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SHORT COMMUNICATION

Ambulatory Remote Monitoring and Emergency Alert System for Patients Using Various Body Sensors

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Abstract— The expeditious development of wireless networks has led to the emergency of a new type of e-healthcare system, providing expert-based medical treatment remotely on time. With the e-healthcare system, wearable sensors and portable wireless devices can automatically monitor individuals' health status and forward them to the hospitals, doctors and related people. The system offers great conveniences to both patients and health care providers. However, to ensure the security and privacy of patients' medical records encounters a lot of challenges: how to achieve the confidentiality and integrity of patients' information, the security of wireless body area network, the privacy and unlink ability of patients' health status, the undeniability and unlinkability of doctors' treatment, the location privacy of patients, the fine-grained access control of patients' medical record, the mutual authentication between patients and hospitals, etc.

Key words : Microcontroller, Temperature sensor, heart beat sensor ,body sensors

I. INTRODUCTION

The research also investigates current physiological monitoring systems and summarizes the architecture and requirements of an ambulatory system. This system developed here is the first to enable a solution for long-distance wireless monitoring in the field.We use GSM Modem for the purpose of knowing everybody related to that particular patient We used PIC microcontrollers (Programmable Interface Controllers), 16F877A this is the PIC microcontroller IC. Using wearable and non-wearable sensor devices humans can be tracked and monitored. Monitoring from the healthcare perspective can be with or without the consent of the particular person. Even if it is with the consent of the person involved, certain social issues arise from this type of application scenario. The issues can be privacy, security, legal and other related issues. Healthcare sensor networks applications have a bright future and it is a must to take up these issues at the earliest. The issues should be carefully studied and understood or else they can pose serious problems. In this paper we try to raise and discuss these issues and find some answers to them. We are developing network architecture for smart healthcare that will open up new opportunities for continuous monitoring of assisted and independent-living residents or comfortably moving around hospital. While preserving resident comfort and privacy, the network manages a continuous medical history. Unobtrusive area and environmental sensors combine with wearable interactive devices to evaluate the health of spaces and the people who inhabit them. Authorized care providers may monitor residents' health and life habits and watch for chronic pathologies. Multiple patients and their resident family members as well as visitors are differentiated for sensing tasks and access privileges. High costs of installation and retrofit are avoided by using ad hoc, self-managing networks. Based on the fundamental elements of future medical applications (integration with existing medical practice and technology, real-time and long term monitoring, wearable sensors and assistance to chronic patients, elders or handicapped people), our wireless system will extend healthcare from the traditional clinical hospital setting to nursing and retirement homes, enabling telecare without the prohibitive costs of retrofitting existing structures. The architecture is multi-tiered, with heterogeneous devices ranging from lightweight sensors, to mobile components, and more powerful stationary devices.

II. GSM MODEM

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. A GSM modem can be an external device or a PC Card / PCMCIA Card. Typically, an external GSM modem is connected to a computer through a serial cable or a USB cable. A GSM modem in the form of a PC Card / PCMCIA Card is designed for use with a laptop computer. It should be

inserted into one of the PC Card / PCMCIA Card slots of a laptop computer. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate. As mentioned in earlier sections of this SMS tutorial, computers use AT commands to control modems. Both GSM modems and dial-up modems support a common set of standard AT commands. You can use a GSM modem just like a dial-up modem. In addition to the standard AT commands, GSM modems support an extended set of AT commands. These extended AT commands are defined in the GSM standards. With the extended AT commands, you can do things like:

- Reading, writing and deleting SMS messages.
- Sending SMS messages.
- Monitoring the signal strength.
- Monitoring the charging status and charge level of the battery.
- Reading, writing and searching phone book entries.

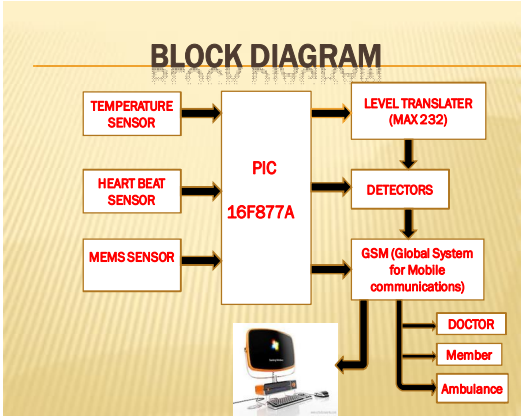
The number of SMS messages that can be processed by a GSM modem per minute is very low -- only about six to ten SMS messages per minute.

III. LITERATURE REVIEW

Much research time is being devoted to the area of wireless healthcare systems lately. A number of recent projects have focused on wearable health devices. These projects have been undertaken by government agencies and other private organizations. These projects cover many areas in healthcare viz. ECG monitoring, glucose level monitoring, stress monitoring, cancer detection, elderly people monitoring and so on. Some of the major indoor/outdoor application projects that are going on around the world are mentioned here[1]. This paper develops the system to network the healthcare resources in the Caribbean region with the aim of providing personalized healthcare security to a wider population regardless of economic status of location. Also described the design strategies used in mediNet to ensure the patients continue to use the system despite failure that occur when transferring data between healthcare devices & mobile phone & between mobile phones & web server components [2].This paper demonstrated the proposed SPOC framework can balance the high intensive PHI process & transmission & minimising the PHI privacy disclosure in m-healthcare emergency[3].This paper focuses on implementing security mechanism, Against two specific types of attack that occur in a network of MICAZ motes. Amachine learning technique named Neural Network(NN) is used to detect DoS attack conducted by an adversary[4].This paper described using wireless and non wearable sensor devices humans can be tracked and monitored monitoring from the healthcare perspective can be with or without the consent of the particular person[5].This paper focuses on several distinct advantages information visualization and usual analytics can offer in the security domain. This also explored the issues and concerns surrounding the application of visual analysis for wireless sensor network security purpose[6].This article propose a secure and resource-aware BSN architecture to enable real-time healthcare monitoring, especially for source wireless electrocardiogram data streaming and monitoring. A crosslayer framework was developed based on unequal resource allocation to support efficient biomedical data monitoring[7].This paper defines the RHM architecture and summarize the design considerations and also present a promising commercialized solution Viicare with system infrastructures and supporting techniques[8]. In this paper a secured frame work is developed for receiving the patients medical data periodically, updates automatically in patient record database and generates a checkup remainder[9].This paper propose a social closeness based method in a mobile healthcare disease control system to detect any clone attacks that may be launched to disrupt the normal operations of the system[10]. This paper describe endto-end body area sensing system that integrates off-the-shelf sensors with a Nokia N95mobile phone to continuously monitor and analyze the biometric signals of a subject[11]. This paper presents a novel key agreement scheme that allows neighbouring nodes in BANs to share a common key generated by electrocardiogram(ECG) signals[12]. This paper identify the unique features of MSNs and introduce relevant node behaviors, such as transmission rate and leaving time, into trust evaluation to detect malicious needs.

IV. WORKING

All sensors are attach to the human body. If human body temperature is suddenly increase and the detector is detect the temp. And level translator show the how much increase the temp.When the heart beat of the patient is also increase or decrease, this detect by the detector, same for increasing or decreasing blood pressure.When detectors are detect above all things and transfer to the GSM modem and computer GSM modem transfer the SMS to the mobiles of the Doctor, family member and Ambulance also.



a) Hardware

PIC Micro Controller 16F877A,Temperature Sensor,Heart Beat Sensor,MEMS Sensor, Level Translator, Detector,GSM module, Computer & Mobile phones

b) Objective of the present work

Portability and unobtrusiveness: Small devices collect data and communicate wirelessly, operating with minimal patient input. They may be carried on the body or deeply embedded in the environment. Unobtrusiveness helps with patient acceptance and minimizes confounding measurement effects. Since monitoring is done in the living space, the patient travels less often; this is safer and more convenient.

Ease of deployment and scalability: Devices can be deployed in potentially large quantities with dramatically less complexity and cost compared to wired networks. Existing structures, particularly dilapidated ones, can be easily augmented with a WSN network whereas wired installations would be expensive and impractical. Devices are placed in the living space and turned on, self-organizing and calibrating automatically.

Real-time and always-on: Physiological and environmental data can be monitored continuously, allowing real-time response by emergency or healthcare workers. The data collected form a health journal, and are valuable for filling in gaps in the traditional patient history. Even though the network as a whole is always-on, individual sensors still must conserve energy through smart power management and on-demand activation.

Reconfiguration and self-organization: Since there is no fixed installation, adding and removing sensors instantly reconfigures the network. Doctors may re-target the mission of the network as medical needs change. Sensors self-organize to form routing paths, collaborate on data processing, and establish hierarchies. Along with the development and implementation we targeted our objectives in different direction where in first part we will try to implement the project in real world to provide advanced real time patient status monitoring for hospital and on other hand provide a hands on training and experience to work on line project to academic students and faculties.

V. CONCLUSION

The proposed system has been divided in to three main phases of development and implementation. Let's see the each phase in brief. This device is connected to the patients and al the sensors attached to patients body. Figure 2. Shows the sample circuit with the ECG electrodes connected to device. This device will be less with the sensors like, Gyro meter, accelerometer, ECG sensor, temperature sensor and heart beat sensor. The main device where all sensors are connected will transfer sensors values to central server through Wi-Fi module. Centralized web portal and database server application: This is the main web application responsible for monitoring and managing the entire operation of the proposed system. First part of this module will deal with patient's device and get all the reading and store it to database for further utilization. Second part of the module will be a web application which let the doctors view the patient's statistics over the mobile device. Mobile application: Mobile application has been designed by keeping the idea of remote statistics monitoring of patients connected to the monitoring device and alert generation for doctor in case of emergency Figure 3. Shows the sample view of the GUI of mobile application where we can see how doctor can monitor the patient's state. All above module will work together in order to complete the complete the proposed system. Failure of any of one will turns to failure of system so every module needs to be perfect and 100% feasible and working. Network failure can be only the major hurdle in the system we will try to solve this problem by providing alternate network connections to the system.

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