Vol 12 Issue 01, Jan 2022
ISSN NO: 0364-4308

MEDICINE REMINDER AND MONITORING SYSTEM FOR SECURE HEALTH USING IOT

Gita Reshmi , Manjunatha K H , Usha. G

Asst. Professor, Asst. Professor, Asst. Professor

gita.v.patil@gmail.com , manjukh09@gmail.com , ushagonal645@gmail.com

Department of ECE, Proudhadevaraya Institute of Technology, Abheraj Baldota Rd, Indiranagar,

Hosapete, Karnataka-583225

Abstract

People nowadays tend to forget numerous things due to their hectic schedules. People with dementia, which causes them to forget important daily tasks, are more likely to be old or suffer from chronic conditions, both of which need prompt medication administration. This has been the subject of a situational analysis. In this paper, we will take a look at the home health care technologies that are already helping with things like medication reminders, remote monitoring, and the ability for prescribers to update their patients' data with new medication schedules on the web.

Introduction

Most of the time due to number of work for the people as well as regarding age and some disease which leads to forget the basic things among daily routine. If the patient sufferings from the disease where it is compulsory to take medicine at proper time, in this paper we have review the technology of home health care system among them a medicine reminder system and some improvement regarding authentication have well focused. Generally for home based health care the arrangement include communications, imaging, sensing and human computer interaction technologies embattled at diagnosis, treatment and monitoring patients without disturbing the quality of lifestyle. It can be possible the development of a low cost medical sensing, communication and analytics device that is real-time monitoring internet allowed patients physical conditions. Internet of Things (IoT) network will provide active and real-time appointment of patient, hospitals, caretaker and doctors apart from this the secured data transmission from source point to destination for the purpose of remote monitoring there is need of the architecture of a low cost embedded platform for Web-based monitoring 1 . The distant monitoring is made possible by using various biomedical devices, they measure and transmit data via Bluetooth or ZigBee to a unit that manages them (PC, iTV). The collected information may be stored on the device or sent to a collection centre that provides a complete monitoring, for both health professionals and patients. Access to the medical centre can be allowed, via web, from mobile device or PC 2 The IOT and RFID combination also play a vital role in object detection and personal identification which can be use categorized the person while remote monitoring when number of people information have observed which will helpful to unique identity to each patient and their respective data will be

stored . As a Consequence of healthcare reforms, digital medical records have facilitated the widespread availability of publicly available, statistical data. Feeding the pool of mounting data is the patient doctor interaction Physicians assess the patient's complaint and prescribe a course of action2 The data collected provides the basis for a decision support tool for Patients to compare Prescription Drug Plans based on a patient's individual situation and preferences. The tool will provide explicit information that will assist the patient in determining the most suitable prescription drug plan, taking into account the individual importance of plan features. Utilizing historic data, comparisons on Prescription spending will be made to past patients who have a similar health profile as identified by the current patient3 . Figure 1, is observed result from review which leads to home health care module specifically for the medicine whose technology discuss in technique requirement part. In overall system function the alarm will generate according to scheduled and the situation can be recorded with help of sensor which will remotely monitor, save for the future reference, update drug information according to need through web after comparing drug taking habit of patient.

Literature survey

1. A. Sawand, S. Djahel, Z. Zhang, and F. Na. Multidisciplinary Approaches to Achieving Efficient and Trustworthy eHealth Monitoring Systems. Commun. China (ICCC), 2014 IEEE/CIC Int. Conf., pp. 187–192; 2014.

The rapid technological convergence between Internet of Things (IoT), Wireless Body Area Networks (WBANs) and cloud computing have contributed to the emergence of ehealthcare, significantly improving the quality of medical care. In particular, patient-centric health monitoring plays a vital role in e-healthcare service, involving a set of important operations ranging from medical data collection and aggregation, data transmission and segregation, to data analytics. This survey paper firstly presents an architectural framework to describe the entire monitoring life cycle and highlight the essential service components. More detailed discussions are then devoted to data collection at patient side, which we argue that it serves as fundamental basis in achieving robust, efficient, and secure health monitoring. Finally, a set of design challenges is particularly analyzed for developing high quality and secure patient-centric monitoring schemes, along with some potential solutions. The recent advances in wireless sensing technology have led to the emergence of a wide range of applications in different domains such as medical, sports, consumer electronics, social networking, and enterprise usage. eHealth is recognized as the most important and promising among these applications due to its potential for health monitoring of chronic illnesses, lifesaving in emergency situations, and its ability to provide round the clock healthcare to rural and disadvantaged areas. Wireless Body Area Networks (WBANs) are the key enabler of remote and in-hospital health monitoring and are expected to revolutionize the health and real-time body monitoring industry.

M. Parida, H.-C. Yang, S.-W. Jheng, and C.-J. Kuo.Application of RFID Technology for In-House Drug Management System.15th Int. Conf. Network-Based Inf. Syst., pp. 577–581; 2012.

Ageing populations and the increase in chronic diseases all over the world demand efficient healthcare solutions for maintaining well-being of people. One strategy that has drawn significant research attention is a focus on remote health monitoring systems based on Internet of Things (IoT) technology. This concept can help decrease pressure on hospital systems and healthcare providers, reduce healthcare costs, and improve homecare especially for patients with chronic diseases and the elderly. This paper explores the use

of IoT-based applications in medical field and proposes an IoT Tiered Architecture (IoTTA) towards an approach for transforming sensor data into real-time clinical feedback. This approach considers a range of aspects including sensing, sending, processing, storing, and mining and learning. Using this approach will help to develop useful and effective solutions for pursuing systems development in IoT healthcare applications. The result of the review found that the growth of IoT applications for healthcare is in areas of self-care, data mining, and machine learning. The increasing trend of ageing populations all over the world in recent years [1], [2] has led to complex health issues, including the increase in chronic diseases and rise in hospital and clinical services expenditures [3], [4], [5]. Health monitoring is playing an important role in maintaining health for individuals, in particular for the elderly or people with chronic diseases because it can reduce hospitalisation and increase the quality of life [6]. Traditional health monitoring models are time-consuming and inconvenient for all involved [7]. These models will be insufficient to meet the need of medical services in our ageing society. There has been a demand for developing efficient healthcare solutions which help to decrease the pressure on hospital systems and healthcare providers, improve the quality of care as well as have a part in reducing healthcare costs by keeping patients out of hospitals for routine care. It is expected that New Zealands government health spending would increase 1.5 times in the period from 2016 to 2060, reaching about 11 percent of GDP in 2060, if there was no change in funding and delivering healthcare services IoT is promising for developing remote healthcare monitoring systems. IoT applications present a paradigm to connect physical and virtual things [9] and enables these things to communicate, share information and coordinate decisions. In recent years, IoT-based applications in the medical field have drawn substantial attention of researchers and technologists. Our research presents an IoT Tiered Architecture (IoTTA) towards a holistic and integrated application development to transform sensor data into real-time clinical feedback. Following are the healthcare challenges that motivate our research. Firstly, populations are ageing all over the world. According to the United Nations [1], the number of people aged 60 and over in the world reached 901 million in 2015, and it is projected to grow to 1.4 billion in 2030 and nearly 2.1 billion in 2050. It is forecasted that the largest age group will be 65+, and the average age will be approximately 50 in many countries in Asia and Europe in 2050 [2]. Secondly, the increase in chronic diseases. In Europe, the most common diseases that affect 15 million people with an incidence of 3.6 million new cases every year are Chronic Heart Failure (CHF), Chronic Obstructive Pulmonary Disease (COPD) and Diabetes. The same trend is also recorded in U.S. [3].

L. Ilkko and J. Karppinen.UbiPILL A Medicine Dose Controller of Ubiquitous Home Environment. 2009 Third Int. Conf. Mob. Ubiquitous Comput. Syst. Serv. Technol., pp. 329–333; 2009.

Ubiquitous Health Monitoring System (UBI Health) is built for the needs of continuously monitoring human health condition. By monitoring human health conditions, irregular vital signs will be detected early. Potential increase in temperature, heart rate variability, diabetes symptoms and arthritis symptoms could also be detected early, then notification could be raised. UBI Health design consist of Smart Mouse, Smart Mirror, Smart Chair, Windows Phone App, Desktop App, Online Monitoring and Expert System. Smart Mouse will detect heart rate and body temperature. Smart Mirror is designed to detect heart rate, respiration rate and body temperature. Smart Chair detects heart rate, measure body temperature and body weight. Heart Rate measurement is also applied by utilizing the camera on WP. Visual Acuity Test, Hearing Test and Colour Blind Test also built in Windows Phone platform. The other designed application in Windows Phone are Drug Application and Health Education App. Desktop App si also built to detect heart rate and respiration rate. Online Monitoring System is built to monitor vital sign periodically. In Smart Mouse

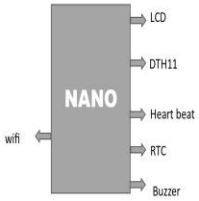
implementation, user excessive hand movements will disturb the measurement of heart rate and body temperature. Low light levels will affect the validity of the measurements on the Smart Mirror. Heart rate measurement application on Windows Phone still needs improvement in terms of user experience. On Online Monitoring section, the system already can read progression of vital signs from patients in a real time manner. According to WHO, the cause of 35 million deaths worldwide are caused by the disease category of noncommunicable diseases (NCDs). Among them are cardiovascular disease, cancer, acute respiratory and diabetes. This is the number one killer disease in the world, 80% of them are in low-and middle-income countries [1].

Kliem, M. Hovestadt, and O. Kao.Security and Communication Architecture for Networked Medical Devices in Mobility-Aware eHealth Environments," 2012 IEEE First Int. Conf. Mob. Serv., pp. 112–114;2012.

This paper presents an alternative way to secure communications in e-health. During the communication processes, users exchange different types of information with different levels of sensitivities. For example, communications between a doctor and a patient contain data of higher levels of sensitivities than communications between a social worker and a nurse. The different levels of the sensitivities of the information are secured by using different types of security processes. In this paper, these different communication types and different levels of data sensitivities in e-health are explained, the requirements for each type for communications are described and the use of the cryptography to secure the communication is discussed. Nowadays, the pervasive use of the Internet improves of healthcare services. The electronic health, or e-health, enhances the communications between patients and doctors. It also provides education through online resources, as well as information sharing irrespective of their locations [1]. In addition, e-health improves efficiencies, reduces cost, and improves the quality ofhealth service delivery [2]. The current practices in e-health encompass many aspects with information and telecommunication technology as the backbone to support communications. For example, Mapaci [3] is an e-health research project, which assists patients with throat illness through voice processing algorithms and a communication framework. Mapaci provides online consultation rooms for doctors and patients. It has a program that can capture patients' speeches to be analyzed by medical experts. Another application called DITIS [4] also supports communications and collaborations of different users for homecare. More e-health applications can be found in [5].

Block diagram

Vol 12 Issue 01, Jan 2022
ISSN NO: 0364-4308



ARDUINO NANO (Micro controller)

The Arduino Nano, as the name suggests is a compact, complete and bread-board friendly microcontroller board. The Nano board weighs around 7 grams with dimensions of 4.5 cms to 1.8 cms (L to B). This article discusses about the technical specs most importantly the pinout and functions of each and every pin in the Arduino Nano board.

Arduino Nano has similar functionalities as Arduino Duemilanove but with a different package. The Nano is inbuilt with the ATmega328P microcontroller, same as the Arduino UNO. The main difference between them is that the UNO board is presented in PDIP (Plastic Dual-In-line Package) form with 30 pins and Nano is available in TQFP (plastic quad flat pack) with 32 pins. The extra 2 pins of Arduino Nano serve for the ADC functionalities, while UNO has 6 ADC ports but Nano has 8 ADC ports. The Nano board doesn't have a DC power jack as other Arduino boards, but instead has a mini-USB port. This port is used for both programming and serial monitoring. The fascinating feature in Nano is that it will choose the strongest power source with its potential difference, and the power source selecting jumper is invalid.

DHT TEMPERATURE & HUMIDITY SENSORS.

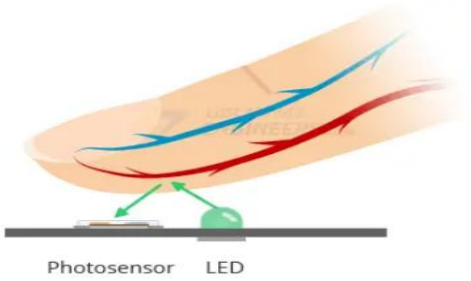
These sensors are very basic and slow, but are great for hobbyists who want to do some basic data logging. The DHT sensors are made of two parts, a capacitive humidity sensor and a thermistor. There is also a very basic chip inside that does some analog to digital conversion and spits out a digital signal with the temperature and humidity. The digital signal is fairly easy to read using any microcontroller.

Vol 12 Issue 01, Jan 2022
ISSN NO: 0364-4308

Humidity is the measure of water vapour present in the air. The level of humidity in air affects various physical, chemical and biological processes. In industrial applications, humidity can affect the business cost of the products, health and safety of the employees. So, in semiconductor industries and control system industries measurement of humidity is very important. Humidity measurement determines the amount of moisture present in the gas that can be a mixture of water vapour, nitrogen, argon or pure gas etc… Humidity sensors are of two types based on their measurement units. They are a relative humidity sensor and Absolute humidity sensor. DHT11 is a digital temperature and humidity sensor.

Heart beat

The theory behind optical heart-rate sensors is very simple. If you've ever shined a flashlight through your fingers and observed your heartbeat pulsing, the concept of optical heart-rate pulse sensors can be easily grasped.



The oxygenated hemoglobin in arterial blood has the property of absorbing green light. The redder the blood (the higher the hemoglobin), the greater the absorption of green light. With each heartbeat, blood is pumped through the finger, causing a change in the amount of reflected light, which in turn produces a waveform at the photosensor's output.

RTC DS1307 – Pin Description, Features & Working of DS1307

What are Real Time Clocks?

Real time clocks (RTC), as the name recommends are clock modules. The DS1307 real time clock (RTC) IC is an 8 pin device using an I2C interface. The DS1307 is a low-power

clock/calendar with 56 bytes of battery backup SRAM. The clock/calendar provides seconds, minutes, hours, day, date, month and year qualified data. The end date of each month is automatically adjusted, especially for months with less than 31 days.

They are available as integrated circuits (ICs) and supervise timing like a clock and also operate date like a calendar. The main advantage of RTC is that they have an arrangement of battery backup which keeps the clock/calendar running even if there is power failure. An exceptionally little current is required for keeping the RTC animated. We can find these RTCs in many applications like embedded systems and computer mother boards, etc. In this article we are going to see about one of the real time clock (RTC), i.e. DS1307.

BUZZERS

In common parlance a Buzzer is a signaling device that is not a loudspeaker. It can be mechanical, electromechanical, or electronic (a piezo transducer). BeStar produces Buzzers in every available configuration for a wide variety of applications. A Piezo transducer can produce the sound for panel mount buzzers, household goods, medical devices and even very loud sirens. When a lower frequency is required an electromagnetic buzzer can fill the need. These are very common in automotive chimes and higher end clinical diagnostic devices. The BeStar buzzer range includes self drive units with their own drive circuitry (indicators), or external drive units, which allow the designer the flexibility to create their own sound patterns.

Conclusion

As this paper's study shows, there have been a lot of technological advancements in home health care, and the scheduling of medical procedures has been a major priority. This has helped to increase the efficacy of prescription medications while decreasing costs. Home health monitoring systems are the result of a plethora of monitoring technologies that aim to enhance the current home health care approach. In order to ensure that messages carrying health-related information do not get corrupted, the sensing element and wireless module that may be used to construct the monitoring system should be secure. In order for the two devices to communicate with one another, the Internet of Things (IoT) is crucial. messaging standard and communication protocol we can securely transfer the important messages regarding to health. open source IOT cloud will be effective for storing sensors data, the benefit of digitally storing is the retrieving of data

is easy and faster manner in case of emergency for secure health. For the user personal identity and Encryption/Decryption purposes the RFID will best.

REFERENCES

1. A. Sawand, S. Djahel, Z. Zhang, and F. Na. Multidisciplinary Approaches to Achieving Efficient and Trustworthy eHealth Monitoring Systems. Commun. China (ICCC), 2014 IEEE/CIC Int. Conf., pp. 187–192; 2014.

2. D. a. Clifton, D. Wong, L. Clifton, S. Wilson, R. Way, R. Pullinger, and L. Tarassenko. A large-scale clinical validation of an integrated monitoring system in the Emergency Department. IEEE J. Biomed. Heal. Informatics vol. 17, no. 4, pp. 835–842; 2013.

3. M. Parida, H.-C. Yang, S.-W. Jheng, and C.-J. Kuo.Application of RFID Technology for In-House Drug Management System.15th Int. Conf. Network-Based Inf. Syst., pp. 577–581; 2012.

4. L. Ilkko and J. Karppinen.UbiPILL A Medicine Dose Controller of Ubiquitous Home Environment. 2009 Third Int. Conf. Mob. Ubiquitous Comput. Syst. Serv. Technol., pp. 329–333; 2009.

5. A. Kliem, M. Hovestadt, and O. Kao.Security and Communication Architecture for Networked Medical Devices in Mobility-Aware eHealth Environments," 2012 IEEE First Int. Conf. Mob. Serv., pp. 112–114;2012.

6. S. T.-B. Hamida, E. Ben Hamida, B. Ahmed, and A. Abu-Dayya.Towards efficient and secure in-home wearable insomnia monitoring and diagnosis system. 13th IEEE Int. Conf. Bioinforma. Bioeng., pp. 1–6; 2013.

7. P. Ray.Home Health Hub Internet of Things (H 3 IoT): An architectural framework for monitoring health of elderly people.Sci. Eng. Manag. Res. (, pp. 3–5, 2014.

8. S. Huang, H. Chang, Y. Jhu, and G. Chen.The Intelligent Pill Box - Design and Implementation. pp. 235–236; 2014.

9. F.-T. Lin, Y.-C. Kuo, J.-C. Hsieh, H.-Y. Tsai, Y.-T. Liao, and H. C. Lee A Self-powering Wireless Environment Monitoring System Using Soil Energy. IEEE Sens. J., vol. 15, no. c, pp. 1–1; 2015.

10. S. S. Al-majeed.Home Telehealth by Internet of Things (IoT). pp. 609–613; 2015.

[9] Karne, R. K. ., & Sreeja, T. K. . (2023). PMLC- Predictions of Mobility and Transmission in a Lane-Based Cluster VANET Validated on Machine Learning. International Journal on Recent and Innovation Trends in Computing and Communication, 11(5s), 477–483. https://doi.org/10.17762/ijritcc.v11i5s.7109

[10] Radha Krishna Karne and Dr. T. K. Sreeja (2022), A Novel Approach for Dynamic Stable Clustering in VANET Using Deep Learning (LSTM) Model. IJEER 10(4), 1092-1098. DOI: 10.37391/IJEER.100454.

[11] Reddy, Kallem Niranjan, and Pappu Venkata Yasoda Jayasree. "Low Power Strain and Dimension Aware SRAM Cell Design Using a New Tunnel FET and Domino Independent Logic." International Journal of Intelligent Engineering & Systems 11, no. 4 (2018).

[12] Reddy, K. Niranjan, and P. V. Y. Jayasree. "Design of a Dual Doping Less Double Gate Tfet and Its Material Optimization Analysis on a 6t Sram Cells."

[13] Reddy, K. Niranjan, and P. V. Y. Jayasree. "Low power process, voltage, and temperature (PVT) variations aware improved tunnel FET on 6T SRAM cells." Sustainable Computing: Informatics and Systems 21 (2019): 143-153.

[14] Reddy, K. Niranjan, and P. V. Y. Jayasree. "Survey on improvement of PVT aware variations in tunnel FET on SRAM cells." In 2017 International Conference on Current Trends in Computer, Electrical, Electronics and Communication (CTCEEC), pp. 703-705. IEEE, 2017.