International Journal of Research
Available at https://edupediapublications.org/journals
e-ISSN: 2348-6848
p-ISSN: 2348-795X
Volume 04 Issue 14
November 2017

Iot Based Small Health Care Kit

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Abstract: Patient monitoring systems are gaining their importance as the fast-growing global elderly population increases demands for caretaking. These systems use wireless technologies to transmit vital signs for medical evaluation. The aim of the project is to provide a better health care to people from house in more economic and pertinent friendly manner. The need of home based health monitoring system is increased now days because health care cost is increasing exponentially in last few decades. In the proposed home based health monitoring system using android smart phone includes the aspects of acquisition of medical parameters like Body temperature, Pulse rate and ECG. Processing of a collected data using ARM7 (LPC2148) processer and processed data is then displayed on doctors or relatives android mobile phones. Also the data can be displayed on personal computer. The system is utilizing a low cost component to transmit data like ECG to physician for monitoring; diagnosis and patients care at significantly low cost, regardless of patient's location.

Keywords*: LPC 2148, GPRS, ECG. Pulse.*

INTRODUCTION:

In intensive care units, there are provisions for continuously monitoring patients. Their heart rates, temperatures, ECG etc. are continuously monitored. But in many cases, patients get well and come back to home from hospital. But the disease may return, he may get infected with a new Disease, there may be a sudden attack that may cause his death. So in many cases, patients are released from hospital but still they are strongly advised to be under rest and observation for some period of time (from several days to several months).

In these cases, our system can be quite handy. Patient's data (temperature, heart rate, ECG etc.) will be frequently measured and sent to server [1][2]. Period of sending (say every 3 min) can be set. Heat rates can be sent every minute and temperatures can be sent after half an hour etc. But these can be parameterized to ensure that when a patient is normal, not many readings will be sent so that sensors have a longer life-time. But when the patient is ill, readings will be taken frequently and sent to server. Monitoring person learns patient specific threshold. Say the regular body temperature of a patient is 37℃ whereas one person feels feverish if his body temperature is 37℃. By employing an averaging technique over a relatively long time, Observer can learn these thresholds for patients. Using android application, one can view his medical history date wise, event wise etc. android application can perform data mining on a particular patient data to discover important facts. Suppose a person has medium high temperature that starts at evening and lasts till midnight.

If this phenomenon continues for several days, observer can detect this fact and inform to doctors saying "You frequently have short-period fever that may be a symptom of a bad disease. Consult patient immediately". This system can transmit continuously data. Suppose a patient has come back home after cardiac surgery.

If the patient has cardiac problems like arrhythmia, then there will be irregular variation of heart signal. This may occur only once or twice a day. But if system transmits continuous data, such variations will be immediately detected and alerts will be issued. Early detection and diagnosis of potentially fatal physiological conditions such as heart attack require continuous monitoring of patients health following transfer from hospital to home. Studies have shown that 30% of patients with a discharge diagnosis of heart failure are readmitted at least once within 90 days with readmission rates ranging from 25 to 54% within 3 – 6 months [1]. In response to these types of needs, home based health monitoring systems are being proposed as a low cost solution. Such a system consists of physiological data that stores, process and

communicate through a local manner such as smart phones, personal computers. Such systems should satisfy strict safety, security, reliability, and long term real-time operation requirements.

LITERATURE SURVEY

In the previous existing method PC devices used as data acquisition (DAQ) systems we are able to collect vital information about the elderly patients remotely. Existed system which monitors temperature & pulse rate of different patients and immediate action is taken using Bluetooth technology [3].

The Mobile Hub has many attractive features cheaper price, portable, location awareness, inbuilt touch screen , however on the other side it has also significant limitations compared to a full PC hardware like limited CPU power, memory, storage size and external interface connection support, The Mobile Hub is targeting different functionalities compared to the Home Hub solution due to the smaller screen size and fewer hardware interfaces, and it can extend the usability with additional special features, such as mobility, location awareness and small size. Mobile Hub software is capable to run almost all Bluetooth enabled and Android based Smartphone. In a sudden panic situation an alarm can be activated manually (by the patient) or automatically (by e.g. the accelerometer) with the mobile device [4][5]. When an alarm signal initiated the central dispatcher is able to acquire location information (based on GSM/GPRS cell information) immediately [6].

PROPOSED SCHEME

Microcontroller:

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.

BLOCK DIAGRAM:

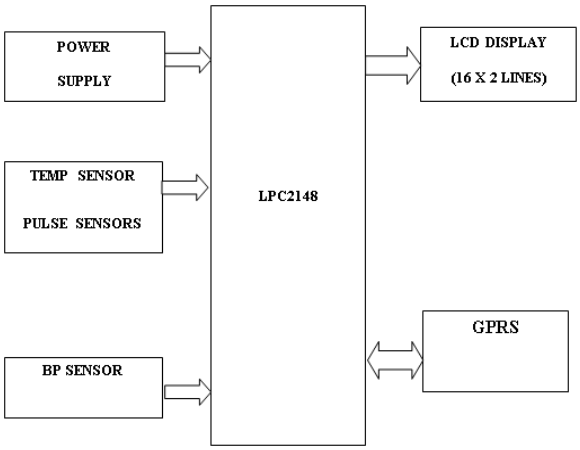

Fig:1: Block diagram

Liquid-crystal display (LCD)

It 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.

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 overcurrent 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:2: Temperature sensor

BP sensor:

Attach to finger and get Analog out from the sensor based on heart beat pulse. You can read the analog output with microcontroller ADC and then plot it or calculate readings like heart beat per minute. It is simple to use and accurate results.

Fig: 3: pulse sensor

Buzzer:

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave ovens, & game shows. The word "buzzer" comes from the rasping noise that buzzers made when they were electromechanical devices, operated from stepped-down AC line voltage at 50 or 60 cycles. Other sounds commonly used to indicate that a button has been pressed are a ring or a beep.The "Piezoelectric sound components" introduced herein operate on an innovative principle utilizing natural oscillation of

piezoelectric ceramics. These buzzers are offered in lightweight compact sizes from the smallest diameter of 12mm to large Piezo electric sounders. Today, piezoelectric sound components are used in many ways such as home appliances, OA equipment, audio equipment telephones, etc. And they are applied widely, for example, in alarms, speakers, telephone ringers, receivers, transmitters, beep sounds, etc.

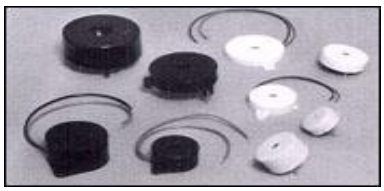

Fig:4: Types of Buzzers

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: 5:ECG Sensor

GPRS:

GPRS (general packet radio service) is a packet-based data bearer service for wireless communication services that is delivered as a network overlay for GSM, CDMA and TDMA (ANSI-I36) networks. GPRS applies a packet radio principle to transfer user data packets in an efficient way between GSM mobile stations and external packet data networks. Packet switching is where data is split into packets that are transmitted separately and then reassembled at the receiving end.

Fig:6: GPRS module

GPRS supports the world's leading packet-based Internet communication protocols, Internet protocol (IP) and X.25, a protocol that is used mainly in Europe. GPRS enables any existing IP or X.25 application to operate over a GSM cellular connection. Cellular networks with GPRS capabilities are wireless extensions of the Internet and X.25 networks.

RESULT

Fig: 7 Hardware kit of Project which shows the patient condition.

Hardware board comprises of pulse sensor, temperature sensor and BP module. These connected to LPC218 microcontroller. The acquisition of data through sensors is posted to webpage through GPRS modem.

Fig: 8 Systolic, Diastolic and Pulse rate values of patient condition as seen in BP module.

One of the parameter is Blood Pressure to check patient health condition and this is measured by BP module and the value is posted to webpage. That can be observed by doctor from anywhere and necessary treatment can be provided

.

Fig: 9 Output of patient condition in an IP address through GPRS modem.

CONCLUSION

This system reduce costs by enabling in home monitoring of patients, eliminating the need for utilization of expensive facilities, and reducing the need for transportation of patients to physicians and Medical centers. Alert messages sent to doctor to for immediate treatment process and for the future enhancement it has to be connected to cloud to analyze the patient condition over a long period for better curative methods.

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