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A Survey on Continous Health Care System Using (W)

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Abstract— *Wireless network technologies have realize new opportunities from wireless body area network (WBAN) for continuous remote monitoring patient's vital signals in the hospital and remote health care environment. Monitoring patient glucose level use of WBAN. Sensors node is capable of sensing and processing the vital signals as well as communicating to the remote monitoring system. Patient diabetes signals transfer to the hospital server and the doctors system to communicate continuously. Glucose monitoring is an integral part of diabetes management, and the maintenance of physiological blood glucose concentration is the only way for diabetic patients to avoid the life-threatening diabetic complications. Continuous glucose monitoring provides maximal information about the shifting of blood glucose levels throughout the day and facilitates the making of optimal treatment decision for a diabetic patient. This report discusses continuous glucose monitoring in terms of its purpose technology target pop elations, accuracy, clinical indications, outcomes, and problems. Personal Digital Assistant or smart phone can be used as PD. Based on the existing architecture mentioned above, we propose design concept for virtual doctor server (VDS) to support various patient health care services. VDS will keep the historical data about the patient to generate the daily tips and advice for him, call the doctor or emergency squad if required it can provide first aid assistance instructions on patient or any of his close relative's PDA's.*

Keywords— Wireless Body Area Network, personal digital assistant, virtual doctor server.

I. INTRODUCTION

A wireless body area network (WBAN) is a radiofrequency (RF) based wireless networking technology that interconnects tiny nodes with sensor or actuator capabilities in and on or around a human body. As describe in, the transmissions of these nodes covers a short range of 2 m, and other specifications of WBAN are Wireless Body Area Network is a special kind of network that is designed and developed for the Human body, to monitor, manage and communicate with different vital signs human body like temperature, Blood pressure and ECG etc. These vital signs can be monitored by using different sensor installed on clothes or in the body or even under the human skin. Any kind of drug that can be injected using actuator installed on human body likes to control the blood pressure, temperature or it can inject any life savings drugs. Central unit is responsible to establish the communication between sensors, actuators and cellular phone in the wireless fashion. Cellular phone of a person can be used to transmit all information to and from the human body to the external world (physical, emergency). This kind of wireless personal area network around and near the human body is called as Wireless Body Area Network (WBAN) where each body is assigned to an IP address. IEEE 802.15 Task Group 6 standard is assigned to develop an energy-efficient device and to develop applications for WBAN. In what follows we present a survey of major existing WBAN application, technologies, architectures, protocols, available infrastructure and available standards.

II. RESEARCH AREAS OF INTEREST

Research compare alternative system level approaches to supporting and improving patient access to care; receipt a appropriate evidence based care; the quality, timeliness, and safety of the patient care experience; decision-making based on patient personal values and self-care. Research that compares alternative approach to models of care deliver or coordination of care across health care service or settings, including care for patients with complex, chronic, and/or multiple conditions are of interest. The emphasis is on comparing approaches their effect on patient and, when relevant their caregivers, in ways that the experience and think are important. Research that compares alternative system level approach that aim's to improve the efficiency of health care delivery to patient populations. These may include effort to reduce the use of ineffective wasteful care, to reduce redundant and duplicative care, to shorten waiting time to enhance the timeliness and good quality of communications during referral and transitions in care. Strategies of interested include, but are not limited to, applications of health info systems, including electronics health record, patient system, and a personal health record; the use of incentives

directed at clinicians or patients; of payment such as value-based purchase and bundled payment; reconfigure (redesign) of care, such as the patient-centered medical home and accountable care organization and models of care coordination and integration organizational decision-making protocols to guide care referral and specialize assessment of patient with complex conditions; and new and extended roles for allied health professional (e.g., pharmacist, nurses, physician assistant, dentists, chiropractors, complementary and alternative medicine provider, patient navigator, health coaches, social and service coordinators , volunteers, etc.). Strategies may focus on patient or system enrolls population with a single condition or with a range of conditions. Systems strategies to support and improve care for patients with rare conditions are of interest. Rare diseases are defined as life-threatening, chronically debilitating diesis that are of such as low prevalence in population that special efforts, such as combining data across a large population, may be needed to address them. The term low prevalence is defined as meaning condition that affect fewer than 200,000 individual in the United States or have a prevalence of less than 1 in 1,500 persons. Backgrounds healthcare systems are characterized by the organization of people and resources to deliver services to meets the health need of target population. System may be publicly or privately organized. Systems are often evaluated in terms of the ability to deliver accessible, good quality, efficient, and equitable care. Governmental policies and market force motivate healthcare system to improve these parameters, and these pressures in turn help to shape the clinical, environment, workforce, and financing decisions made by system. Importantly, the demographic and clinical characteristic of the population served and the scopes and mission of the organization also have strong influences on each of these system level metrics by the access, pattern of use, and effectiveness of various health services. Over the past decades, the Institute of Medicine (IOM) and others have sharpened the focus on ensuring that systems are also designed and toward achieving the health outcomes most desired by individual patients—that is, to become patient centered. Innovation and change in health care system and in the behavior of health system actors (patients, caregivers, clinicians, payers, purchasers, industry, researchers, and policy makers) is often driven by economic, political, and social need to improve access to care or quality of care, to attract patients or enrollees, and to contain costs. In recants time, rising healthcare cost, demographic trends, and the implementation of the Affordable Care Act have been important catalyst to new approach to change healthcare systems respond to the current and expected future health needs of the US population.

III. APPLICATION OF WBAN IN HEALTH CARE

There are different application and usage models of body area networks. WBANs will play an important role in real time monitoring:

- Medical health care services, e.g. Medical check-up
- Physical rehabilitations
- Physiological monitoring of vital signal parameters.

The small biosensors can collect various real time vital health parameters including blood pressures, electroencephalogram (EEG), electrocardiogram (ECG), carotid pulse, glucose rate, body temperature. The BAN is used in other non-medical areas such as military, sport, and entertainment. IEEE 802.15.6 categorizes WBAN applications in medical & non-medical (Consumer Electronics) as can be seen in The WBAN can also be used in entertainment applications such as microphones, camera, head-mounted displays and advanced computer appliances. They can be used in a virtual reality & gaming purposes, personal item tracking, exchanging digital profile or business card and consumer electronics.

IV. MANAGED BODY SENSOR NETWORKS

A manage body sensors network (MBSN) is defined as a systems where the third party makes decisions based the data collected from one or many BSN. We will discuss Mobile Health and Code Blue, two manage BSN that are approaching development of managed BSN from different perspectives. In 2003, two researchers from the University of Twenty published a paper entitled "Continuous monitoring of vital constants for mobile users: the Mobil Health approach." The paper described the increasing demands of resource placed on the medical community, the rising costs of in-patient care, and the relative lack of out-patients monitoring. The paper defines "extra-BAN communication" (EBAN) as communication between a BAN and another network. The solution paper provided was MobiHealth, a BSN with EBAN connectivity to a 2.5/3G networks to provide out patients monitoring of patients vital signals. Through this infrastructure the MobiHealth

Designers were able to provide sensors information's to qualified medical professionals, where multiple patients data could be monitored in an aggregate form. MobiHealth is simply one example of a managed BSN. Harvard University's Code Blue represents another example of BSN currently in the trial stages. Like Mobile Health, Code Blue provides an infrastructure for multiple patients monitoring via EBAN communication. Code Blue takes a more middleware approach to BSN instead of the packaged solutions that Health provides. By providing a middleware layer, the Code Blue project allows developers to specify the modules to use. In this way, Code Blue rather flexible at runtime. Two examples given by the Health team are emergency response and monitoring movement in stroke patient rehabilitation. Both scenarios have very different requirements both from a sensors perspective, and a timeliness perspective however the platform is able scale to accommodate both accordingly.

V. WIRELESS BODY AREA NETWORKS ARCHITECTURE

The Body Area Network (WBAN) is a human centered communication network. The network consists of three types of nodes. The Sensor nodes consist of implanted and body surface nodes. These nodes collect vital parameters of the human body; this information is transmitted to either intermediate router node or to an external coordinator node. The intermediate router node exchanges the data and control messages between the sensor and coordinator node. The Coordinator node is an external node which acts as a gateway for higher layer applications

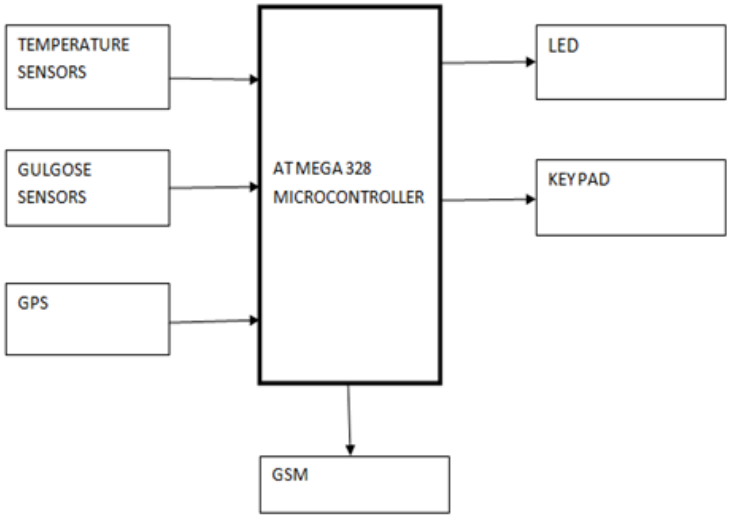

FIG.1 ARCHITECTURE OF WIRELESS BODY AREA NETWORK

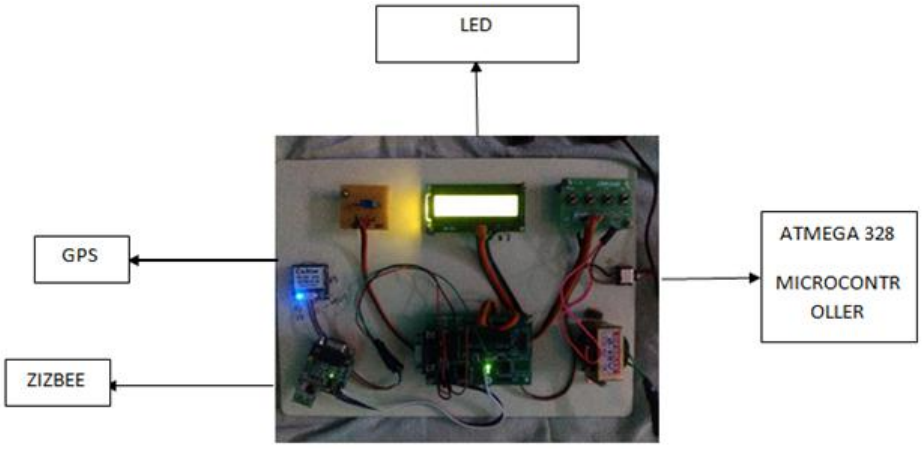

FIG. 2 WBANS SYSTEM HARDWARE AND DEVICES

VI. DESIGN GOALS

The following are the design goals that are applicable to virtually every patient monitor application domain, size, and complexity.

1. Simplicity
2. Consistency
3. Identity
4. Visual appeal
5. Compatibility

6.1 Problem Definition

The problem is, when the patient health monitoring system in wired communication, and weight of the device is high, when the BAN system use in wired network in small distance communication, it is traditional technology .And use wired sensors to gather and monitor the patient health conditions like ECG, Blood Pressure, etc..., Details sends to doctors system and doctor arrive the patient room to give the health tips.

VII. OVERVIEW OF PROJECT

Advance in wireless sensor network technologies have realized new opportunities to form Wireless Body Area Network (WBAN) for pervasive remote monitoring for the patients vital signs at hospital and remote homecare environment, thereby improving health care system. Today wireless sensor networks are used in various applications like Military and Healthcare etc. Wireless sensor network is deployed in an open or hostile environment. The wireless physiological body sensor node is capable of sensing and processing in vital signals as well as communicating to the Network Coordinator for the transmission of these signals for remote monitoring.

To design and implementation of a prototype for low power WBAN for remote monitoring of the patients' physiological signals such body glucose. The sensor nodes and Network Coordinator are connected in star network using proprietary (LTE/WCDMA/GSM) transceiver modules from. The connectivity of WBAN to commercially available PDA as base station is provided ultra wide band protocol module in mobile.

WBAN has been widely use in the military, entertainment, consumer electronics, smart home, public services, and especially in healthcare. WBAN has provides a new means for healthcare to disease monitoring, health recovering, especially for special groups' monitoring, which has a great meaning in applications and market. By micro-sensors embedded in human body, WBAN can collect the data of human movement, then to realize that the movement monitoring, movement recognition, gait recognition, gait analysis, movement power consumption monitoring etc.

VIII. PROPOSED WORK

8.1 DATA TRANSFER TO NODES TO MICROCONTROLLER

In this module, the sensor nodes collect the information in human body and transfer to the centralized microcontroller; sensor nodes continuously collect the information to transfer the data in controller.

8.2 MICROCONTROLLER TRANSFER DATA TO SYSTEM

In this module, microcontroller transfer the collection of information through the Zigbee transceiver its send the data in wide band frequency. The doctor system receives the data via the zigbee transceiver to the doctor system. Doctor continuously analysis the patient health in all the way.

8.3 DOCTOR SEND DESCRIPTION TO PATIENT

In this module, Doctor continuously monitor the patient health to send the description to patient system to display the description in LED display in the patient side system. And continuously monitor the patient condition the network communication take high speed data transfer to communicate and interface the patient and doctor system.

8.4 CRITICAL SITUATIONS MESSAGE TO AMBULANCE SERVICE

In this module, patient health conditions is critical situation arise the data transfer the hospital system and simultaneously transfer message automatic to the doctor mobile and the ambulance service and transfer the patient location gather patient location in GPS transfer via GSM module.

IX. BRIEF LITERATURE SURVEY

Ghosh et.al [1] proposed a modulation technique, i.e. Discrete Frequency Shift Key (DFSK) for ultralow power wireless sensor nodes application, which has been shown to be the more energy-efficient transmission techniques for short-distance wireless communication systems. The proposed DFSK technique significantly relaxe the frequency stability requirement in the transmitter RF front-end at the cost of a little increases transmission power, which, in turn, significantly simplifies the circuit complexity as well as reduces the overall circuit power consumption with the transmitter.

Hamada et.al [2] proposed a packet of error mitigation technique named as LT code, to realize a highly reliable wireless body area network (WBAN). By using the LT code, received signal strength (RSS) is measured as radio propagations around the human body between the antennas attached to the participants, calculated packet error rate (PER) based on the measurement results of RSS to mitigate the packet error, evaluate the application of LT code to WBAN

Wang et.al [3] presents a distributed WBAN network for medical supervision. The system contains three layers: sensors network tier, mobile computing network tier, and remote monitoring network tier. It provides collection, demonstration, and storage of the vital signal information such as ECG, blood oxygen, body temperature, respiration rate. Furthermore, it also provides medical service mgmt and disease warning.

Ortiz et.al[4] proposed the multi-hop in BANs to improve the network performance by reducing energy consumption and, thus, extending the network lifetime and work presents the Adaptive Multichip tree-based Routing (AMR) protocol that is extensively evaluated in a real tests bed deployment. Fuzzy logic is proposed to evaluate several node and network parameters in order to improve the network performance in terms of throughput and energy consumption.

X. CONCLUSION

In this paper, a comprehensive review of WBANs in terms of its applications, characteristics, network architecture, physical layer modeling, hardware requirement and recent low power, short range technologies is presented. As a complement to existing wireless technologies, the WBAN plays a very important role in interdisciplinary research and development. We believe that this survey can be considered as a source of inspiration for future research directions. Several open issues like effect of RF circuits and Physical characteristics of sensors, Biocompatibility, Security, Privacy and Authentication, Routing protocols still need to be addressed. In particular, for life-saving applications, thorough studies and tests should conduct before WBANs can be widely applied to humans. WBANS system mainly focuses on the efficient communication to transfer the patient vital signal to doctor system. The secure routing and security provide the WSNS; it provides the synchronization to the patient and the doctors provided by the WBANS. It provides large scalable of health monitoring system and empirical evolution with large scale WSNs. Finally, we demonstrate a proof-of-concept wireless body area sensor network health care system in WSN application.

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