Advanced System For Accessing Electronic Health Records Of Patients Using Android Mobile And Sensors

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ABSTRACT-A health monitoring system is developed based on the smartphone. Health information was sent to a remote healthcare server through a built-in 3G network in the smartphone. The remote server monitored multiple users in real-time. Normally data of vital signs were being transmitted to the server. In an emergency or for a special care case, additional information such as the waveform of the ECG and PCG were displayed at the server. For increased transmission efficiency, data compression and a simple error correction algorithm were implemented. Using a widespread smartphone, an efficient personal health monitoring system was developed and tested successfully for multiple users.

Keywords-Third generation (3G),Smartphone.

I. INTRODUCTION

TELEMEDICINE involves remote medical information exchange via electronic communications for easy access to patient electronic health records (EHR) and patient health information. Mobile-Health(mHealth) is a subset of electronic-health (eHealth) and refers to wireless portable devices capable of transmitting, storing, processing, and retrieving real-time and non-real-time data among end users (e.g., patients, doctors, and pharmacists).

Mobile systems are currently being used to monitor, record, and relay variety of health-related data applications, such as hypertension, blood oxygen levels, blood sugar, and disease-related conditions such as: diabetes and dialysis. Other health-related activities such as weight tracking, cardiovascular monitoring, and patient location tracking are also monitored using mHealth. There are seven key capabilities that EHR systems are expected to provide: Result and order management schemes, data and health information, decision and patient supports, administrative processes, electronic data collection (e.g., sensing), connectivity,andend-to-end communication. The main focus of this paper is on the connectivity (i.e., link technology) part, between the sensor and the data collector (i.e., manager or Smart- phone) in a mHealth system.

II. RELATED WORKS

In [1],A number of emerging mobile applications that require 3G and 4G mobile networks for data transport relate to telemedicine, including establishing, maintaining, and transmitting health-related information, research, education, and training.

In[2],The scope for increase in demand for health services seems unlimited.The scope for increase in supply is restricted.Evidence suggests that eHealth has the potential to support healthcare providers in meeting growing demand

In[3],Electronic Health Records can be seen as a pool for various health related data, where also different types of structured data can be stored. International standards serve as a unified framework for data communication and storage. We take different types of data sources as examples: a pulse oximeter,blood pressure monitor and a simple weighing scale.

In [4],Improving cardiac patients' medication compliance is a major factor in reducing mortality rate and reducing hospitalization rate.

In[5], The goal is to reach a good balance among communication range, powerconsumption, data rate, and link quality

In[6], The popularity of smartphones with their open operating systems provides a powerful platform for developing very low-cost personalized healthcare applications.

In[7], The key for successfully deploy mobile applications is the ability to understand the specific needs of its customers

In[8],Wireless technology is making a huge impact in telemonitoring by enabling remote patient monitoring for the healthy (preventative medicine) and for those that require management of chronic diseases.

In[9],was to evaluate the impact of home-based telemonitoring using Internet and mobile phone technology

III. BENEFITS OF MHEALTH REALIZATION

Switching from traditionl health information handling to ehealth/mhealth is expected to increase performance and reduce costs associated with healthcare activities. in particular, reductions are anticipated in the following cost items:pre-and post PACS(picture archiving and communication systems), patient transfers, unnecessary and duplicate patient exams, per-patient and per-unit, and turnaround times[10] .the goal of ehealth/mhealth can be summarized as :achiving the greatest benefits in the shortest time frame, with the least risk and associated cost.this goal can be achieved through the following increaments[11]: efficiency, equity, service delivery(time reduction), patient –centeredness, safety, security, effectiveness,and improved quality decision techniques.these increments should be achieve with an overall cost reduction.

IV. CHALLENGES IN MHEALTH REALIZATION

The realization of eHealth and mHealth systems and infrastructureshas its own set of challenges. First of all, not all listedbenefits can easily coexist. For example, quality of service [12] and security have traditionally been at odds, since increasing the effect of one could have potentially impacted the strength of the other. The main reason is due to the fact that implementing security mechanisms often leads to the added overheads, which requires an extra bandwidth to transfer the same amount of data compared to the case without security, thus undermining the effects of QoS provisioning [13]. That being said, the current advances in wireless communication protocols, standards, and infrastructures (e.g., IEEE 802.11n and Long Term Evolution "LTE") have made simultaneous QoS and security possible.Technical and architectural challenges however still exist, especially when dealing with end-to-end QoS-security coverage.Providing end-to-end security mechanisms are also challenging (e.g., privacy, authentication, nonrepudiation, and accesscontrol). Here, are a number of challenges with regards to therealization of eHealth and mHealth systems [14]–[16].

1) Security: Identification of the weakest point in an end-to end sense.
2) Semantic interoperability.
3) Scalability in linking healthcare providers to end users.
4) Unified agreements among healthcare providers.
5) Unified eHealth/mHealth education.
6) Anywhere and anytime availability.
7) Management of distributed/decentralized/shared space.
8) Multilayer management infrastructure.
9) Ownership of medical and health data.

Security, scalability, distributed andmultilayermanagementissues will be touched upon in this paper.

V.MEDICAL RESEARCH INVOLVING MHEALTH

A number of medical research efforts have based onmHealth to monitor and study the deployment of sensor-based technologies in the been patient diagnosis and treatments,including: Aged population health monitoring [18], calorie in takemonitoring [18], treating patients with diabetes [19], [20],blood-pressure monitoring, treating cardiac patients [20], [21],and blood oxygen level monitoring (i.e., pulse oximeter) [22].Telemonitoring is not only suitable and vital for patients with heart-related diseases and conditions, it is also necessary for patietswith other health problems, such as diabetes. Kollmann*etal.*[23] consider Type 1 diabetes patients and their interaction swith physicians via data-ready mobile phones. The objective of this study was to evaluate the patient acceptance feasibility to use mobile phones to collect, transfer, and receive healthrelateddata/instructions to assist Type 1 diabetes patients. Patients were provided with Java-based data-ready mobile phones, which were synchronized with a remote database at the MC where health-related data were stored and appropriate statistics were generated and used by the CT. The acceptance feasibility was measured through a set of questionnaires, which were givento the patients. All patients took part in the trial and 95.5% of the patients successfully completed the first trial with notable improvements in health parameters related to diabetes

VI .LOW-POWER WPAN LINK TECHNOLOGIES:BLUETOOTH

Traditional Bluetooth is not considered a long-term healthrelatedlink technology because of its relatively high transmission powers and high duty cycles. However, since BT-LE is an

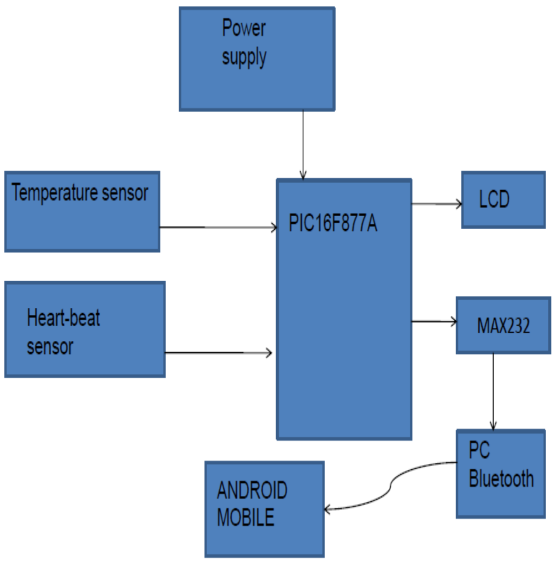
Performance Parameter	Range
ISM Frequency Band	2.4 GHz
Data Rate	0.1-24 Mbps
Wireless Range	1-100 meters
Number of Nodes	7+1
Battery Life	5-10 days
Peak Current	40 mA
Modulation	GFSK, DPSK, and DQPSK
Security Capabilities	Pre-shared key authentication and AES encryption algorithm
Applications	Consumer electronics and mobile phones

important candidate among low-power link technologies, it's vital to consider Bluetooth in the big picture. Classical Bluetooth operates in the 2.4-GHz band using GFSK modulation with 1-Mb/s data rate and wireless ranges of 1–100 m. Bluetooth v1.1 (ratified as IEEE 802.15.1-2002)was the first clean version of Bluetooth. Bluetooth v1.2 (ratified as IEEE 802.15.1-2005) was introduced, featuring adaptive frequency-hopping spread spectrum. Bluetooth v2.0 + enhanced data rate (EDR), released in 2004, supporting 3 Mb/s of data rate and has a lower duty cycle compared to previous versions. Other versions of Bluetooth are: Bluetooth v2.1 +EDR (adopted by the Bluetooth Special Interest Group (SIG)on July 26, 2007) and Bluetooth v3.0 + high speed (adopted by the Bluetooth SIG on April 21, 2009), with a theoretical data rate of up to 24 Mb/s [17]. Newer versions of Bluetooth use differential phase-shift keying (DPSK) and QPSK in addition to GFSK. Table VII shows Bluetooth's performance parameters. A new version, Bluetooth v4.0, emerged on June 12, 2007,and was called Wibree by Nokia and Bluetooth SIG, featuring an ultra-low-power Bluetooth technology, marking the birth of BT-LE.

VII.PROPOSED SYSTEM

Switching from traditional health information handling to eHealth/mHealth is expected to increase performance and decrease costs associated with healthcare activities. The goal of eHealth/mHealth can be summarized as: Achieving the greatest benefit in the shortest timeframe, with the least risk and associated cost. This goal can be achieved through the following increments: Efficiency, equity, service delivery (time reduction), patient-centeredness, safety, security, effectiveness, and improved quality decision techniques. These increments should be achieved with an overall cost reduction.

BLOCK DIAGRAM



The advantages are:

- Remote monitoring of Elderly People's body conditions.
- Automatic Emergency Alert to Care Takers and Doctors.
- Necessary treatment can be provided to patient in time.
- Reduces loss of life due to lack of timely treatment.
- Health related information will be more secured.

VIII .CONCLUSION

The proposed model explains the connectivity between the sensor part and the smartphone.Future work may involve the deployment of a prototype system based on one of the sensor technologies. Power consumption and computational analysis should be carried out based on a number of use cases.

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