



AUTOMATIC PILL REMINDER FOR EASY SUPERVISION USING RTC TIMER

ANL.Harisha, R.Vijayalakshmi, Assitant Professor, Department of ECE, Ramachandra College of Engineering

Ch. G.S.V.S. Sanjana, P. Nagesh, P. N.Ravindra, M. Azgar Ali UG Students, Department of ECE, Ramachandra College of Engineering, Eluru, A.P : sanjanachegu06@gmail.com

ABSTRACT

In this paper we present a working model of an automatic pill reminder and dispenser setup that can alleviate irregularities in taking prescribed dosage of medicines at the right time dictated by the medical practitioner and switch from approaches predominantly dependent on human memory to automation with negligible supervision, thus relieving persons from error-prone tasks of giving wrong medicine at the wrong time in the wrong amount. In this project we used RTC for remanding the time for medicine having. Its indicate daily medicine time and drug name. Every time we will set the time, medicine description using IOT application from mobile phone. For every remanding interval of time respective voice alerts 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.

1. INTRODUCTION

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 a 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 Methodologies

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 reminders. 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, and 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. IoT may be helpful to monitor real-time condition and IoT can be a powerful and effective paradigm to store data collected by sensors devices to the cloud. In our project, the IoT 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.

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 location autonomous monitoring system, the suitable and secured medical data can be transferred 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 artifact data with the help of algorithm, analyzing and communicating the resultant data for reporting to clinician, here in this demonstrated the 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 include the application oriented smart 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 IOT, 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 collection, aggregation, data transmission and data analysis here entire monitoring lifecycle and essential services component have discuss 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. EXISTING SYSTEM

Patients may often fail to comply with their medication whether it was from forgetting to take the medicine, from taking medicine at the wrong time or even from taking too much medicine. Therefore, there are many systems such as reminder, alarm, and so on to remind patient. We have focus on those patients who having difficulty to take medication on time, we tried to design and to aid patients with managing their medical prescriptions, through a reminder app they will use to look at and manage their medications. The Pill Reminder will facilitate users to require the right medication on time. This system provides a real time monitoring system that allow related people to monitor the patient's activity remotely.

4. PROPOSED SYSTEM

The proposed medicine remainder system is integrated of both hardware and software. This system used IOT android based RTC time, audio speakers and Arduino model microprocessor, regulated power supply section for sign conversion system using python

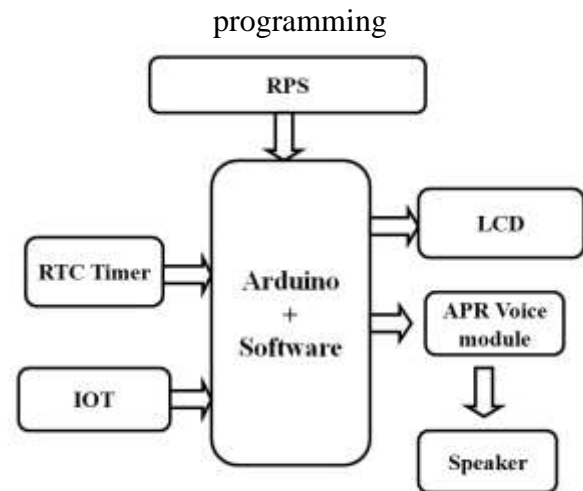


Fig.1. Proposed block diagram

WORKING MODEL:

The RPS module converts the 230 ac volts into 5v of dc. The 5v 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 sends voice through APR voice module. The IOT server can send the data and display the data in the IOT server app. The output has LCD, Speaker, APR voice module, and IOT module also. 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 a 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 they 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 server 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.

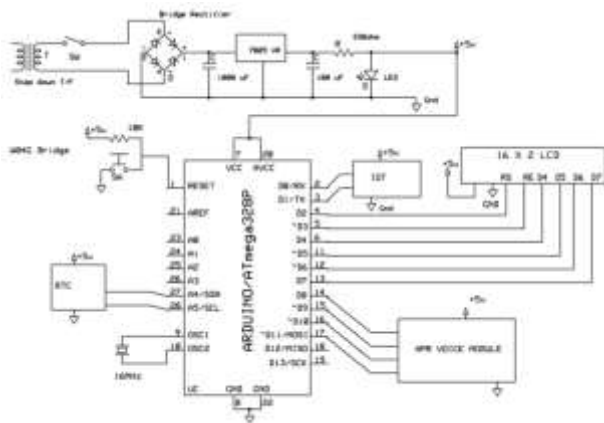


Fig.2. Proposed Circuit diagram

PIN DESCRIPTION

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 IOT, for transmitting and Receiving the data. D2-D7 pins are connected to 16*2 LCD display, D8-D13 pins are connected to APR Voice Module gives the voice of 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.

5. RESULTS

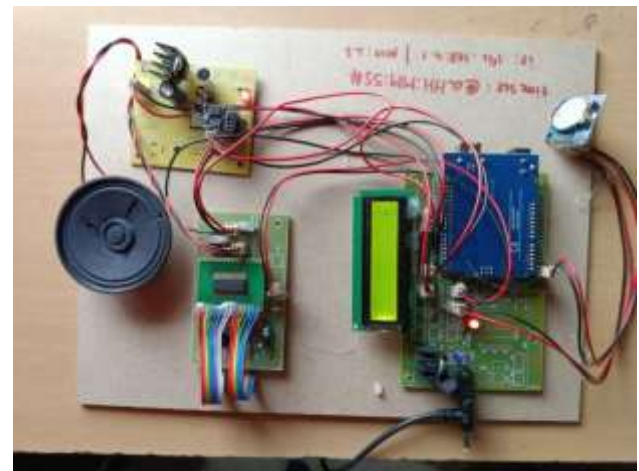


Fig.3. Proposed Output model

When the power is on the LED on the Arduino gets on and blink red colour. And the LCD gets on and displays the title of the project which is IOT garbage collector. And LED on IOT module also blinks which is used to pass the data to the server.

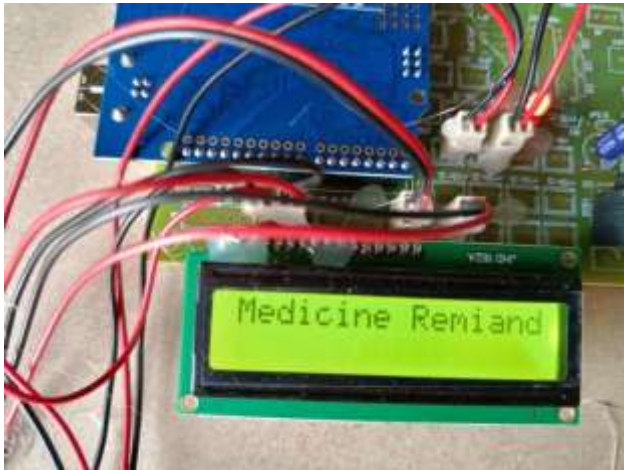


Fig.4. LCD Output Level Indication

When we hit the reset button after providing the regulated power supply, the LCD displayed the Medicine Remainder. The output may be seen in the following image after we have connected the IoT module via a WIFI connection.

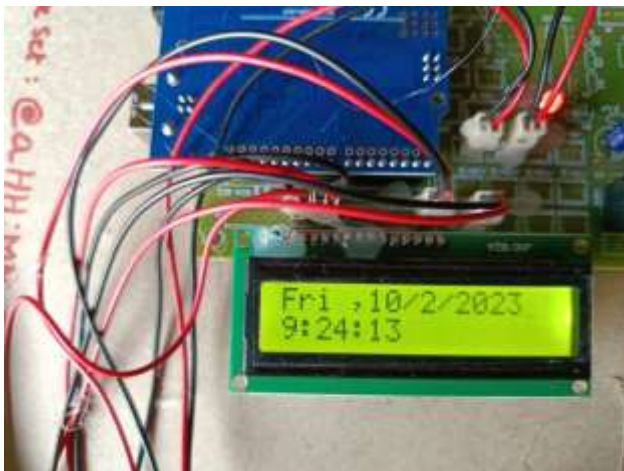


Fig.5. LCD Output Level Indication

The current date and time are displayed on the LCD once the wifi has connected to the IOT server. Connect to the IOT server using port 23 and IP address 192.168.4.1. When connected, the LCD shows the current date and time. Next, we may use the command @HH:MM:SS#

to specify a reminder time for the medication. Eight orders can be given, saved, and sent before the LCD displays the settings of reminders. The voice for the first two instructions is the same as for the next six as well. The next command has a reminder function. Along with speaking, we can simultaneously use an IOT server app and see the medication's name on the LCD.





Fig.6. IOT Mobile Application

This image displays the project's finished product. First, we were able to save commands, send them via voice produced by the APR speech module, and at the same time, the IoT server was able to display the remaining medication in the app.

Table.1 Results comparison Table

Parameter	Existing Model	Proposed Model
Microcontroller	8051	Arduino
Speed	Low	High
Complexity	High	Low
Efficiency	LOW	HIGH

6. CONCLUSION

Overview of the project is “Automatic Medicine Pill Remainder for Easy Supervision using RTC Timer” the main aim of the project reminding the medicine for the people who are having the health problems mentally 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 voice of the medicine can produce by the APR voice module

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