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Monitoring Patient Self-Management Using Mobile Health System

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Abstract — Patient monitoring provides flexible and powerful patient surveillance through wearable devices at anytime and anywhere. One of the most important and challenging issues that healthcare providers must deal with is how to secure the personal information of patients and to eliminate their privacy concerns. Specifically in an healthcare system medical users are no longer needed to be monitored within home or hospital environments. Instead after being equipped with smartphone and wireless body sensor network formed by body sensor nodes medical users can receive the high quality healthcare monitoring from medical professionals. Each mobile medical user can collect their personal health information (PHI) such as heart beat, pressure and temperature. The proposed system is to monitor patient health status level. It is helpful for their disease management and treatment.

***Index Terms*—Health Monitoring, Body Sensor Network, patient status logging, wearable sensor network, Mobile-healthcare Emergency.**

I. INTRODUCTION

Mobile health system has been the main application of pervasive computing technologies to improve mobile healthcare quality and save human lives. Number of system and tools has been demonstrated, to mainly focus the patient health monitoring and information management by patient [1].This notion of patient self management has been associated with particular disease management enhancing patient role and participation in healthcare service delivery. Especially patient may be benefited from self management activities in terms of easily understanding on their disease, communication with the doctors and increase their self-confident [2]. The patients collect their personal health information to manage their disease by providing the vital signs such as heart rate, body temperature and, pressure.i.e various symptoms during their daily activities. The importance of the daily management is to provide health information by several clinical guidelines. The health system provides information such as health record, health management and status logging of the patients [3]. The integration of the patient health system provides vital sign monitoring during various policy or technical issues. Furthermore, Social networking i.e. patient is able to share the diverse recorded element of their personal health information through structured message with network community, consisting of friends and relative healthcare professionals .By utilizing event-driven patterns, the patients are able to share the health record information under situation specified by the mobile user. This “anytime-anywhere” information sharing may be valuable to senders (i.e. patients) and receivers (e.g. healthcare professionals, social networking).The main framework of the patient health systems introduce the novelty of integration as three important features such as patient self-management, patient health monitoring, status logging and social networking [4]. This system is first designed for continuously monitoring the patient health by patient vital signs parameters to sensor the data through deployment of specified sensing devices. Status logging is mainly consisting the recorded health information of the patients for their observation and understanding. Social sharing of health data consist of patient’s family or friends [5]. The proposed system mainly focused their disease management through their daily activites.It has been implemented using a mobile and wearable multi-sensing device for patient health monitoring, while a web services.

II. PROBLEM STATEMENTS

Patients can record various health problems or symptoms, occurring during their daily life. Technical description of diseases cannot be understood. Information on health issues cannot be shared with others. Examples of such subjective type of information include chest pain, stress, etc. Pocket PC, Medical Alerts and Recording Devices, Blood Pressure/Pulse Monitors, Wearable Insulin Pumps [3] .The time and location are important parts denoting the background of the patient that can be used in various ways. The identification of a patient’s location could be helpful for patient safety in cases of emergency. This is social issue that is heavily expressed in Europe and United State. Patients are always concerned about their health information. As in some field, information security is essential task. In case of health information patients lives depend on more information [8]. The current E-health applications use many of the sensing devices that are made available by different types of application. Some of these sensors are not standardized.

III. SYSTEM GOAL

User authentication is the initiation phase of the desired task. Already registered users can login themselves with the provided identities. New users are provided with secured mail id and password. Patient Health Monitoring is done by using Body sensor network (BSN). It is to express the application of wearable computing devices. Health parameters and vital

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signs, such as heart rate, body temperature and pressure, and activity, may be continuously monitored through deployment of various body sensing devices [7]. Due to the appeared health information overwhelming, event driven patterns that correspond to the configuration of personalized monitoring schemes can be initialized by the patient. Finally sensed data is to generate the appropriate alerts and feedback. Communication support is given by Bluetooth. In sense the detail information as send to mobile covert. Furthermore detailed patient health information passed in the Bluetooth via sender to medical database centre. Social Networking is made to involve emergency rescue activities. Patients are able to share the diverse recorded elements of their personal health information through structured messages with their networked community, consisting of friends and relatives, health professionals [4].

IV. SYSTEM ARCHITECTURE

In Fig.1, The overall system architecture is having the mobile health information as its middle part.

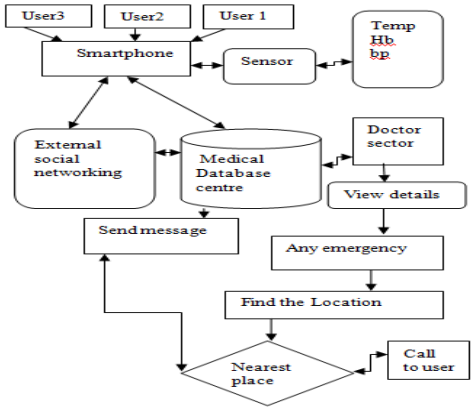

Fig1. Proposed system architecture for patient self-management using mobile health system

The mobile device is mainly focused as Smartphone is connected wirelessly with sensors and its patient health information controller regulates various sensor alerts such as heart beat sensor, body temperature sensor, blood pressure sensor and other types of information extent which reproduce the patient health status level [6]. The smartphone is used for recording typical personal health information such as various conditions.Exchange of information to medical healthcare centre organization from mobile phones through bluetooth after sensing.Alert to medical domains or entities (doctors, nurses) on emergency.

V. IMPLEMENTATION

The model system has been implemented using specific sensor devices, software and hardware platforms and technologies as described below.

A. Smartphone Communication

The prototype has been implemented using specific samsung smartphone to android OS. A netbeans was the chosen development platform which is enabled to eclipse IDE with android which enabled to implement techniques and the described functionality. In order to provide call service.java web service.java function based on the SOAP/HTTP approach. In main techniques Apache tomcat was applied to application container on the medical database center, MySQL for data information persistent and Apache the mainly identified using web service based on SOAP.

B. Sensor Communication

The sensor communication system for different sensing such as heartbeat sensor, body temperature sensor, pressure sensor designed individual essential signals. The temperature sensor and pressure sensor consist of analog devices. The analog to digital convertor use 8-bit channel frequency. The Peripheral interface circuit PIC16F87XA microchip main usage part on the sensor communication device for health monitoring. It is provided with important channel frequency on the ADCON0, ADCON1. ADCON is one of the registers that control the operation of the A/D converter. In wearable sensor system with Bluetooth modules installed in a hardware part device microcontroller on the PIC16F87XA microchip as analog to digital convertor on the serial port interface communicate to RS232 cable. The Bluetooth module communication to smartphone GPS network work as a remote station health monitoring. The wireless sensor network and Bluetooth security authentication producers to RSA is based on encryption security techniques.

C. Patient Health Information Sharing to Social Networking

The patient health information sharing to facebook, medical healthcare centre according to patient preferences within a specified external social group. The API (https://www.facebook.com/)relying is used in order to functionality the smartphone. The API is HTTP-based and provides method for both retrieving data from the social network platform via GET and POST request respectively, e.g., Status/update to Patient list of members.

D. Performance Evaluation

The performance of the proposed patient health monitoring framework using a custom simulator built in java android. This simulator mainly implements on the application layer to the communication between smartphones and communication as body sensor network and smartphones are always mainly focused to transmission ranges. The performance metrics used in the evaluation are number of patient available to qualified helper is mainly defined as medical user in emergency to the patient personal health information process within a given time period. In simulation location area provided on A, B, C.The total N medical user L= {U0, U1, U2….UN-1} uniformly area. Each user U=L is equipped personal health information to body sensor network and a Smartphone radius of 10m moves along the velocity. Each medical user randomly assigned 2-3 symptoms character. Suppose any emergency occurrence the user to provided on the {1,2,3} waits of number as qualified helper arrives on the

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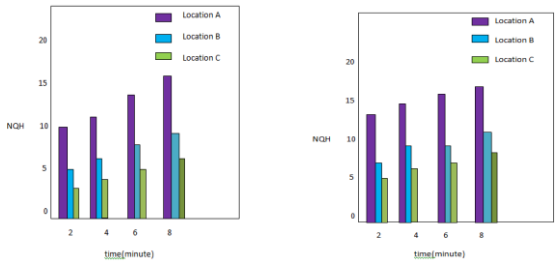
social networking help centre to each and every 10 minutes for e.g. emergency occurrences to ambulance,facebook,microblogging,mobile telemedicine etc.



time (minute) **time (minute)**

(a) l=24,th=4 **(b) l=24,th=6**

Fig .2. Number of Qualified Helpers (NQH) varying with time to under different user l and threshold Th

In Fig. 2,In simulation result to provide on the number of medical user helper to provide on the location A,B,C varying time from 2 to 8 minutes under different user l and threshold th. From the figure, with the increase of time, the average NQH will also increase, especially form the location A. The main reason that, when all medical user moves on the simulation area by the mobility model, Location A will have traffic than location B and C. The user l in the simulation area increase at the same time user arrival time also increase and location A, B, C also increase. In main difference on the threshold th =4 and th =6 varying on the minimize privacy method. The high performance evaluation on the personal health information process in accepted in mobile healthcare emergency. In resources consumption ratio measure to medical emergency healthcare system varying under the different user name l to provided threshold th.

VI. CONCLUSION

The patient self management based on mobile personal system encapsulating services to support patients health information management and health status level sharing to medical healthcare database center. The prototype implementation constituted a technical as regards the possibility and applicability of the proposed approach. It is evident that the presented system is mainly target at patients prepared to play a more active role in managing their disease and save lives.

REFERENCES

[1] Ming Li, Wenjing Lou, Worcester "Data Security and Privacy in Wireless Body Area Networks", IEEE Wireless Commun.vol, 25, no.4, (2010).

[2] Yongulin, Richard Werner Neelim Pazzil, Azzendine Boukerche "Monitoring Patients via a Secure and Mobile Healthcare System", IEEE Wireless Commun., vol, 24, no.3, 2011.

[3] Rongxiu Lu, Xiaodong Lin, Xuemin Shen "SPOC: A Secure and Privacy Preserving Opportunistic Computing Framework for Mobile-Healthcare Emergency", IEEE Transaction on Parallel and Distributed System, vol.24, no. 3, 2012.

[4] Y.M, Huang, M.Y.Hsieh, H.c.Chao, S.H.Hung, J.H Park "Pervasive, Secure Access to a Hierarchical Sensor-Based Healthcare Monitoring Architecture in Wireless Heterogeneous Networks", IEEE Journal on Selected Areas in Communications.vol, 27, no.4, 2009.

[5] Andreas K.Triantafyllidis, Vassilis G.Koutkias, Ioanna Chouvarda, Nicos Maglaveras "A pervasive Heath System Integrating Patient Monitoring", IEEE Journal of Biomedical and Health Informatics, vol.17, no.1, 2012.

[6] A.Toninelli, R.Monatari, A.Corradi, "Enabling Secure Service Discovery in Mobile Healthcare Enterprise Networks", IEEE Wireless Commun., vol.16, no.3, pp.24-32, 2009.

[7] Valarmathi J, Preethi R, Bhuvaneshwari .N, V.Karthick, "A Novel Trust Management Scheme in Pervasive Healthcare" IEEE-International Conference on Recent Trends in Information Technology, 2011.

[8] U.Varshney,"Pervasive healthcare", IEEE Comput., vol.36, no. 12, pp.138-140, Dec.2003.