Implementation Of Health Monitoring System Using 8051

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Abstract: The human health becomes obsession for most people around the world, the heart diseases is one of many factors that threatens human lives, the objective of this paper is to provide medical intervention anywhere at any time using GSM technologies. In the current paper, we are using a novel idea for continuous monitoring patient's health conditions. The health care scheme is focus on the measurement and monitoring various biological parameters of patient's body like heart rate, oxygen saturation level in blood and temperature using a web server application, where doctor can continuously monitor the patient's condition on. In the event the parameters of the patient vary abnormally, the message is being sent to the doctor through the GSM module, indicating the patient's condition along with his location. All the parameter data of the patient are visualized by using LCD display
Keywords: Health Care Monitor System, Temperature sensor, GSM, 8051, oxygen level sensor.

1. INTRODUCTION

Health monitoring system are picking up their criticalness as the Fast-developing all inclusive older populace expands requests for care taking. In ICU there is expected to nonstop observing their wellbeing conditions. In such a large number of cases patients discharged from the medical clinic still they are unequivocally encouraged to be under rest and perception some period time then these cases the framework is especially useful. Observing and recording of various physiological parameters of patients in the outside clinical condition is winding up progressively. Patients are becoming more interested in managing their own health, which is leading to changes in traditional information dissemination from the health care professional to the patient. In managing this change, it is necessary to design software applications to support. Both the health care professional and the patient in the clinic and out [1-2]. Personal health records and eHealth system provide two ways in which the patient can be involved in health management. First, we will look at existing definitions for each of these concepts, examine some concepts from literature for each, and see how they are related. There is no currently agreed upon definition for eHealth, but health and technology are two common themes in this area. Previous work has shown there exists little evidence to support claims of cost effectiveness and patient outcome improvements through eHealth systems even through eHealth systems have been implemented (such as eHealth Ontario or are in the process of being implemented (such as the European Commission eHealth Network.

In one study, the authors recommend evaluating new health technologies comprehensively from both social and technological standpoints to achieve an optimal result. Considering both social and technological factors is a large undertaking, so we only focus on one aspect of the technological perspective here – emergent behaviour in the design of new health software. Personal health records can be defined as private, secure, and confidential electronic systems which range in complexity and allow users to access, manage, and share health information of their own and those for whom they are authorized. Some personal health systems provide standalone data for tracking of, for example, physical activity, diet, weight, and sleep (such as Fit Bit and My FitnessPal allowing the patient to track information independent of a health care professional [3]. Other personal health and eHealth systems integrate guidance from a health care professional. Such interconnected systems provide more significant benefits, one of which is improved communication between health care professionals and patients.

In the preliminary design presented here, communication facilitation between patient and health care professional via a software tool is expected to increase patient knowledge and involvement in a health program. However, modifying existing systems to allow or increase patient interaction can be a challenging task. It is important to ensure modifications will not compromise system integrity and lack of central control in distributed systems poses challenges such as emergent behaviour. Emergent behaviour is behaviour in a synthesized model of the distributed system not explicitly specified in its specification. Emergent behaviour arises when there is a state in which the system component cannot determine which

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course of action to take. For instance, deadlock is a form of emergent behaviour [4-5].

The sensor networks for in-home patient monitoring together with the electronic patient records and information security are subject to recent research. Also, building a secure sharing environment has become a new subject for both health care industry and academic community. The electronic health care records management offers advantages related to easy accessibility and use of the patient information, no limitation in time, space and human resources for monitoring patients. The first issue is the organizational and cultural matters related to health care. This issue is rather important regardless of information systems since organization models and culture do not allow the continuity of care nor any type of structured data collection. The second issue is the technological gap between health-care professionals and information science experts. Doctors are often reluctant to use information systems that, as they say, are not designed for them. Trade-offs between power and communication range need to be considered carefully.

2. BACKGROUND

In 1872 Alexander Moorhead attached wires to patient's wrist to obtain the heartbeat while pursuing his Doctorate degree in electricity at the St Bartholomew's Hospital. He used Lippmann capillary electrometer created by the British physiologist John Burdon Sanderson for gathering and visualizing the data. Later Augustus Waller took this idea and designed an electrical device that was able to record the heartbeat in real time by connecting a Lippmann capillary electrometer to a projector. The major breakthrough came when Willem Einthoven invented the string galvanometer which was more accurate in measuring the heartbeat. Einthoven assigned letters P, Q, R, S, and T to the different projections and described the electrocardiographic features of different cardiovascular disorders. The principles of Willem Einthoven are still in use today but with more advanced technology for detecting the electrocardiograph.

Heartbeat rate can provide a lot of physiological and pathological information and is an important health indicator. Nowadays, heart diseases have already become one of the most common and deadly diseases. The diagnostic of heart diseases has always been considered a very important issue in the medical community worldwide. Gathering heart beat information in real time provides doctors with the necessary tool to monitor and treat patients. A large number of heart monitoring systems are available in the market, however most of these systems tend to be large in size and are not convenient to use on a regular basis. Typically, patients need to go to a hospital or medical office to perform the test and then wait for the results to be sent to the doctor. In addition to being inconvenient, this is an inefficient use of human resources. The disadvantages of previous heart monitors have led us to consider a new system that can monitor heart rate without limitation due to time or location of the patient. This system should be able to record and send the heart beat rate data to doctors either upon request or when an abnormal condition is detected. This is particularly convenient for elderly and disabled patients who have difficulty in traveling to see their doctors.

The effective operation range for a wireless sensor system is also every important. A small operation range in a relative large application area will require multiple sensor systems with higher cost and complexity. In order to make the operation range wider, a more powerful transceiver should be considered. Yet a more powerful transceiver implies more power consumption, which is not desirable for a battery powered wireless sensor system as is the case in our application. In order to increase the operation range, an ad-hoc network seems to be more favourable. Ad-hoc network sends data from node to node. However, this could cause a sensor node to be transmitting more frequently which will decrease battery life. In addition, ad-hoc network is more complex than direct connection. As a proof of concept, we will first implement a direct connection between the sensor node and the host.

Instead of going to the hospital, the proposed wireless monitor will provide doctors with the ability to remotely monitor and diagnose patients while pursuing normal daily activities. The project could also be applied to battlefield health monitoring. Military doctors usually treat battlefield casualties immediately if there is no medical station nearby. Using wireless vital sign sensor network, the doctor could set up a local wireless network and receive the vital signs of many casualties at the same time, in order to determine which patient needs treatment the most.

3. RELATED WORK

Health care is a very complex process, his final quality (the treatment of the patient, his reintegration in their normal familiar and professional life) depend of many complementary processes and actions of diverse elements of the medical process. To implement his conceptions about the quality of the applied medical treatment the quality management system of the organism (medical centre) must realize some characteristic activities, these activities can be classified as following:

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- identification of the basically elements (compartments) necessaries for define and realize his global activity (treatment of the patients);
- coordination of the activities of this elements;
- definition and adaptation of criteria's and methods to make the control of the activity of the composing elements and the entire medical process;
- make a permanent supervision, measurement and analyse of the process (based on the defined criteria's);
- Implement the proposed activity's to obtain the planed results, and realize a continuous amelioration of the process.

To ensure the secure storage and access management of EHR, with corresponding Quality of Service (QoS) measures several security requirements must be taken into account, such as:

• EHR storage - the electronic patient information can be stored electronically: locally on the computer, on the corporation network storage facilities, and on dedicated storage servers using cloud computing. The challenge is to find a suitable compromise between speed and security of access to resources, knowing that the security requirements are increasing as the use of IT infrastructures is becoming more complex.

• Malicious code - malicious software routines, unpatched applications or computer viruses can cause disruption of normal operation in a health care information system, damaging the EHR. Protection from intrusive attack, antivirus applications, firewalls, and software updates are a few requirements in order to protect an information system.

• Protected access – because medical data may contain confidential information, the EHR must be protected and it can only be accessed and processed by authorized personnel. The multi-factor authentication protected access to the electronic health records, databases, and medical applications is a mandatory apprehension in order to assure the information protection against access violations.

• Mobile devices – modern health care approaches such as remote medical diagnosis or remote surgery systems has led to the inclusion of the general mobile IT equipment in the acquisition, access and decision process over the medical information.

• Online systems protection - because the EHR content is a "sensitive" data and often associated with confidential information, the health care IT departments must face the recent security and privacy implications and challenges. The current trend is to standardize the information from medical terminology to networking protocols in order to electronically store the medical records and to instantly access it and sent it anywhere in the world. In order to promote and maintain the fundamental medical ethical principles and social expectations, the human resources and security equipment (firewalls, antivirus, and content filtering devices) must be aggregated in the protection of the health information against criminal activities over the Internet. • IT, physical and human security – because any security flaw may be a gateway for data leakage, an efficient protection of the EHR must include access rights to data, data analysis rights, security of data transfer, how and when data is stored, and the governing policies.

4. PROPOSED SYSTEM

This system composed of three parts, they are sensor part for collecting and analysing the data from the human body, controller part processing the collected data and stored into the memory. The below figure (1) shows the architecture of proposed system. The devices used in the architecture are oscillator, Heart beat sensor, Temperature Sensor, GSM Module, and LCD Display & Power Supply and buzzer. Heart beat sensor is in charge of visualizing the biomedical signals and stored the data in a file, which can be shared in different ways. This saved data afterwards, can then be given to a specialist for its proper diagnostic. Now the GSM module will allows to share the location. Now let us discuss about the devices in detail manner.
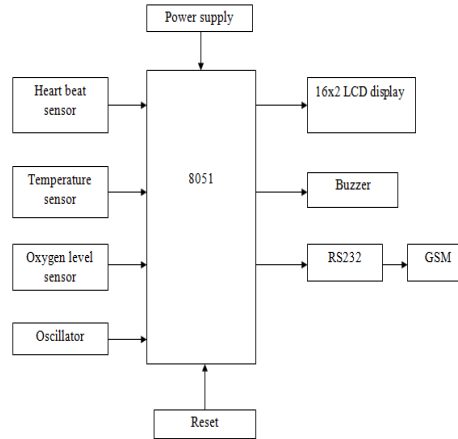
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Fig. 1: PROPOSED SYSTEM

A. Temperature Sensor

The body temperature can be determined by placing sensor in contact with body. In the game plan the body temperature sensor is utilized LM35.The LM35 is fastidiousness coordinated circuit temperature sensor, whose yield voltage is directly to the Celsius (centigrade) temperature. It can quantify temperature very exactly than the thermistors and it have low self-warming capacity.

B. Gsm Module

GSM (Global System for Mobile correspondences) is an open, computerized cell innovation utilized for transmitting portable voice and information administrations. GSM (Global System for Mobile correspondence) is a computerized cell phone framework that is broadly utilized in Europe and different parts of the world. GSM utilizes a variety of Time Division Multiple Access (TDMA) and is the most broadly utilized of the three advanced remote phone innovations (TDMA, GSM, and CDMA). GSM digitizes and packs information, at that point sends it down a channel with two different floods of client information, each time permitting space. It works at either the 900 MHz or 1,800 MHz recurrence band. It underpins voice calls and information exchange rates of up to 9.6 kbit/s, together with the transmission of SMS (Short Message Service).

GSM systems work in various diverse recurrence ranges (isolated into GSM recurrence ranges for 2G and UMTS recurrence groups for 3G). Most 2G GSM systems work in the 900 MHz or 1800 MHz groups. A few nations in the Americas (counting Canada and the United States) utilize the 850 MHz and 1900 MHz groups on the grounds that the 900 and 1800 MHz recurrence groups were at that point designated. Most 3G GSM systems in Europe work in the 2100 MHz recurrence band. The rarer 400 and 450 MHz recurrence groups are doled out in a few nations where these frequencies were recently utilized for original frameworks.

C. LCD Display

liquid crystal display (LCD) is a slender, level showcase gadget made up of any number of shading or monochrome pixels displayed before a light source or reflector. Every pixel comprises of a segment of fluid precious stone atoms suspended between two straightforward anodes, and two polarizing channels, the tomahawks of extremity of which are opposite to one another. Without the fluid gems between them, light going through one would be obstructed by the other. The fluid gem turns the polarization of light entering one channel to enable it to go through the other.

A program must interface with the outside world utilizing information and yield gadgets that discuss specifically with an individual. A standout amongst the most widely recognized gadgets joined to a controller is a LCD show. The absolute most normal LCDs associated with the contollers are 16X1, 16x2 and 20x2 showcases. This implies 16 characters for each line by 1 line 16 characters for every line by 2 lines and 20 characters for every line by 2 lines, individually.

Numerous microcontroller gadgets use 'brilliant LCD' presentations to yield visual data. LCD shows planned around LCD NT-C1611 module, are reasonable, simple to utilize, and it is even conceivable to create a readout utilizing the 5X7 dabs in addition to cursor of the presentation. They have a standard ASCII set of characters and numerical images. For a 8-bit information transport, the presentation requires a +5V supply in addition to 10 I/O lines (RS RW D7 D6 D5 D4 D3 D2 D1 D0). For

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a 4-bit information transport it just requires the supply lines in addition to 6 additional lines (RS RW D7 D6 D5 D4). At the point when the LCD show isn't empowered, information lines are tri-state and they don't meddle with the activity of the microcontroller.

D. Oscillator

An oscillator gives a source of repetitive A.C. motion over its yield terminals without requiring any contribution (aside from a D.C. supply). The flag produced by the oscillator is normally of steady abundancy. The wave shape and sufficiency are dictated by the plan of the oscillator circuit and decision of part esteems. The recurrence of the yield wave might be settled or variable, contingent upon the oscillator plan.

E. Power Supply

A power supply is an electrical gadget that provisions electric capacity to an electrical burden. The essential capacity of a power supply is to change over electric flow from a source to the right voltage, flow, and recurrence to control the heap. Thus, control supplies are at times alluded to as electric power converters. Some power supplies are independent bits of hardware, while others are incorporated with the heap apparatuses that they control. Instances of the last incorporate power supplies found in personal computers and hardware gadgets. Different capacities that control supplies may perform incorporate constraining the flow attracted by the heap to safe dimensions, closing off the flow in case of an electrical blame, control molding to counteract electronic commotion or voltage floods on the contribution from achieving the heap, control factor remedy, and putting away vitality so it can keep on controlling the heap in case of an impermanent interference in the source control (uninterruptible power supply).

All power supplies have a power input association, which gets vitality as electric flow from a source, and at least one power yield associations that convey flow to the heap. The source power may originate from the electric power matrix, for example, an electrical outlet, vitality stockpiling gadgets, for example, batteries or energy units, generators or alternators, sunlight based power converters, or another power supply. The information and yield are typically designed circuit associations, however some power supplies utilize remote vitality exchange to control their heaps without wired associations. Some power supplies have different kinds of data sources and yields too, for capacities, for example, outside observing and control.

F. Heart Beat Sensor

Heartbeat sensor gives a straightforward method to consider the capacity of the heart which can be estimated dependent on the rule of psycho-physiological flag utilized as an improvement for the augmented simulation framework. The measure of the blood in the finger changes as for time. The sensor sparkles a light projection (a little splendid LED) through the ear and measures the light that gets transmitted to the Light Dependent Resistor. The intensified flag gets transformed and separated, in the Circuit. So as to ascertain the pulse dependent on the blood stream to the fingertip, a pulse sensor is collected with the assistance of LM358 OP-AMP for checking the heartbeat beats.

G. RS232

RS 232 is a procedure innovation used to make little incorporated gadgets that join mechanical and electrical segments. They are manufactured by utilizing integrated circuit (IC) cluster handling methods and can extend in size from a couple of micrometres to millimetres. These gadgets (or frameworks) can detect, control and incite on the micro scale, and produce consequences for the macro scale. The PS arrangement are high performance speakers that utilize piezoelectric components and are intended for simple joining into different circuits. They highlight to a great degree low power utilization in contrast with electromagnetic units. In our undertaking we are utilizing the ringer type PS19 type because of the reality, it has a low frequency tone of 2 kHz and piezoelectric material is covered with water and dust resistive material.

H. Oxygen Level Sensor

It measures the level of oxygen in the patient. The size of the sensor nodes is crucial in our design. Since the sensors are designed for patients to wear while pursuing normal daily activities, the sensor nodes need to be as small and light weight as possible. This is important because sometimes a patient has to wear multiple sensor nodes for multiple vital sign monitoring and larger size sensor nodes will cause discomfort to the wearer.

5. CONCLUSION

This current planned framework gives low complexity, low power utilizations and profoundly compact for medicinal services checking of patient's and it can disposes of the need of usage of costly offices. The doctor can facilitate the patient's data at anyplace with the assistance of android web server. In future, we can build up a major information base of the considerable number of patients of any medical

clinic and the wellbeing parameters can be observed persistently, and furthermore the data is transferred to the emergency clinic server. These servers keep the data of the patients in the information base, and specialists can have the entrance of patient's history, when any further consultancy occurs with the specialist.

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