SYTSEM FOR ACTIVE AND ASSISTED LIVING HEALTH MONITORING BASED ON IOT

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Abstract— As the healthcare industry has evolved, technology provides readily accessible health data that may facilitate people to deal with health concerns. Wearable sensors are commonly used for this purpose. Wearable systems are used for exercise regimes for health and rehabilitation are notably helpful at the same time can be easy by the Wireless sensor network. Wireless technology has completely transformed the way we live, but health care is yet to enter the digital age at least at remote areas. By harnessing innovation in the wireless space along with cloud computing and pervasive technologies such as ubiquitous sensing and data analytics we can fundamentally shift the paradigm in health care delivery and dramatically improve the health care services at rural areas. Ultimately, we have the opportunity to create a new "infrastructure-independence" model of health care, which translates into the right care, at the right time, wherever people need it. Also putting cloud computing with it makes the health data to be monitored at any comfortable places or devices. Wireless health encompasses end-to-end solutions that facilitate continuous access to health care information, expert advice, or therapeutic intervention enabled by remote sensing, ubiquitous telecommunications networks, and smart systems and platforms.

Key words: ARM7, Sensors, GPRS.

I.   Introduction

The problem found in most hospitals is that the physician has to frequently visit the patient and asses his/her condition by measuring the parameters such as temperature, blood pressure, drip level etc. In case of emergencies, the nurse intimates the doctor through some means of communication like mobile phone. A growing selection of innovative electronic monitoring devices is available, but meaningful communication and decision supports are also needed for both patients and clinicians. Health care monitoring systems can help people by providing healthcare services such as medical monitoring, memory enhancement, medical data access, and communication with the healthcare provider in emergency situations through the SMS or GPRS. Continuous health monitoring with wearable or clothing-embedded transducers and implantable body sensor networks will increase detection of emergency conditions in at risk patients. Not only the patient, but also their families will benefit from these. Nowadays, more and more urban residents living in the Community and the communities became ever larger. There is a medical center in a medium community in general which can provide some treatment to those common diseases. With the aging society in China, more and more elderly will live in urban community. Community health centers can also be a feature that is perfect for the elderly on a regular basis to provide some basic health care, such as measurement the blood pressure and heart rhythm once a month for the elderly, and keep record of the physical condition for them. Meanwhile, the elderly are also looking for this kind of health care, and hope to have a professional to make some reminders according to his own body

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status. Usually the medical center could allocate some medical staff to examine on-site for elderly regularly, but with increased number of older persons in the community, such on-site service is becoming increasingly costly. Therefore, we want to design a family telemedicine system, will enable residents examine the health themselves in home with electronic Sphygmomanometers and other home medical tools, and coupled with simple operation, the original body health data could transmitted to the community medical center automatically. Replaced those staff but improve the efficiency of community medical center services.

II.   Literature Review

VeyselAslantas, RifatKurban and tuba Caglikantar [1] created a Pocket pc based, low-cost, portable, wireless health monitoring and alarm system. Human's electrocardiogram (ECG), temperature and pulse data are acquired and sent to a personal digital assistant (PDA) using IEEE 802.15.1 Bluetooth. Although this approach appeared well rounded and convenient as it serves a portable way to monitor electrocardiogram (ECG), temperature and pulse data, in the present day and age, there are several devices that don\'t need any extra device that needs carrying around. Purnima, et. al, presents an Zigbee and GSM Based Patient Health Monitoring System Care of critically ill patient, requires spontaneous & accurate decisions so that life-protecting & lifesaving therapy can be properly applied. Statistics reveal that every minute a human is losing his/her life across the globe. More close in India, everyday many lives are affected by heart attacks and more importantly because the patients did not get timely and proper help. This paper is based on monitoring of patients. We have designed and developed a reliable, energy efficient patient monitoring system. It is able to send parameters of patient in real time. It enables the doctors to monitor patient's health parameters (temp, heartbeat, ECG, position) in real time. Here the parameters of patient are measured continuously (temp,heartbeat, ECG) and wirelessly transmitted using Zigbee. This project provides a solution for

enhancing the reliability and flexibility by improving the performance and power management of the patient monitoring system. In the current proposed system the patient health is continuously monitored and the acquired data is analyzed at a centralized ARM microcontroller. If a particular patient's health parameter falls below the threshold value, an automated SMS is sent to the pre-configured Doctor's mobile number using a standard GSM module interfaced to the ARM microcontroller. Here, we are using Zigbee for wireless transmission. The Doctor can get a record of a particular patient's information by just accessing the database of the patient on his PC which is continuously updated through Zig bee receiver module. Using GPS, the location of remote patient can be detected so that help can be provided in case of emergency from nearest hospital. [3]

Fuzzy Logic based Health Care System using Wireless Body Area Network [PrakashgoudPatil, Samina Mohsin, Karnataka, India] Contribution: Wireless Sensor Networks (WSN) that provides the communication in healthcare systems. This sensor with advance Micro-Electro-Mechanical Systems (MEMS) technology, create a Body Sensor Network (BSN) that continuously monitors the abnormal changes in health of patients. This proposed system designed for measuring health parameters of patient body in which it consists of temperature and pulse sensor, this sensor is connected to Base Station through a microcontroller and that device have the ability to be control and monitored by remote computer. Wireless Sensor Network system continuously monitoring the pulse and temperature of patients at remote or in hospital. This wearable wireless sensor system is designed to continuously capture and send the bio-signals to the Doctor or Patient mobile phone. In that case of emergency alert will be transmitted to doctors, relatives, and ambulance in the form of Short Message Services (SMS). Doctor can also provide remote prescription for the patients this Data stored at database then after is passed to fuzzy logic controller to improve accuracy and this data is to be sent to the remote user. These data are read from sensor are imprecise / crisp here we design a Fuzzy logic controller (FLC), the

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FLC is one of the component in our healthcare monitoring system. The FLC system receives data from sensor as input and the fuzzification module converts input into fuzzy linguistic variable and its output is sent to Patient or Doctor. These systems have the main purpose: to provide or transmit the health information to the patient, to the medical staff or for both at the same time. This paper demonstrates the use of wearable Wireless Body Sensor Network and ambulatory health monitoring. If there is any change in the patient body that physiological parameter information is transferred through sensor, if there is any emergency then these message is transferred to doctor or relative or emergence unit. After receiving the in

formation from patient doctor can controlled the patient via remote. This application main aim is to provide the quickly facility of hospital. This paper proves wireless sensor networks can be widely used in healthcare applications. Which could improve the quality of life.[2] [5] proposed a system about Efficient Sensor Network for Vehicle Security. Today vehicle theft rate is very high, greater challenges are coming from thieves thus tracking/ alarming systems are being deployed with an increasingly popularity .As per as security is concerned today most of the vehicles are running on the LPG so it is necessary to monitor any leakage or level of LPG in order to provide safety to passenger. Also in this fast running world everybody is in hurry so it is required to provide fully automated maintenance system to make the journey of the passenger safe, comfortable and economical. To make the system more intelligent and advanced it is required to introduce some important developments that can help to promote not only the luxurious but also safety drive to the owner. The system "Efficient Sensor Network for Vehicle Security", introduces a new trend in automobile industry.

III.   Design of Proposed Hardware

The System Architecture has two sections. They are
1. Patient Section, 2. Monitor Section

Patient Section: In this section we are performing Data Acquisition. It is performed by multiple wearable sensors that measure physiological biomarkers, such as ECG, skin temperature, Blood Pressure, Pulse rate, and moments. The sensors connect to the network though an intermediate data aggregator or concentrator, which is typically a GPRS module. The Data Transmission components of the system are responsible for conveying recordings of the patient from the patient's house (or any remote location) to the data center of the Healthcare Organization (HCO) with assured security and privacy, ideally in near real-time. Typically, the sensory acquisition platform is equipped with a short range radio such Fig. 1. Components of a remote patient monitoring system that is based on IoT-Cloud architecture.
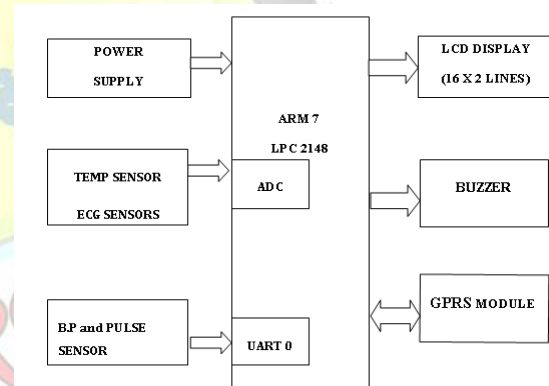

Fig. 1.Patients Section

IV.   Working Model:

Mainly the block diagram of the project consists of microcontroller, sensors, GPRS module, and power supply which is shown in Figure

In case of emergency and dangerous situations we have to alert the doctor immediately. For this we are using a Wireless network for doctor to patient communication in the hospital. This way of communication is actually done with GPRS.

Each patient will be given this module and with the help of this module the patient health condition is monitored.

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In this microcontroller plays major role of data collection from the sensors and analyze the data will be passing to the monitoring section by using GPRS communication Technology.

V. Modules used in this project

Technologies used in our project to get effective data of a patient health details are:

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.

B.P and Pulse sensor

For the Measurement of Pulse rate and BP values we have taken Sunrom's Sensor which will give sensors data in UART TTL logic mode. To get the Data from sensor module, interface to the UART of the controller. Blood Pressure & Pulse sensor is used to measure the Blood Pressure and pulse rate of the patient. It has shown readings on display with serial out for external projects of embedded circuit processing and display. Shows Systolic, Diastolic and Pulse Readings. Compact design fits over your wrist like a watch. Easy to use wrist style eliminates pumping.

Fig. 3.BP and Pulse Sensor

ECG:

The ECG sensor measures electrical potentials produced by the heart (Electro-cardiogram). These small voltages are measured at the skin of the wrists and elbow through electrodes. The ECG sensor can also be used to measures the electrical potentials generated by muscle cells when these cells contract and relax (Electromyogram). For safety reasons the sensor uses an optical coupler to avoid any direct electrical contact between the person whose ECG is measured and the measurement interface or computer. The ECG sensor is delivered together with a package of 100 electrode patches.

Fig.4.ECG Sensor

Thermistor

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.

Fig.5.Temperature sensor

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VI.   CONCLUSION

In this paper, we have presented a low-power wearable IoT system for active and assisted living healthcare applications. We have outlined the main components of the proposed system and explained their implementation details. We have built a prototype to illustrate the different performance aspects of the proposed system. The preliminary performance evaluation results have demonstrated the efficiency of the proposed system – despite being a low-cost one. This makes the proposed system a good candidate for implementing a wide set of wearable healthcare systems. In this approach explains how to design and implement an ARM-based embedded system, which is simple, stable, very easy to use at home for the elderly persons in a community and also very convenient to all of the community residents. The system has a good scalability. The residents can access the community server to check themselves' health information without others software but a computer with IE. Doctors can review a patient's former health information via internet too when they diagnose the patient. As a result, this system would have a widely use in future.

VII.   FUTURE ENHANCEMENT

There is always chance to improve any system as research & development is an endless process.

From the above designed project it can be concluded that we are able to transmit the data which is sensed from patient to the server PC by using wireless transmission technology. We extend this data transmission by using GPS technology.
And also we added extra sensors like blood glucose level sensors, EEG sensors add for better monitoring patient condition.

Along with this, expanding the project to allow two way communications between doctors and patients will be beneficiary in many cases where patient needs to communicate directly to the doctor.

This will allow doctors to send messages to the patients, and thus make the consultation and service provision more transparent and effective.

VIII.   REFERENCES

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