TELE -HEALTH MONITORING USING DRAGINO

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Abstract-- Now a day's healthcare industry is to provide better healthcare to people anytime and anywhere in the world in a more economic and patient friendly manner. In the present paper the physiological parameters such as Pulse rate and Temperature are obtained, processed using ARM LPC1768 processor and displayed in a MATLAB graphical user interface. If any vital parameter goes out of normal range then alert SMS will be sent to Doctor Mobile. This system reduces costs by enabling in-house monitoring of patients, eliminating the need for utilization of expensive facilities, and reducing the need for transportation of patients to physicians and medical centers.

Keywords- ECG, pulse Rate, Temperature, ARM, MATLAB, DRAGINO

I. Introduction

The electronics technology has entered almost in all aspects of day-to-day life, and the medical field is not exception for that. The need for well-equipped hospitals and diagnostic centers is increasing day by day as the people are becoming more conscious about their health problems. In biomedical fields special units are used, such as intensive care unit or coronary care unit. All of these units are designed to offer the advantage of the low Nurse – Patient ratio and concentration of the equipment and the resources needed; to take care of critically ill or seriously injured units. The medical world today faces two basic problems when it comes to patient monitoring, firstly the need of healthcare providers' present bedside the patient and secondly the patient is restricted to bed and wired to large machines. In order to achieve better quality patient care, the above cited problems have to be solved. As the technologies are advancing it has become feasible to design to horne based vital sign monitoring system to display, record and transmit signals from human body to any other location.

The Dragino is connected to microcontroller through UART. This Dragino works with LUA scripting. It has an Ethernet port through which the data is maintained in the server wirelessly. And this server data can be seen by the doctor when he enters IP address related to patient data. If any parameter goes abnormal then the system will sent an alert SMS to the doctor through GSM modem. Dragino is a low cost device, has full Ethernet and 802.11b/g Wi-Fi capabilities. The goal of the Dragino is to solve the connectivity problems and acts as a server to the system.

II. The Hardware System

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.

ARM Cortex-M3: The LPC1768 are ARM Cortex-M3 based microcontrollers for embedded applications featuring a high level of integration and low power consumption. The ARM Cortex-M3 is a next generation core that offers system enhancements such as enhanced debug features and a higher level of support block integration.The LPC1768 operate at CPU frequencies of up to 100 MHz. The ARM Cortex-M3 CPU incorporates a 3-stage pipeline and uses Harvard architecture with separate local

instruction and data buses as well as a third bus for peripherals. The ARM Cortex-M3 CPU also includes an internal prefetch unit that supports speculative branching

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. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

GSM modem Section: This section consists of a GSM modem. The modem will communicate with microcontroller using serial communication. The modem is interfaced to microcontroller using MAX 232, a serial driver.

DRAGINO: Dragino is a low cost, has full Ethernet and 802.11b/g Wifi capabilities. The goal of the Dragino is to solve the connectivity problem and greatly enhance microcontroller products such as the Arduino, ARM. Dragino has a powerful 180MHz CPU, 8M flash, 16M RAM, Ethernet, Wifi. Applications include remote control of robots, data logging, web applications for data presentation, mesh networking over Wifi and many more.

SENSORS: Sensor modules are used to sense information about the patient. Here temperature sensor is used to sense body temperature of patient, pulse sensor is used to detect heartrate of patient. This information is given to microcontroller and send to doctor through dragino module
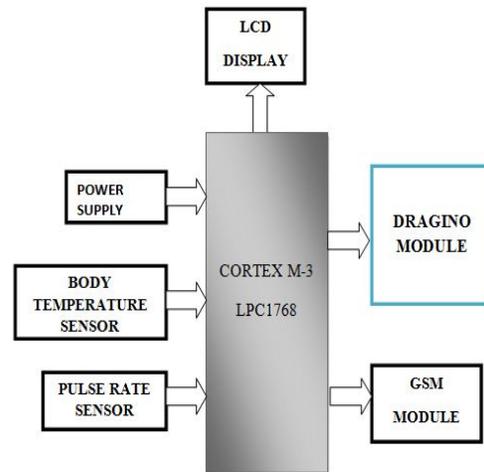
III. Design of Proposed Hardware System

Fig: Block Diagram

The proposed model has the LPC1768 microcontroller as Central Processing Unit. The whole system is interfaced with microcontroller. The GSM modem is serially connected with the controller which is the communication module between Doctor and patient as information is collected through SMS. The body parameters such as temperature and pulse rate are obtained by corresponding sensors, and processed by ARM processor, it will display to the patient on LCD. The Dragino is connected to microcontroller through UART which is a major communication module. It has an Ethernet port through which the data is maintained in the server wirelessly. And this server data can be seen by the doctor when he enter IP address related to patient data. This system reduces costs by enabling in-horne monitoring of patients, eliminating the need for utilization of expensive facilities, and reducing the need for transportation of patients to physicians and medical centers. The system is user friendly and does not require any particular training aside from knowledge of widespread and standard Internet tools. Due to the interactive approach of the system, the physician is also able to make online consultation directly from the software provided on personal computer.

IV. Board Hardware Resources Features

Temperature Sensor: A Thermistor is a type of resistor whose resistance varies significantly with temperature, more so than in standard resistors. The word is a portmanteau of thermal and resistor. Thermistors are widely used as inrush current limiters, temperature sensors, self-resetting over current protectors, and self-regulating heating elements. Thermistors differ from resistance temperature detectors (RTD) in that the material used in a thermistor is generally a ceramic or polymer, while RTDs use pure metals. The temperature response is also different; RTDs are useful over larger temperature ranges, while thermistors typically achieve a higher precision within a limited temperature range, typically −90 °C to 130 °C.

Pulse Sensor:

The sensor consists of a super bright red LED and light detector. The LED needs to be super bright as the light must pass through finger and detected at other end. Now, when the heart pumps a pulse of blood through the blood vessels, the finger becomes slightly more opaque and so less light reached the detector. With each heart pulse the detector signal varies. This variation is converted to electrical pulse. This signal is amplified and triggered through an amplifier which outputs +5V logic level signal.
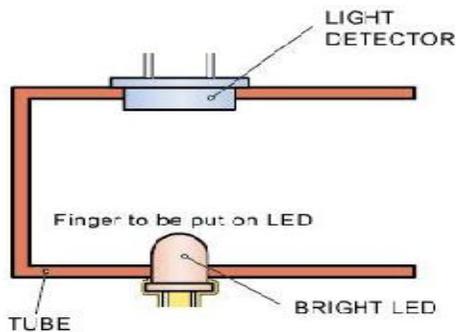

Fig: Pulse Sensor

GSM:

An embedded system is a special-purpose system in which the computer is completely encapsulated by or dedicated to the device or system it controls. Unlike a general-purpose computer, such as a personal computer, an embedded system performs one or a few pre-defined tasks, usually with very specific requirements. Since the system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product. Embedded systems are often mass-produced, benefiting from economies of scale.Global System for Mobile Communication (GSM) is a set of ETSI standards specifying the infrastructure for a digital cellular service. The Mobile Station Roaming Number (MSRN) is essentially an ISDN telephone number at which the mobile subscriber can currently be reached. The MSRN is a temporary number that is valid only for the duration of a single call.
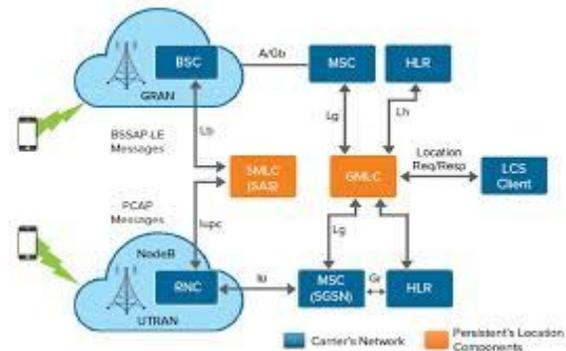

Fig: Architecture of GSM Network

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The dragino is interfaced to microcontroller through UART. The amount of power consumed should also be updated in the server. So we are writing an interrupt handler where it checks for received data from dragino. If the data is received it is updated in the server.

Fig:Dragino Module interior view

V. CONCLUSION

This system reduce costs by enabling in-horne monitoring of patients, eliminating the need for utilization of expensive facilities, and reducing the need for transportation of patients to physicians and medical centers. In future work the telemonitoring application is presented which allows doctor to view his patient's vital parameter remotely and dynamically in a Web page in real time and does not need to have any special requirement on his PC; all he needs is an internet access. For the patient side, it is a horne based Lab VIEW application embedded in a horne PC, during signal acquisition. The alert file is generated in Lab VIEW it will automatically send mail using Email notification application.

VI. REFERENCES

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