Patient health management system using e-health monitoring architecture using WSN

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ABSTRACT

The proposed system uses mobile devices and wireless sensor networks. Sensor data getting Activity from Bluetooth. Patient can be add and remove from the admin panel. Send SMS if threshold data more and above by SMS API. Provide history of patient like sensor data in Graph format. It is easy for doctors and the caregivers to immediately act in emergency cases and Chat patient with doctor. Also to provide medication depending on the health parameters without the physical presence of the doctors.

I. INTRODUCTION

Healthcare is the most important concern of many countries in the world. Improving the lives of patients especially in the weaker parts of the society which include the elderly, physically and mentally disabled as well as the chronically ill patients is the major factor to be improved. E-Health systems depending on modern technology play a vital role in eradicating the problems and faster curing of the patients. Also, lot of advancement has been done in order to improve the systems in various terms of size, speed mobility and faster communication in emergency situations. New health monitoring systems have proved to be of great help to the healthcare of the patients. But the major constraint of this system is that patients are supposed to be bed fitted and kept in the smart rooms and are immobile. It is easy for doctors and the caregivers to immediately act in emergency cases, and also to provide medication depending on the health parameters without the physical presence of the doctors.

II. LITERATURE SURVEY

The current Health Management System is only able to store patient's medical history and its personal information. The older Health Management System is not able to communicate with the patient. So, That was not helpful in the absence of the doctor. Using e-Health Monitoring Architecture has an older management tools functionality as well as the communication portal with the help of WSN.This is easy to handle one or many patients at a time with the same problem

1. Patient Health Management System using e-Health Monitoring Architecture.

-Srijani Mukherjee, Koustabh Dolui, Soumya Kanti Datta

This paper illustrates the design and implementation of an e-health monitoring networked system. The architecture for this system is based on smart devices and wireless sensor networks for real time analysis of various parameters of patients. This system is aimed at developing a set of modules which can facilitate the diagnosis for the doctors through tele-monitoring of patients. It also facilitates continuous investigation of the patient for emergencies looked over by attendees and caregivers. A set of medical and environmental sensors are used to monitor the health as well as the surrounding of the patient. This sensor data is then relayed to the server using a smart device or a base station in close proximity. The doctors and caregivers monitor the patient in real time through the data received through the server. The medical history of each patient including medications and medical reports are stored on cloud for easy access and processing for logistics and prognosis of future complications. The architecture is so designed for
monitoring a unitary patient privately at home as well as multiple patients in hospitals and public health care units. Use of smart phones to relay data over internet reduces the total cost of the system. We have also considered the privacy and security aspects of the system keeping the provision for selective authority for patients and their relatives to access the cloud storage as well as the possible threats to the system. We have also introduced a novel set of value added services through this paper which include Real

Time Health Advice and Action (ReTiHA) and Parent monitoring for people with their family living abroad.

Keywords:- e-health monitoring; wireless sensor networks; smart devices; remote health advice.

2.Fault Tolerant and Scalable IoT-based Architecture for Health Monitoring.

-Tuan Nguyen Gia1, Amir-Mohammad Rahmani1, Tomi Westerlund1, Pasi Liljeberg1,
And Hannu Tenhunen

A novel Internet of Things based architecture supporting scalability and fault tolerance for healthcare is presented in this paper. The wireless system is constructed on top of 6LoWPAN energy efficient communication infrastructure to maximize the operation time. Fault tolerance is achieved via backup routing between nodes and advanced service mechanisms to maintain connectivity in case of failing connections between system nodes. The presented fault tolerance approach covers many fault situations such as malfunction of sink node hardware and traffic bottleneck at a node due to a high receiving data rate. A method for extending the number of medical sensing nodes at a single gateway is presented. A complete system architecture providing a quantity of features from bio-signal acquisition such as Electrocardiogram (ECG), Electroencephalography (EEG),and Electromyography (EMG) to the representation of graphical waveforms of these gathered bio-signals for remote real-time
monitoring is proposed.

Keywords:- Internet of Things, e-Health, 6LoWPAN, Wireless Sensor Network (WSN), Remote Patient Monitoring, Fault Tolerance, Scalability

3. Continuous Health Condition Monitoring by 24x7 Sensing and Transmission of Physiological data over 5-G Cellular Channels.

-Amitabh Mishra, Dharma P. Agrawal

A novel architecture tested exclusively for instantaneous sensing and 24x7 transmitting important physiological signals over cellular networks has been introduced in this paper. Pulmonary Artery Pressure (PAP) and Electrocardiogram (ECG/EKG) are selected as two preliminary physiological signals for this exercise as these two can help diagnose Cardio-Vascular Diseases (CVDs), the major silent killer of modern days. We use a Wireless Body Area Sensor Network to get the physiological data from a user's body and transmit them to a WBAN coordinator. The coordinator compresses received data from the body sensors, modulates it using bi-phase modulation scheme and sends it to a GSM module for remote transmission over existing cellular network. The GSM module receives the data and sends it to a remotely located tiny server for subsequent demodulation and reconstruction of the original signals. We explain details of different techniques used for data compression of this methodology and provide efficient transmission of data considering allowable range of perturbation in the information content in maintaining original characteristics. For the transmission of physiological data, we visualize to have a dedicated channel in upcoming fifth generation mobile technology, as more bandwidth for everybody is anticipated for services like data on demand, and would make 24x7 health monitoring a reality in the near future. The novelty of our approach lies in the fact that it would enable online, round-the clock health watch for the cellular system subscribers at very low power consumption by collaborating with the underlying sensor networks.

Keywords:- Bit-error-rate (BER); body sensor nodes, wireless body area network (WBAN), coordinator and sink station (CSS), IEEE 802.15.6; telehealth; mHealth; Wireless Body Area Sensor Network (WBAN).

4.INTEGRATION OF WEARABLE DEVICES IN A WIRELESS SENSOR NETWORK FOR AN E-HEALTH APPLICATION

-PEDRO CASTILLEJO, JOSÉ-FERNÁN MARTÍNEZ, JESÚS RODRÍGUEZ-MOLINA,
AND ALEXANDRA CUERVA, GRYS-CITSEM, TECHNICAL UNIVERSITY OF MADRID (U.P.M.)

Applications based on Wireless Sensor Networks for Internet of Things scenarios are on the rise. The multiple possibilities they offer have spread towards previously hard to imagine fields, like e-health or human physiological monitoring. An application has been developed for its usage in scenarios where data collection is applied to smart spaces, aiming at its usage in fire fighting and sports. This application has been tested in a gymnasium with real, non-simulated nodes and devices. A Graphic User Interface has been implemented to suggest a series of exercises to improve a sportsman/woman s condition, depending on the context and their profile. This system can be adapted to a wide variety of e-health applications with minimum changes, and the user will interact using different devices, like smart phones, smart watches and/or tablets.

Keywords:- Internet of things, communication architecture, remote monitoring

5.A Health-IoT Platform Based on the Integration of Intelligent Packaging, Unobtrusive Bio-Sensor, and Intelligent Medicine Box.

-Geng Yang, Li Xie, Matti Mäntysalo, Xiaolin Zhou, Member, IEEE, Zhibo Pang, Li Da Xu, Senior Member, IEEE, Sharon Kao-Walter, Qiang Chen, and Li-Rong Zheng, Senior Member, IEEE

In-home healthcare services based on the Internet-of-Things (IoT) have great business potential; however, a comprehensive platform is still missing. In this paper, an intelligent home-based platform, the iHome Health-IoT, is proposed and implemented. In particular, the platform involves an open-platform-based intelligent medicine box (iMedBox) with enhanced connectivity and interchangeability for the integration of devices and services; intelligent

Pharmaceutical packaging (iMedPack) with communication capability enabled by passive radio-frequency identification (RFID) and actuation capability enabled by functional materials; and a flexible and wearable bio-medical sensor device (Bio-Patch) enabled by the state-of-the-art inkjet printing technology and system-on-chip. The proposed platform seamlessly fuses IoT devices (e.g., wearable sensors and intelligent medicine packages) with in-home healthcare services (e.g., telemedicine) for an improved user experience and service efficiency. The feasibility of the implemented iHome Health-IoT platform has been proven in field trials.

keywords :- Bio-Patch, Health-IoT, intelligent medicine box (iMedBox), intelligent packaging, Internet-of-Things (IoT), printed
electronics.

6.ENERGY-EFFICIENT REMOTE HEALTHCARE MONITORING USING IoT: A REVIEW OF TRENDS AND CHALLENGES.

- Wan Aida Nadia Wan Abdullah, Naimah Yaakob, Mohamed Elshaikh Elobaid
Mohd Nazri Mohd Warip, Siti Asilah Yah

The emergence of Internet and technologies such as Wireless Sensor Network (WSN) has created another platform of Wireless Body Area Network (WBAN) and also an ever growing new area of Internet of Thing (IoT). A WBAN offers a flexibility and mobility to health monitoring system. Most of WBAN is made up of several small and light-weighted battery-operated sensor nodes and lead to energy-constrained system. Thus, an energy-efficient WBAN system is crucially needed to make the network last longer. In addition, data reliability and data transmission is important to make the system more effective. IoT concept helps in forming an interaction of things in the surrounding as well as support data storage (database) for collected vital body sign by the sensors. In this paper, we review the concept and design of energy-efficient WBAN and contribution of IoT in healthcare monitoring system.

Keywords :- Remote healthcare monitoring; energy efficient; WBAN; IoT

7.Use of Internet of Things (IoT) in Healthcare : A Survey.

-Mrs. Anjali S. Yeole, Dr. D. R. Kalbande

In today's world of connectivity, with the advancement of Internet of Things (IoT) all entities are connected to each other by some communication means. The Internet of Things for the medical equipment will produce data that can go a long way in not only increasing equipment efficiency, but also patient health. The Internet of Things (IoT) is increasingly being recognized by industry and different services mainly in healthcare. This paper describes the various Internet of Things (IoT) enable devices and its practices in the area of healthcare for toddler, children, chronic care, monitoring of critical patients, operation theaters and medicine dispenser.

Keywords-IoT, Sensor, Healthcare

8.Optimize databases for health monitoring systems.

-Catalin BUJDEI, Sorin-Aurel MORARU, Stefan DAN

In this paper, we will study and describe the methods which could be used for optimizing the database and achieving the best performances. The optimizing possibilities was considered for the case of systems which user wireless sensor networks (WSN) inside the systems dedicated for monitoring the health status of the patients. Also, this kind of optimizations could be implemented and for other type of similar systems. The system was created also as an extension at Leonardo da Vinci project, VetTrend.

Keywords:- Optimize performances, index, tuning, SQL, MsSQL.

9.A Mobile Core-Body Temperature Monitoring System on Android.

-Orlando R. E. Pereira1 João M. L. P. Caldeira1,2 Lei Shu3 Joel J. P. C. Rodrigues

Recently, Google launched the Android mobile operating system and several mobile devices already support it. This paper proposes a mobile Android-enabled tool for collecting, monitoring, and analyzing intra-vaginal temperature. A previous proposed intra-vaginal sensor acquires temperature values and sends the collected data to Android device over a Bluetooth connection. The Android tool allows women for real-time monitoring of their temperature with mobility support and following their daily life. Woman can control and detect their fertile and ovulation periods when this human parameter increases about 0.5ºC over their regular temperature. Other application of this solution includes the preterm labor prevention. The proposed system was evaluated and validated, and it is ready for use.

Keywords:- Mobile and pervasive computing, Android, biosensor, biofeedback, e-Health.

10.Health Monitoring and Management Using Internet-of-Things (IoT) Sensing with Cloud-based Processing: Opportunities and Challenges.

-Moeen Hassanalieragh, Alex Page, Tolga Soyata, Gaurav Sharma, Mehmet Aktas†, Gonzalo Mateos Burak Kantarci, Silvana Andreescu

Among the panoply of applications enabled by the Internet of Things (IoT), smart and connected health care is a particularly important one. Networked sensors, either worn on the body or embedded in our living environments, make possible the gathering of rich information indicative of our physical and mental health

Captured on a continual basis, aggregated, and effectively mined, such information can bring about a positive transformative change in the health care landscape. In particular, the availability of data at hitherto unimagined scales and temporal longitudes coupled with a new generation of intelligent processing algorithms can: (a) facilitate an evolution in the practice of medicine, from the current post facto diagnose-and treat reactive paradigm, to a proactive framework for prognosis of diseases at an incipient stage, coupled with prevention, cure, and overall management of health instead of disease, (b) enable personalization of treatment and management options targeted particularly to the specific circumstances and needs of the individual, and (c) help reduce the cost of health care while simultaneously improving outcomes. In this paper, we highlight the opportunities and challenges for IoT in realizing this vision of the future of health car

Keywords:- remote health monitoring; IoT; visualization; analytics

III. PROJECT SCOPE

- In this application we are using different techniques to the find information of the patient's health.
- We are using some Bluetooth sensor to gather information of the patient and forward to the respective doctor.
- This application is storing all medical history of the particular patient as well as the he can able to chat with the Doctor using WSN.
- Doctors will be able to see all stored data. This application has provide emergency SMS to the patients registered contact details.
- The system is such that, remote monitoring of patients can be done by diagnosis of the patients with the help of the environmental and medical sensors.
- The sensor monitors the health of patients and in real time and the collected data is sent to server. This data is received by the doctors and caregivers through server which is analyzed by the doctors.
- The server helps to store the data, medical history of the patient for future use. The system architecture is such that the patients can be monitored and treated privately at home.

IV. ANALYASIS MODEL

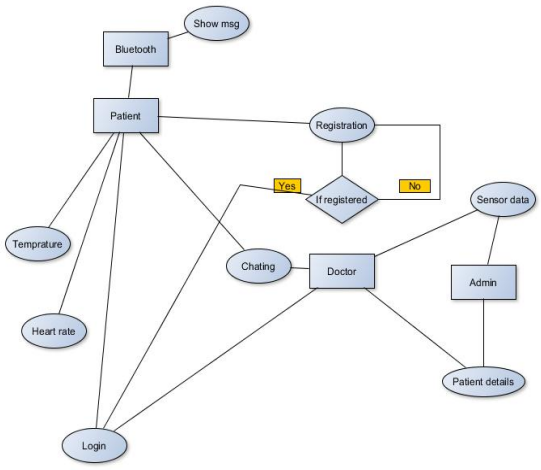

Fig: ER Diagram

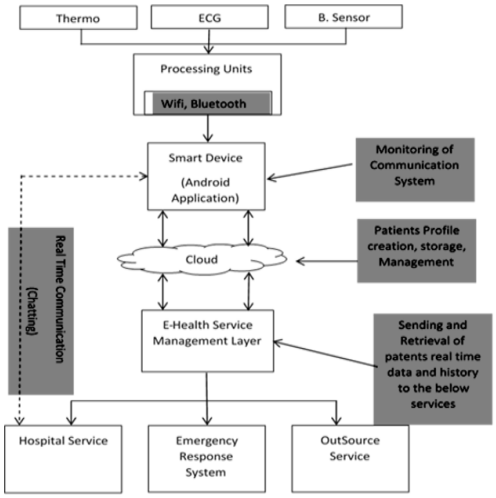

Fig: Architecture Diagram

V. ADVANTAGES, DISADVANTAGES AND APPLICATIONS

ADVANTAGES

1. Reduce manual work.
2. Increase Efficiency
3. Easy to contact with doctor
4. Easy to make patient Sensor data Graph

DISADVANTAGE

1. Costly
2. Must require internet.

APPLICATION:

1. Hospital
2. Personal data monitoring,
3. Real time communication,
4. Healthcare sectors
5. ICU department etc

VI. CONCLUSION

- In this application we are using different techniques to the find information of the patient's health.
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