IOT and RTC based smart drug admin system

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To Cite this Article

Article Info

ABSTRACT

The main aim is to make a Smart medicine box for those users who regularly take medicines and the prescription of their medicine may be very long as it is hard to remember to patients.

Also, Old age patients face problem to take pills on proper time which causes certain health issues for patients having Permanent diseases like diabetes, blood pressure, breathing problem, heart problems, cancer diseases, etc. We saw these problems in hospitals & people around us who have such kind of diseases and thus based on these two problems we made smart medicine box which solve these problems by Setting up time table of prescribed medicines as given in prescription. Therefore, at the time of taking medicine, the system generate buzzer and display the Bright light in certain pill boxes and pill box gets open. So, patient can know the specific number of boxes from which he has to take out medicines. All pill boxes are pre-loaded in the system which patient needs to take at given time. Thus, final result of our system provides fast curing of patient health by using our advantageous system. every time we will set the time, medicine description using IOT Telnet application from mobile phone. For every remanding interval of time respective voice alert will alert you. Every status of project is monitor in LCD using 16*2 modules. The proposed system is designed using ARDUINO microcontroller using Arduino IDE software. 5V regulated power supply used to control ARDUINO microcontroller.

Keywords: IOT, RTC Based Smart, Drug Admin System.

1. INTRODUCTION

Currently, worldwide aging and regularity of persistent diseases are flattering a broad concern. Numerous countries are undergoing hospital restructuring by reducing number of hospital beds and escalating home healthcare, which is envisioned to perk up health care quality, has fascinated wide-ranging attention. In order to track the physical status of the elderly and, in the meanwhile, to keep them healthy, the proposed idea will be helpful. IoT expands the Internet into our everyday lives by wirelessly connecting various

smart objects, and will bring significant hangs in the way we live and interact with smart devices. Internet of Things (IOT) is a network where many of the objects that surround us will be networked in one form or another. In this process of encryption, the schedule data or doctor's prescription are send to pill box through mobile app. The LEDs are placed for indication and buzzer for alarm alerts and reset button is used to count for medicine in cloud platform. During the past century the life expectancy of the living world has increased by more than 50 percent due to advancements in medicine. Utilizing the groundbreaking telemedicine technology, the Pill Ejector has been designed in such a way that it can help the elderly patients to take their medicines on time without any external help. It is an automatic medication dispenser that removes the stress and danger of missing or incorrect doses of medicine. Thus the machine helps them to live an independent life with reliable functionality. There has been alarming results showing the fatal effects of medication error. The main aim of E-Pill Ejector is to reduce the medication errors and the fatal effects of it. Once the device is loaded with pills and the time schedule is set, it reminds the patient to take the right medicine on time. The Digitalized Voice Activated E-Pill Ejector is designed using telemedicine technology and it removes the stress and danger of missing or incorrectly administering medicine doses.

The main step in the treatment of any disease is not just prescribing medication but also for the right administration of the drugs. Thus, this machine automatically gives the right pills at the right time and also sounds an alarm to remind the patient about the medication time. Once voice feedback is received from the patient, the pills are ejected. The proposed model makes it easy especially for the elderly people who has one or more chronic condition or those who have to take multiple medications. This device mainly assists people with chronic device or those suffering from heart diseases, osteoporosis, diabetes or cancer.

Materials and Methodlogies

The block diagram as shown in figure 1 consists of Embedded System based microcontroller unit, Keyboard interface- To set the time schedule, LCD Interfacing- display module, Real time clock, Buzzer Unit- As reminder, Voice recognition module- To eject the medicine after the speech recognition box- To load medicine, Motors and Power Supply. The vital part of the E-pill is the microcontroller which controls the entire operation of the pill ejector. The working of the E-pill is initiated by entering date and time of medication using the keyboard interface of the machine. Once the data is entered, the LCD displays it. Real time clock counts seconds, minutes, hours, date of the month, month, day of the week and year with leap-year as shown in figure 2.The scheduled time is fed into the Real Time Clock. Once the time is set, the buzzer rings accordingly thus reminding the patient to take the medicine in time. On hearing the buzzer ring, the patient gives a voice input which is recognized by the voice recognition module and thus the buzzer stops which leads to the rotation of stepper motor and thereby ejects the pill.

The reality is that many of us will need assistance in our later years. In some cases, people need nothing more than occasional visits from a home nurse, some light housekeeping, meals on wheels, and visitors willing to talk and notify about pills. While there is a movement to make aging at home possible for more people, it is not always an option. Dementia and other illnesses can require around the clock medical care and monitoring, things often more easily given in a professional facility than at home. On the other end, increasing number of smart systems opens area where medical treatment can be utilized to completely new level. In this paper we show a working solution how a smart home can be utilized to help people with

medication related remainders. Proposed flow starts when a new medication prescription is taken from the doctor. eHealth system generates QR code which is then delivered as part of prescription, holding set of information, such as medications treatment, duration, next visit and similar. This set of information is used by the expert system which handles all the notifications generated by prescription. In used system, three types of notifications are used, smart phone notifications, home voice and video notifications.

When it comes to loved ones, humans strive to keep them fit and healthy at all times. But what if they forget to take their medicine and become ill as a result? Hence, many patients require medication at the health care center, and it is difficult for us to remind each patient to take medicine at a specific time. Traditional way requires lot of human effort to remind the patient to take medicine. But in this digital era, humans make use of machines to do certain works. Pill remainder has a wide range of uses, including use by patients at home, doctors in hospitals, and a variety of other settings. This paper presents a working of advance pill remainder setup, which can remove asymmetry in taking medicine dosages and remind the patient to take medicine at prescribed time and particular number of dosages. In this approach, the users are switching from human memory to automated supervision.

In modern society, most of the time people remain busy in their daily life schedule. It is true that they give more preference to their work than taking care of their health. Several diseases like diabetes, blood pressure is nowadays very common. Maintaining daily medication become very difficult for old people. Sometimes younger is faced with the same problem. There are many people in our family who need constant help may it be our elderly people, younger or others. But it is not always possible for us to remind them of their medicine's dosages every time. For this purpose, there needs to be some facility for us which monitoring patient and take care. Nowadays we are all used to living technology-based life. We can use this technology in a way that will be beneficial for us. Cell phones aren't best utilized for calling but now maybe used as an ensemble of embedded sensors that together allow new packages including human services, healthcare, social networks, environmental tracking etc. Today in medical services frameworks, the usage of cell phones is turning into an expanding number of values. Bluetooth may be helpful to monitor real-time condition and Bluetooth can be a powerful and effective paradigm to store data collected by sensors devices to the cloud. In our project, the Bluetooth enabled device will control the overall monitoring system. And developed an android application which help patients by reminding medicine in take time and so on.

- The existing techniques in the market for the reminder . But this does not help in checking the medicine. This proposed idea is valuable solution to the medical noncompliance problem.

- The innovation scheme help patient keep trail of their medicine consumption through a series LED alarm indicator signal. The main objectives of the project are:

- Dispense of medicines from pill box at scheduled time.

- Medical alerts to care taker and retailer.

- Online report generation of medicine.

- Real-time health statistics monitoring of medicines.

- Configuration data is send through IoT.

2. LITERATURE SURVEY

Several medical treatment systems have been built using different approaches and platforms. With the growing popularity of remote healthcare and medical apps, a lot of researches in these fields have been evolved. As part of that, several medication reminder systems have been introduced. In [1], the researchers proposed a prototype of an in-home medication management and healthcare system based on intelligent and interactive packaging and intelligent medicine box. Similar system is proposed in [2], where a medicine reminder app that manages prescription schedules and alerts for reminding patients about the type and time of the medication according to the prescribed medicine schedule. A typical design for smart medicine box introduced in [3] where a time table of prescribed medicines through push buttons as given in prescription. Another medication reminder system in [4] is proposed where it transmits open mobile alliance (OMA) data synchronization (DS) based messages which contain the patient's prescription and the device data to a remote medical staff. While in [5] researchers proposed an intelligent home monitoring system using ZigBee wireless sensors network that monitors the elderly who are living alone. We used the Medication management concept to propose a medication reminder system where pharmacists or patients can set the schedule time and the number of pills of up to eight medical doses. Based on an RTC (Real Time Clock) interfaced to the microcontroller, [6] the programmed time and number of pills for a medicine is displayed on the LCD along with a buzzer sound to alert the patient about taking the appropriate medicine. If patient doesn't press done button, he will receive a reminder about the medicine he has to take via SMS on his/her cell phone, by using GSM modem Ilkko et al4 proposed UbiPILL A Medicine Dose Controller of Ubiquitous Home Environment (2009), Home automation and wireless sensor network which have enhancing the quality of life by providing security, information and comfort. Here had discuss a centric home server with three main roles: use of existing Interfaces on registered systems for remote monitoring and Control, serving the surrounding system as a data gateway and Providing content adaptive user interfaces enhanced by Belongings of end-user client devices, the ubipill device had implemented to remind people for elder and for monitoring purposes ubipill and home server have been design to reliably monitor the medicine box activity by web browser[7].

Kliem et al5 proposed Security and communication architecture for networked medical devices in mobility- aware eHealth environments (2012), Telemedicine concept is cost efficient and lo cation autonomous monitoring system, the suitable and secured medical data can be tr ansferred with different devices with attention towards security and privacy issue. Emergency situations need on the flutter network integration and data transmission fluctuating from domains like patients home, medical practices, ambulances and, hospitals, where each domain may parallel to a different authority so, mobility aware approach allowing out of the box medical device integration and authentication, and simultaneously fulfilling the typical security and privacy requirements of e-health environments. Parida [8] et al3 proposed Application of RFID Technology for In-House Drug Management System (2012), RFID based technology have used to make drug management system, in this tracking of medicine can be done including emergency or regular medicine with or without RFID tag .the HF tag have assigning the user and by employing RFID reader along with camera and web based system to track the user. This system can be beneficial for the old age, less educated people. Clifton et al2 A Self-powering Wireless

Environment Monitoring System Using Soil Energy, proposed A large- scale clinical validation of an integrated monitoring system in the emergency department(2013), [9] In the integrated patient monitoring which include electronic patient data which generally have more amount challenges to acquire cope with artefact data with the help of algorithm, analyzing and communicating the resultant data for reporting to clinician, here in this demonstrated th e machine learning technology embedded within healthcare information system which provide clinical benefits for improving patient outcomes in busy environments. [10] Hamida et al6 proposed towards efficient and secure in-home wearable insomnia monitoring and diagnosis system (2013), Due to the evolution in technology it is now possible to specific timing monitoring here delivers an experimental estimation of communication and security protocols that can be used in in-home sleep monitoring and health care and highlights the most proper protocol in terms of security and overhead. Design Procedures are then derived for the distribution of effective in-home patients monitoring systems Ray et al7 proposed Home Health Hub Internet of Things (H3IoT)(2014) , Health is vital part of life and it is quite necessary to give priority health related issue in which digitization helpful by using number of devices through the concept of IOT but due to heterogeneity and interoperability the concept of digitization for health care is neglected, here in this the best focus given to architecture framework for human health hub which have envision of usage of real life implementation. Shivakumar et al8 proposed Design of vital sign monitor based on wireless sensor networks and telemedicine technology (2014), Vital sign monitor can be implemented with IOT technology which is embedded with sensor, the transmitter will in clude the application oriented sm art phone enable with 3G or IEEE 802.11 i.e. wi fi based transmission. The data from transmitter will be sending to cloud for centralized monitoring takes place; the expert in remote place can view all patient data and in case of emergency can take appropriate action. [11] Ajmal Sawand et al1 proposed Multidisciplinary approaches to achieving efficient and trustworthy eHealth monitoring systems(2014),The technological merging between BLUETOOTH, wireless body area network and cloud computing have vital contribution in e health care which improve the quality of medical care, basically patient centric monitoring play a role in e health care services which involve medical data co llection, aggregation, data transmission and data analysis here entire monitoring lifecycle and essential services component have discus as well as design challenges in designing the quality and patient centric monitoring scheme along with potential solution. Huang et al8 proposed the intelligent pill box—Design and implementation (2014), the implementation of pill box has proposed by keeping the problems of old age people in mind to provide full medication safety. The pill box will remind the patient about timing by doing this drug abusing can be controlled. In this paper [12] the creator portrays Tolerant drug and medicine adherence has been a broadly perceived issue in the social insurance industry since specialists started recommending meds to patients. In the past 50 years, a few examinations have been directed regarding the matter, and numerous noteworthy steps have been made in expanding tolerant consistence. With the approach of versatile innovation comes a chance to additionally build up the strategies used to go up against the continuous issue of therapeutic consistence in patients and to upset the manner in which specialists can connect with and monitor their patients. Endeavors have just been made to use portable innovation for this reason; be that as it may, there exists a distinction where the client is awkward with utilizing a cell phone. The point of this undertaking is to close that hole by structuring a prescription consistence application that is instinctive and simple to utilize, in any event, for those people who discover the idea of a PDA amazing and overwhelming, and is prepared to do inactively collecting information on quiet medicinal consistence. As versatile innovation turns out to be progressively predominant, the expanded accessibility of data turns into an advantage that

can be utilized by restorative analysts. In this paper [13] the creator presents an easy-to-understand portable application that naturally creates caution sign to remind a client to take drug. This application can consequently process a remedy of numerous meds and give a visual update, just as a sound update in the client's picked language/tongue. This application can advance drug adherence among older patients [14].

3. PROPOSED SYSTEM

The proposed medicine drug admin system is integrated of both hardware and software. This system used IOT android based RTC time, buzzer and Arduino model microprocessor, regulated power supply section for sign conversion system using python programming. When the set time is match with controller data base time then automatically medicine box will open to consume medicine pill.
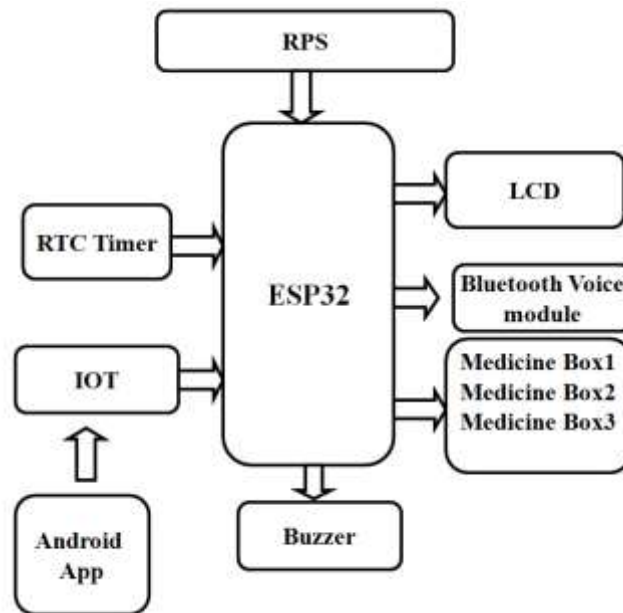

Figure.1. Block diagram

The RPS module converts the 230 ac volts into 5v of dc. The5v of power supply goes to all components in the system. The input of the project is RTC and IOT module. The RTC has CMOs battery and RTC circuit and it counts the time and opens the medicine box. The IOT server can send the data and display the data in the IOT server app. The output has LCD, Buzzer alarm and dc motor, In the Arduino microcontroller contains the software programming code Embedded C. The main purpose of the microcontroller is the data can be control by the microcontroller.

Once we should ON the kit first Reset the kit because to connect wifi to IOT server. The kit is reset the LCD displays the Medicine Remainder. After we configure to IOT server by using an TCP Telnet Terminal app. By using our mobile phone, we can connect the wifi to IOT server. Once the wifi is ON the mobile data should be OFF. By using the IP address 192.168.4.1 and port:23 connect the IOT server. Once it is connected the LCD displays the present Date and Time.

Next we can the set the time for reminding the Medicine we can use the command like @HH:MM:SS# . We can give the Eight commands first we can save and then send the LCD displays the configurations of reminders. The first two commands are getting the same voice and similarly the next six commands also. The next command is for the reminding purpose. Not only giving the voice we can also see the name of the medicine on the LCD and at the same time IOT app.

In real time once we can set the commands it working on 24/7 until the power is OFF. Suppose the power is OFF we can again set the commands.

In this project we are using Atmega328p Microcontroller. It has total 28 pins. In these 28 pins we are using only 20 pins.D0-D13 are the Digital pins(14) and A0-A5 are the Analog pins(6). Here the D0,D1 are connected to the BLUETOOTH, for transmitting and Receiving the data. D2-D7 pins are connected to 16*2 LCD display, D10,D11 pins are connected to Medicine pill box Module gives the Medicine. A4-A5 pins are connected to RTC timer which can use to counts the time. The 230v Ac is converted into 5V of DC and that is given to the circuit through pin7. Reset is given to the pin 1 which is used to reset the circuit for connecting to the IOT module. The oscillator is connected to the pin9 and pin10, the GND is connected to the pin8 and pin22

Arduino sketch that functions as a medicine drug admin system using an Arduino board, a Real-Time Clock (RTC) module, a Liquid Crystal Display (LCD) module. The system is designed to remind users to take their medication at specific times by displaying messages on the LCD and dc motor opens the medicine box. The proposed system designed to configure and manage medication reminder times, display the current date and time on an LCD, and trigger dc motor boxto remind users to take their medication.

4. RESULTS

It uses an RTC module to keep track of time and EEPROM memory to store configuration data. However, there are a few issues with the code, such as incorrect variable names and potential logic errors, which might need further debugging and refinement for the system to work correctly.
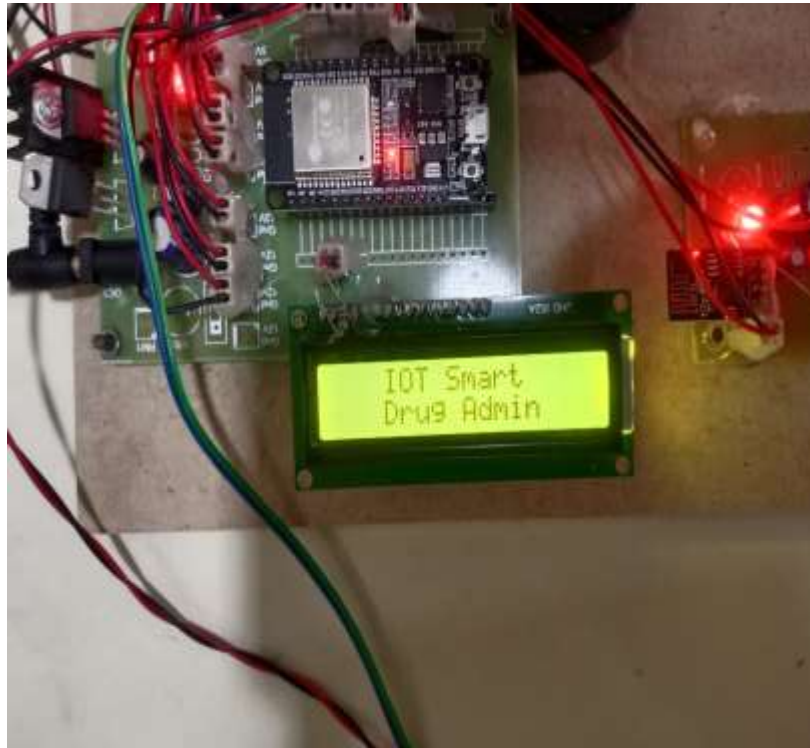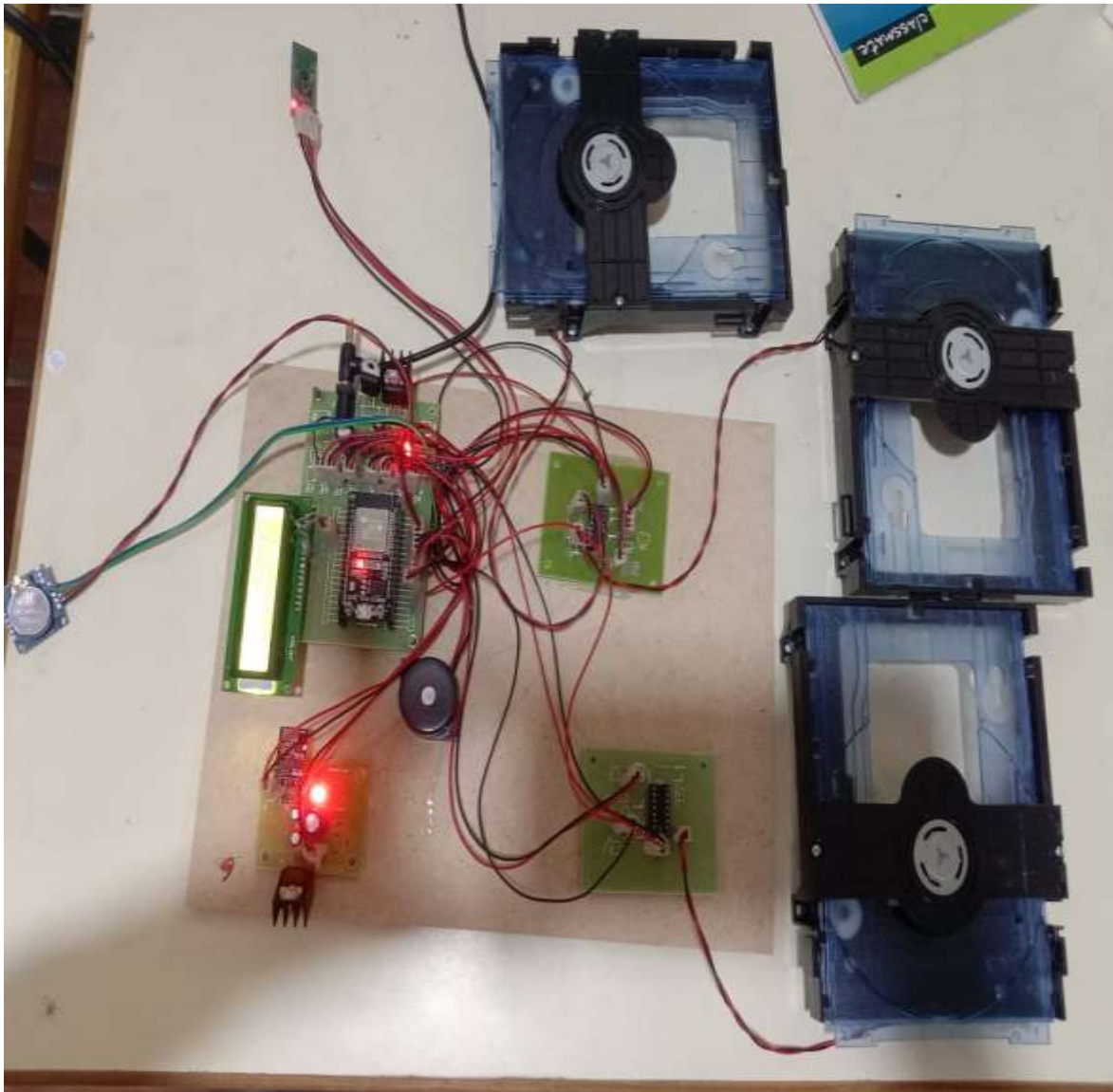
Figure 1: LCD Displays the IOT Smart Drug Admin

Figure.2: Connection and working of IOT Smart Drug Admin

5. CONCLUSION

Overview of the project is "IOT RTC based smart drug admin gives the medicine box automatically open and close for easy consumption of medicine at correct time." the main aim of the project reminding the medicine for the people who are having the health problems Mentally elderly and physically. In this project we are using the RTC timer and IOT module transmitting the data. And the data can be controlled by Microcontroller. By using the wifi connect the IOT server. The data can display on the LCD display and at the same time IOT server. The medicine box will be open through the dc motor module.

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