the use of diffuse reflection sensors for short ranges or with background suppression is recommended.

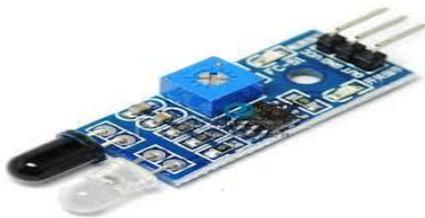


Fig .5: IR sensor

CONCLUSION

The main idea of the proposed system is to provide better and efficient health services to the patients by implementing a networked information cloud so that the experts and doctors could make use of this data and provide a fast and an efficient solution. The final model will be well equipped with the features where doctor can examine his patient from anywhere and anytime. Emergency scenario to send an emergency mail or message to the doctor with patient's current status and full medical information can also be worked on.

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