IOT Based E-Health Care System for Telemedicine

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Abstract : The Technological and economical advancement needs enhanced healthcare system. Telemedicine healthcare system provides the provision of medical treatment from a remote distance. The telemedicine research and product development has embarked immense growth during the past decade primarily due to tremendous technological advancement in automation. The aim of IOT-based health care system is to ensure and increase the welfare of patients and the quality of life in rural areas. In this paper we present a low cost Health sensor platform and sugar level without blood for rural health monitoring with a well-structured and secure interface between medical experts and Cellular and WLAN for sharing of important medical parameters. In our proposed and implemented model we developed separate interface for medical experts and medical server, Caregiver, Emergency other then physician and introduced a new algorithm for implementation. Features like live video streaming, automatic prescription generation and push notification to allotment are included. The prototype is used for trial under the supervision of medical experts and the data are compared with standard test done in pathological laboratory. The result is satisfactory with good level of acceptance.

Index Terms - **IOT,E-health,Telemedicine,Self-Monitoring.**

I. Introduction

The need of e-health care is to improvise the current health management. With the use of this technology and electronic devices we can make sure that the data of the patients are kept in record, by making use of the IOT we can provide the care for the patients. The need of telemedicine is to treat the patients by telecommunication technology. The Mission of e-Health Care is to help patients, physicians, and community hospitals to make appropriate use of information and communication technologies (ICTs) in order to improve access.

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II. RELATED WORKS

Different works have been on e-health care to monitor the patient health remotely to improvise the health care systems and algorithm. Arnold Griswold at.[1] introduced the emergency wait system for health care. This system effectively slashed wait times for 50% of their emergency room patients who are in need of inpatient care. The most ill or injured patients will be dealt with in this area. Patients who exhibit signs of being serious ill where they will be seen by a physician and receive a more thorough assessment and treatment.

Kenneth Bird at.[2] bought telemedicine in health care system. it is used for telecommunication and information technology to provide clinical health from a distance. Patients receive care from doctors or specialists far away without the patient having to travel to visit them. This enables medical professionals to monitor a patient remotely using various technological devices. This method is primarily used for managing diseases or specific conditions such as heart disease, diabetes or asthma.

Stan brock at.[3] introduced m-health(mobile health) the need of the patient and also the health condition can also be indicated through the mobile, such as bodyweight, cholesterol level, body fat, and protein content can be analysed by an remote chip and can be reported to their physician.Overall many people use smart phones and go “paperless”, receiving bills and statements by mail or etc., so by targeting this they have achieved this process and bought the health condition to overall 30% less using m-health in the health care industry.

III. ARCHITECTURE

Healthcare is the maintenance or improvement of health via the prevention and treatment of disease, illness, injury, and other physical and mental impairments in human beings.

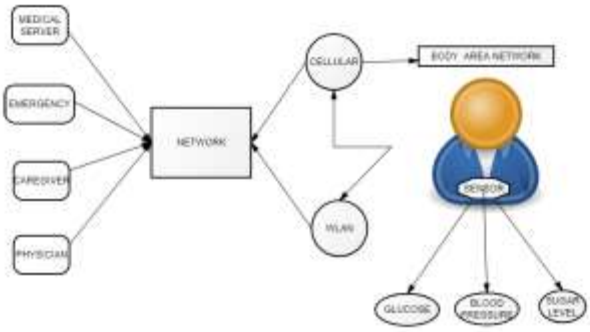

Fig 1: Base Architecture

Health sensor platform and sugar level without blood for rural health monitoring with a well-structured and secure interface between medical experts and Cellular and WLAN for sharing of important medical parameters. In our proposed and implemented model, we developed separate interface for medical experts and medical server, Caregiver, Emergency other than physician and introduced a new algorithm for implementation. Features like live video streaming, automatic prescription generation and push notification to allotment are included. The prototype is used for trial under the supervision of medical experts and the data are compared with standard test done in pathological laboratory. The result is satisfactory with good level of acceptance. Index Terms E-health, Telemedicine.

MODULE 1 : SENSORS

A tiny sugar-sensing device called a "sensor" is inserted just under the skin (subcutaneous tissue).The sensor measures the level of sugar in the interstitial fluid (fluid surrounding the cell) every 10 seconds and changes it into an electrical signal. The signal represents the amount of sugar in blood.

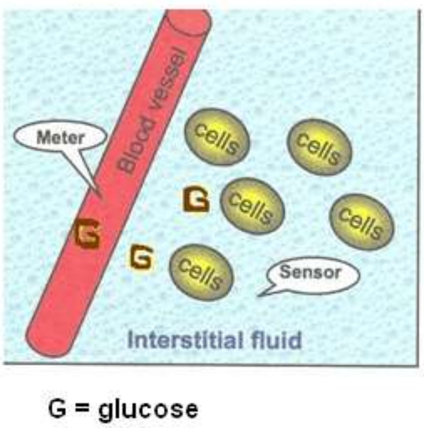

Fig 2: Glucose Monitor

A small transmitter attaches to the sensor. The system automatically records an average sugar value every 5 minutes for up to 72 hours. Results of several finger stick blood sugar readings taken with your sugar meter at different times each day are entered into the monitor for calibration. You and your diabetes educator can then review your sugar levels in relation to the other data collected and make any necessary adjustments in your diabetes management plan. The information will be presented as graphs or charts that can help reveal patterns of sugar fluctuations.

MODULE 2 : WIRELESS EMERGENVY ALERT

Wireless Emergency Alerts (WEA, formerly known as the Commercial Mobile Alert System (CMAS), and prior to that as the Personal Localized Alerting Network (PLAN)), is an alerting network designed.

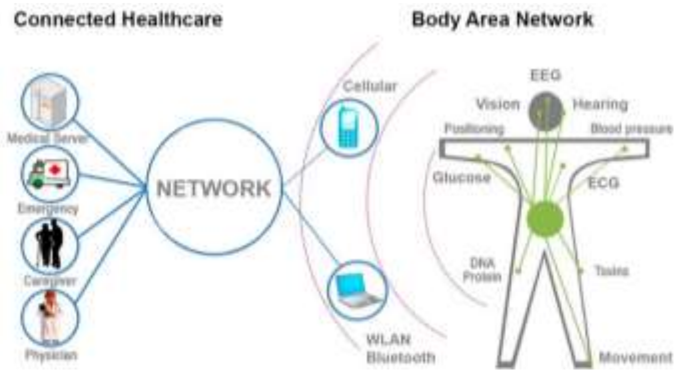

Fig 3: Connected Healthcare with Body Area network

IV. RESULTS AND DISCUSSION

The system is capable of working in both online and offline modes so that it can be used efficiently in limited Internet connected areas. Proposed system consists of AVR Atmega 328P, Arduino shield, Body Temperature, Pulse Oximeter, ECG, GSR, EMG, Blood Pressure, Camera module USB port. The integrated system is connected to a computing device with Intel i3 processor with Windows XP and above. For storage purpose Amazon AWS is used and for syncing an application is developed on Google script Platform.

Doctor Interface has a list of patients which are referred by the remote centre. The interface displays all relevant sensor data of a particular patient in order. Medical practitioner may be live online or offline and hence the proposed model offers live session and offline session. The sensor data are streamed during online session whereas the data are stored in proper format for offline sessions. Standard signal processing toolkits are used to provide some additional Graphical analysis of some of the received sensing data to help medical practitioners in diagnosis. We present a low cost Health sensor platform and sugar level without blood for rural health monitoring with a well-structured and secure interface between medical experts and Cellular and WLAN for sharing of important medical parameters.

Fig 4: Self-monitoring healthcare devices

Self-monitoring devices were created for the purpose of allowing personal data to be instantly available to the individual to be analyzed.

Fig 5 : Sugar Level Chech without Blood Sample

For about a month, Tabb Fir Chau, an entrepreneur living in Seattle, has been wearing a continuous sugar monitor (CGM), a federally approved medical device that tracks blood sugar levels for people with diabetes.

E-Healthcare system needs to record distinct types of sensor data. The proposed system inherits the sensors data through a identification string name and the required number of samples instead of conventional data acquisition system where each sensor node require separate channel. This is an event driven process where at the same time from all sensors data acquisition is not required. Instead, data is captured on occurrence of some specific events and stored. The sampling rate of sensor acquisition mainly depend on sensor specification.

V. RESULTS

The proposed system is tested under the supervision of medical practitioner for some patients. The results obtained from our prototype is compared with the results obtained from the pathological laboratory and is shown in Table .The blood pressure sensor isused for getting blood pressure-related sensing data. The values are measured once via four types of values, which are time, systolic, diastolic, and pulse. The electromyography sensor is used to get sensing data that related to muscle. The sensor collects continuous data. The galvanic skin response sensor is used to gather emotional. The sensor collects continuous data with conductance and resistance sensing data.

In the e-Health system, the e-Health client requests the data that is saved in the database on the e-Health server. The e-Health client is used for controlling the e-Health device to request the semantic model from the e-Health server and collect the sensing data from the user. The message for the body temperature sensor includes the sensing data as a single value because only one value is needed for body temperature. The message for the blood pressure sensor includes time-data, systolic-data, diastolic-data, and pulse-data. The message for the electromyogram sensor includes a series of electromyogram values that are collected by the electromyogram sensor order by time. The message for the GSR sensor includes a series of conductance-data, resistance-data, and conductance-data values that are continuously collected by the GSR sensor.

The T-health framework created for persistent checking in view of Internet of Medical things is an option arrangement that can be utilized to help patients without coming as often as possible to the healing facilities. This proposed will be used only to have link between one primary health centers to one district hospital. In like way with this arrangement, the point is to enhance the personal satisfaction of patients observing them, as well as to empower them to enhance their everyday propensities and exercise schedules. The setting model delivered for the system ended up being capable when making determinations related to the remarkable condition, for instance, recommendations for taking measures through sensors, and what's more proposals and exercise plans tips to improve their life. In future it can be improved to different area central command with state level healing center.

VI. CONCLUSION AND FUTURE ENHANCEMENT

The proposed system is tested under the supervision of medical practitioner for some patients. The results obtained from our prototype is compared with the results obtained from the pathological laboratory. In this paper, we have argued that social studies of self-monitoring would benefit from the articulation of a set of questions informed by empirical research into other domesticated health technologies. Drawing on the traditions of STS and SHI, we hope to animate further empirical work

E-health care system using cloud computing and web services provide better solution over traditional method. Critical condition can be avoided by frequently checking the sensor data at webpage. Here only one blood pressure sensor is attached. System can be improved by attaching more Health sensor platform and sugar level without blood for rural health monitoring with a well-structured and secure interface between medical experts and Cellular and WLAN for sharing of important medical parameters. A large group of the patient can be supported by single healthcare professionals. The system must be available at anytime, anyplace for the personal health-care via internet access using any smart device. This would allow a better health tracking system for analyzing information and conditions for the patient. In the future, we will focus on how to improve the wearing experience of the sensor.

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