

Automated RFID Based Health Care System

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Abstract: Generally people don't know which medicine to take in and the use of that medicine as they end up taking wrongly. Also now a days the expiry dates of the medicine are not seen by most of the people as they have no time for all these. Mostly they forget to take medicines at times. So, there should be always a need of care takers as there is no auto medication system. These problems can be avoided in implementing the automated Medikit system which is RFID based. It indicates the medication which the patient should intake and provides the information about the name, use and the expiry date of the medicine. It displays the details as well as reads in voice also says about the count of the medicines. Heart beat and Glucose sensors are used and the values are automatically updated.

I. INTRODUCTION

In this system, we report the design and development of a wireless sensor network for biomedical application. The human machine interface algorithm is used here to design a medical box which is very helpful for the patients. The patient's may not remind their prescription for their daily consumption. The system contains a medical box which consist of PIC, 16F877A, RFID READER, ZIGBEE and LCD. Radio Frequency Identification Technology consists of (RFID) consists of RFID Tag and Reader. It can read and write devices and larger data. RFID contains higher level of security and can read greater distances than barcodes. It does not require lines of sight as need in barcode. The RFID tag consist of antenna and IC when the tag is brought near the RFID reader the chip used to transmit data and the information when it is exposed to radio waves. The reader is a network connection device with an antenna that sense power, data as well as commands of the tags. The reader read the information of the patient tag while showing the tag and it transmits through zigbee to PC section. The patient has to inform the medicines availability by pressing the keys in the kit. The pc receives and stores the information in the database. The doctor can access the data through his doctor ID. This system provides the quality healthcare at reasonable costs with the help of RFID technology. It provides patient centric and self-managed care as an alternative. It indicates the medication which the patient should intake through RFID tag and reader. The RFID reader placed in the kit and by RFID tag is given to the

medicine and PIC is included in the kit. LCD displays the details of the medicine by reading the RFID tags .All medicines have RFID tags with UNIQUE ID number by which the reader reads. It provides the information about the name, use and the expiry date of the medicine. It displays the details as well as reads in voice. It also says about the count of the tablets. Automated RFID

Based system also says about the counts of the tablets and remaining counts or balance tablets in the strip. The system generates the alarm sound like buzzer sound when the count is minimum .Alert message is given when the tablet is about to finish. APR (Audio Playback Recorder) gives the voice message about the status of medicine. Peripheral interface controller or programmable intelligent computer is an electronic circuit that can be programmed to carryout vast range of tasks.PIC comprises of UART which will act as database where all the information will be saved. Universal Asynchronous Transmitter and Receiver (UART) is used for communicating serial data to the PC. It is used for serial communication. TX is for transmission and RX is for receiver. The device changes incoming parallel information (within microcontroller) to serial database which can be sent on a communication line The information about the name of the patient, intake of medicine its name, use ,expiry date, counts remaining will be automatically updated to PC using IOT (Internet Of Things).PIC has an in build UART which will be used to store all information and also as database. The system has two sensors like Glucose Sensor and Heartbeat Sensor in order to check the level of glucose in blood and the heartbeat rate by heartbeat Sensor. It is important to check the Heart beat level especially if the patient suffers from

diabetes. There are two types of tags which are Active and passive tags. Passive RFID tag is used in the system because it does not battery instead they draw power from the reader, which sense out electromagnetic waves that induce current in the tags antenna. Tags are useful to tracking high values that need to be scanned over long ranges. Passive tags life is up to 10 years depending on environment and the read ranges up to 40 feet. Zigbee is an internal protocol which acts as an communication protocol that is used to create personal area networks with small digital radios. IOT is an environment in which objects, people all are provided with unique identifier and ability to transfer data over network without requiring human to human interaction. The automated based health care system gives advantage of knowing the name, purpose and the expiry date about the medicine which we in take regularly .If any deviations occurs in the value range of glucose and heart beat unusually than the previous ranges , alarm sound is generated automatically from the kit. Fig [2] of this paper is about architecture diagram and fig [3] is the receiver section of those messages from UART1 to Zigbee from Zigbee to PC. All information and the usage of the medications will be saved using IOT automatically and also notifications will be given using application. The application notifies the intake time of tablets and all related data's from tag. This system is very useful for people who have diabetes and other common health issues to take tablets on time and don't want to suffer without tablets because kit alerts if the count is less. It is efficient for old people without any care giver's help.

II. RELATED WORK:

In [1], we discuss the concept of POC Technology called Self-care Technology. POC technologies provide an effective means for reducing health care costs and improving efficiency. The key idea is to provide access to health monitoring and assessment technologies to people with limited or no healthcare facilities, or with geographically distant facilities. Primary goal is to improve quality of care, health outcomes and the financial feasibility. Modern Medicine has witnessed interdisciplinary technology innovations in healthcare with continuous growth in life expectancy across the globe. There is also a growing global concern on the affordability of rapidly rising healthcare costs. To provide quality healthcare at reasonable costs, there has to be converge of preventive, personalized, and precision medicine with the help of technology across the spectrum of Point-Of-Care to critical care at hospitals.

In [2], Point-of-care tests (POCTs, also known as near-patient tests) have been used for quick availability of testing results without sending samples to laboratory.

Point-of-care blood tests are becoming increasingly available and could replace current venepuncture and laboratory testing for many commonly used tests. It improves patient convenience, satisfaction, less time and cost consuming. Generally people go to clinics or hospitals for tests. But by using this method we can easily get the test results without sending samples to the laboratory. The synthesis generated three main themes: the impact of point-of-care testing on decision making, diagnosis, and treatment.

In [3], Driven by the growing age population prevalence of chronic diseases and continuously rising the health care cost and health care system is undergoing the fundamental transformation from the conventional hospital centred system to an individual centred system current and emerging developments in wearable systems will enable the Accessibility and affordability of health care .This paper reviews recent development in the area of wearable medical system of P-Health. Enabling the technologies For continuous and noninvasive measurement of vital signs and bio-medical variables, advances in intelligent bio medical clothing and body area networks, approaches for motion artifact reduction, strategies for wearable energy harvesting, and establishment of standard protocol for evaluation of wearable medical devices are presented in this paper.

In[4], e Health system is envisioned as the promising approach to improve the health care through information technology ,where security and privacy are crucial are crucial for its success and large scale deployment. In this paper we propose a strong privacy scheme. Against Global Eaves Dropping, named SAGE for e Health system. The proposed SAGE can achieve not only context oriented privacy but also a contextual privacy against a strong global adversary. Extensive analysis demonstrates the effectiveness and practicability of the proposed scheme. Formal security proofs show the SAGE can achieve not only the content oriented privacy but also the contextual privacy under the strong global adversary model. SAGE demonstrated efficient in terms of transmission delay.

In [5], Distributed sensor data storage and retrieval have gained increasing the popularity in recent years for supporting various applications. While distributed architecture enjoys a more robust and fault tolerant wireless sensor network (WSN)such architecture also poses a number of security challenges especially when applied in mission critical application such a battle field and e-attacks such as physical compromise ,it is significantly harder to ensure the data security. Second are many missions –critical applications, such as battle field

and e-Healthcare. Sensor data are stored and maintained by individual sensors and unattended sensors are easily subjected to strong attacks, it is significantly harder to ensure data security. Fine-grained data access control is a must as illegal access to the sensitive data may cause disastrous results and are prohibited by the law. Sensor nodes usually are resource constraints which limits the direct adoption of expensive cryptographic primitives. The proposed scheme exploits a novel cryptographic primitive called attribute-based encryption (ABE), tailors, and adopts it for WSN with respect to both performance and security requirements. The feasibility of the scheme is demonstrated by experiments on real sensor platforms.

III. ARCHITECTURE DIAGRAM

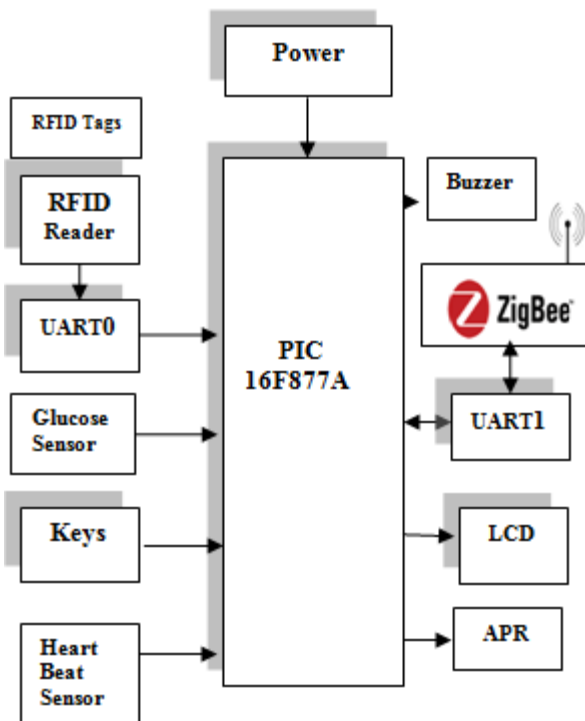


Fig 2: Architecture Diagram

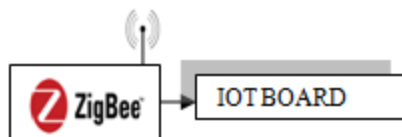


Fig 3: Architecture Diagram (Receiver Section)

The system contains PIC which is known as Peripheral interface controller. PIC are circuits that can be programmed to carry out a vast range of tasks. RFID Tags and Reader are connected with PIC. RFID reader is a device that is used to interrogate RFID Tags. RFID reader reads the information from the patient tag while showing the tag. The UART known as Universal Asynchronous Receiver Transmitter. It helps to receive the data from the reader and transmit to PIC. Glucose and Heart Beat sensors are also present. Glucose and Heart Beat are automatically tested using sensors. The keys are present in the kit. The person has to inform the medicine availability by pressing the corresponding keys. APR is the Audio Pre-recorder voice which reads the information in voice. LCD (Liquid Crystal Display) displays the information like name, use, expiry date etc.. UART1 is used for receiving the data from PIC and transmitting it to Zigbee. The Zigbee is a communication protocol used for transmitting the data with small digital radios. Buzzer is used for generating the alarm sound when the count of the medicines are reduced and also used to inform the timing of medicines to intake. The receiver section contains IOT (Internet of Things). The Zigbee transmits the data wireless. IOT have the ability to transmit data over network without requiring human to human interaction.

IV. PROPOSED SCHEME

The proposed system involves benefits of alert messages and alarm sound in case of emergency like any deviations in level and range of glucose and heart beat while comparing with previous values. It provides efficient way of intake of tablets especially for old peoples without any help of others or any care giver's in order to take care of them. Alarm sound is provided by buzzer and voice is given by APR to read the information in the tag. Tag's data's will be retrieved by RFID reader when exposed to radio frequency. Passive tag is used which covers wider range to give data's to reader. LCD shows the medicine prescription to the patient what medicine has to take. This System is used to maintain the easy database for medicine availability. Kit has Zigbee which is a communication protocol used for transmitting and receiving the data's from kit to PC. Our Proposed system involves

A) RFID Tags and Reader Module

In this module RFID Reader and Tags are placed in the kit. RFID stands for Radio Frequency Identification. RFID reader is a device that is used to interrogate RFID Tags. RFID reader reads the information from the patient tag while showing the tag it transmits the data through Zigbee to PC section. All medicines have RFID Tags with unique Identification number which will be read by the

reader. RFID Tag consists of the antenna and IC. When the Tag is brought near the RFID Reader the chip used to transmit the data and the information when it is exposed to Radio Waves. The tag responds by sending the data. The TX and RX pins of RFID reader connected to TX and RX pins of PIC respectively. Then the reader senses the data from the Tag and transmits the sensed data to PIC via serial port.

B) Sensors Module

In this module, Glucose and Heart Beat are automatically tested using sensors. Heart Beat is sensed by using a high intensity type LED and LDR. The finger is placed between LED and LDR. The skin may be illuminated with visible (Red) using reflected light for detection. The value is preset in the inverting input, the amplified value is compared with preset value if any abnormal condition occurs it will generate an interrupt to the controller. A buzzer is a signaling device, it mostly consists of a number of sensors connected to a control unit that determines if and the button was pushed and illuminates the light on the appropriate button. Blood glucose monitoring is a way of testing the concentration of glucose in the blood. Blood glucose test is performed by piercing the skin to draw blood, different manufactures use different technology, but in this system it automatically tests the glucose level by placing the finger in the kit. It automatically tests and the values gets updated in the PC using IOT.

C) Application Development and Database Module

In this module, it maintains easy database for medicine availability where the data is stored in PIC. Data are visualized using UART. UART is Universal Asynchronous Receiver and Transmitter. It is the individual IC used for serial communication. Application is developed to notify the alerts if any abnormality occurs. It gives notification messages and alert messages automatically about the medicine availability easily. It also notifies all the information of medicines and changing sensor rates. It contains the details of the medicines, use, expiry and all the data.

D) GUI and Implementation Module

In this module, GUI and implementation is done. GUI is the Graphical User Interface. GUI is the type of the interface that allows users to interact with electronic devices through graphical icons and visual indicator such as secondary notation. The actions in a GUI are performed through direct manipulation. GUI is used as the interface between the hardware and the software. PIC is the electronic circuits that are programmed to carry out various tasks. The programming is done in the MPLab. The testing is performed.

V. CONCLUSION

Our system guarantees the Health Monitoring using Wireless communication. This system provides the quality health care with the help of technology. It maintains the easy data base for medicine availability and intimates the stack-out to monitoring system. Using RFID Tags informs the details of medicine like name and use. It also checks about the expiry date and the count of medicines which the patient intakes regularly. It also shows the medicine prescription to the patient what medicine to take at what time. Tests the Heart Beat and Glucose levels are tested automatically using sensors. It automatically generates alert message when any abnormality occurs or the medicines are about to finish.

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