WSN BASED EFFICIENT PATIENT MONITORING SYSTEM FOR MULTIPLE PATIENTS

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Abstract: Wireless Sensor Networks (WSN) is a technology that used in many areas now a days, mostly of research in health sector. In this paper we present The patient's temperature, heart beats, blood pressure is monitored automatically using a bio-medical kit that is connected with the patient. A LCD is provided with the kit that is used to notify the nurse about the patient's health status. It specifically targets assisted-living residents and others who may benefit from continuous, remote health observing. The information is then sent to a mesh node through Zigbee technology. The mesh node is generally a PC that helps the duty doctor to monitor all the wards that are present in the hospital. This ensures that the patient's health status is monitored even in the absence of the nurse. From the mesh node, a SMS is sent to doctors through GSM connection. With the help of the information got through SMS, the doctors can be able to observe the patient quickly. Therefore the observing is done automatically there is no need for any one to observe the patient.

Index Terms: ZigBee, wireless biomedical observing.

I. INTRODUCTION

As the world's population ages, those suffering from any kind of infection, disease the elderly will increase. Now a days some patients need 24*7 observing. Without automatic observing ,memory enhancement and time enhancement takes place. Researchers in computer, networking, and medical fields are working to make the broad vision of smart healthcare possible. Suppose , some of them are constant to continuous medical observation for risky diseases like Alzheimer's, Parkinson's or similar cognitive disorders, aids . This paper presents an emerging system design field around remote, continuous medical observation using wireless sensor networks. Its advantages for in-home observing are described in the next section.

This system is designed to develop an efficient system that can monitor multiple patients' health parameters simultaneously in real time. This system also effectively delivers the data to a patient observing system where it is stored permanently. The multiple parameter that are monitored are temperature, heart bit and GSR(Galvanic skin response). In this system, each patient has its unique identity for the identification purpose. The AVR board are programmed on ardiuno platform using embedded c language. The measured parameters are given to the AVR board and transmitted to the receiver through Zigbee module. At the receiver, the received data is converted using TTL to USB converter. The received data is displayed on the computer screen where we developed an one software program

using visual basic When the measured values exceeds the threshold level, then the system will alert using buzzer and at the same time one text message will be send to the doctor using GSM module.
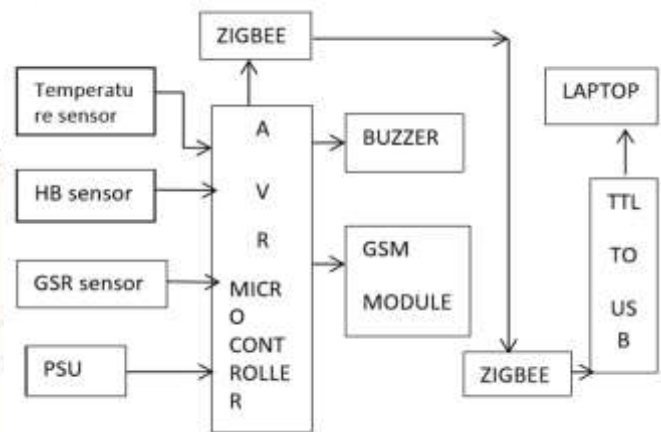
II. BLOCK DIAGRAM AND MODULES DESCRIPTION

Fig.1. Block Diagram

A. Modules and Description

1. Avr Microcontroller

Arduino is a single-board microcontroller, intended to make building interactive objects or environments more accessible. The hardware consists of an open-source hardware board designed around an 8bit AVR 328 microcontroller, Current models feature a USB interface, 6 analog input pins, as well as 14 digital I/o pins that supports various extension boards. that runs on regular pc and allows users to write programs for AVR using C or C++. An Arduino board consists of an Atmel 8-bit AVR microcontroller with complementary components that facilitate programming and incorporation into other circuits. to a variety of interchangeable add- on modules known as shields. Some shields communicate with the Arduino board directly over various pins, but many shields are individually addressable via an I²C serial bus so many shields can be stacked and used in parallel. official Arduinos have used the atmega AVR series of chips, specifically the ATmega8, ATmega168, ATmega328, ATmega128o, and ATmega256o. A handful of other processors have been used by Arduino compatibles. Most boards include a 5 volt linear regulator and a 16 MHz crystal oscillator (orceramic resonator in some variants), although some designs such as the LilyPad run at 8 MHz and dispense with the onboard voltage regulator due

to specific form-factor restrictions. An Arduino's microcontroller is also pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory, compared with other devices that typically

2. ZIGBEE module

Its low power consumption limits transmission distances to 1o–1oo meters line-of-sight, Throughput of ZigBee is low; rate of data transfer is about 25okbps. The Automatic Meter Reading, Residential & commercial utility systems, Building Automation, Personal health care, Body area networks, Fitness observing: home, gym, on-themove, ZigBee Smart Energy, Hospital & institutional, Patient observing, Cable replacements, Automotive, In vehicle control: vehicular & entertainment, Status observing, Telecom Services.

3. Temperature Sensor

Temperature sensor is a device which senses variations in temperature across it. LM35 is a basic temperature sensor that can be used for experimental purpose. It give the readings in centigrade(degree Celsius)since its output voltage is linearly proportional to temperature. If the temperature sensors are thermally attached and protected, they can be used in any temperature measurement application where the maximum temperature range of the medium is between –4o°C to +125°C. Properly cemented or glued to the surface of the medium, these sensors will be within o.o1°C of the surface temperature. introducing errors if the surrounding air-surface interface is not isothermal. Avoiding this condition is easily achieved by dabbing the leads of the temperature sensor and the hookup wires with a bead of thermally conductive epoxy. This will ensure that the die temperature is not affected by the surrounding air temperature.

4. GSR (Galvanic Skin Response)

The Galvanic Skin Response (GSR) is defined as a change in the electrical properties of the skin. The signal can be used for capturing the autonomic nerve responses as a parameter of the sweat gland function. The measurement is relatively simple, and has a good repeatability. Therefore the GSR measurement can be considered to be a simple and useful tool for examination of the autonomous nervous system function, and especially the peripheral sympathetic system. Skin conductance is captured using skin electrodes which are easy to apply (such as the Shimmer GSR+ module). Data is acquired with sampling rates between 1 – 1o Hz and is measured in units of micro-Siemens (µS). The time course of the signal is considered to be the result of two additive processes: a tonic base level driver, which fluctuates very slowly (seconds to minutes), and a faster-varying phasic component (fluctuating within seconds). Changes in phasic activity can be identified in the continuous data stream with bare eyes as these bursts have a steep incline to a distinctive peak and a slow decline to the baseline level. Whenever investigating GSR signal changes in response to sensory stimuli (images, videos, sounds), researchers focus on the latency and amplitudes of the phasic bursts with respect to stimulus onset

5. Heartbeat sensor

A heart bit sensor is a personal observing device that allows to measure heart rate in real time. It measures the change in volume of blood through any organ of the body which causes a change in the light intensity through that organ. It works as a digital heart rate monitor and also works as a patients health observing system. It operates on +5v DC supply and 1oomA operating current. When the heart beat detector is working, the beat LED flashes in unison with each heart beat. This digital output can be connected to microcontroller directly to measure the Beats Per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.

6. Buzzer

A buzzer or deeper is an audio signaling device which may be mechanical, electromechanical piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke..

7. GSM module

it is mobile communication modem, GSM stands for global system for mobile communication. GSM system was developed as a digital system using TDMA(time division multiplexing access) for communication purpose. This system has an ability to carry 64 kbps to 1 mbps data rate.

8. Softwares

i. Visual basics

Event driven programming language and associated development environment from Microsoft for its Programming model. The language not only allows programmers to easily create simple GUI applications, but also has the flexibility to develop fairly complex applications as well the fastest and easiest way to create applications for Microsoft Windows.

ii. ARDUINO

The origin of the Arduino project started at the Interaction Design Institute Ivrea (IDII) in Ivrea, Italy in 2oo3. Arduino is an open source computer hardware and software company, project, and user community. Arduino designs and manufactures single board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The boards are equipped with sets of digital and analog input/output(I/o) pins that may be interfaced to various expansion boards (shields) and other circuits.

Why is this useful?

i. Increases Health care Access
ii. Associating the gap between the patients and the doctor iii. operation of this device is very simple
iv. It gives a good performance when we compare with compact sensor.
v. Reduced Healthcare Delivery Cost

III.   CONCLUSION and FUTURE SCOPE

The baseline of the system is implemented. A one week experiment showed a robust system with some straightforward communications from front to backend of the system. The modularity of this system should enable progressive development of the research areas described in Part VI. We believe this system design will greatly enhance quality of life, health, and security for those in assisted living communities.

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