Medication Management Using Arduino UNO

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Abstract—**The main aim is to make a Smart medicine box for those users who regularly take medicines and the prescription of their medicine is very long as it is hard to remember to patients and also for their care giver. Also Old age patients suffer from problems of forget to take pills on proper time which causes certain health issues for patients having permanent diseases like diabetes, blood pressure, breathing problem, heart problem, cancer diseases etc. All pill boxes are pre - loaded in the system which patient needs to take at given time. And our system has quality that it can sense if the patient had taken out pills from the box or not. Another advantage of our system includes of sensing capability if the patient tries to postpone the time of taking medicine by suddenly opening and closing the medicine boxes to stop the sound**

Keywords: Mhealth-mobile health, RTC module-real time clock.

1. INTRODUCTION

The quantity of occupants in people is extending rapidly, and as people grow increasingly prepared, they make memory challenges. Thusly, progressively prepared people may disregard to take as a lot of time as important or ignore that they have successfully taken their remedies. In this way, they miss estimations of drugs, or take overdoses. To deal with this issue, we sketched out and collected an electronic system, which can be acquainted in a medication agency with screen a man's affirmation of meds. The system criteria have taken after (a) negligible exertion, (b) accommodation, (c) unfaltering quality, and (d) likeness with different authority composes, and tranquilize bottles more particularly, the creation gives procedures and structures to managing a man's answer agency with a PC structure related with the database nearby the sensor.

Regular pharmaceutical cabinets basically part with an instrument to putting a man's medication. Exactly when the remedy department is arranged in a house in which a family lives, it isn't astonishing for the arrangement authority to contain pharmaceuticals for different people from the nuclear family. This displays the probability that one individual may take remedy unintentionally that is suggested for a substitute person. Similarly, it isn't astonishing that a man will disregard to have a medication topped off until the point that he takes the last pill of his answer. With the present

Involved lifestyles, people every now and again consume their medications at an inappropriate time or in an inappropriate whole.

Besides, people are much of the time not aware of new notification about adversarial effects and medicine correspondences for different arrangements. It offers assistive hints to patients as prompts and refreshes and depicts our hardware and programming plot examinations of this therapeutic structure for managing arrangement of individuals.

2. LITERATURE SURVEY

1. Zogg Jb, Woods Sp, Sauceda Ja, Wiebe Js, Simoni Jm: The role of prospective memory in medication adherence.

Most patients cannot remember their entire medication regimen and occasionally forget to take their medication. The objective of the study was to design, develop, and demonstrate the feasibility of a new type of medication self-management system using smartphones with real-time medication monitoring. To designed and developed a smartphone-based medication self-management system (SMSS) based on interviews of 116 patients.

2. Mr.Mohammad mohatram, Mr. Waleed Humaid : Automatic medicine reminder using arduino

The system offered patients two main functions by means of smartphones: storage and provision of an accurate, portable medication history and medication-taking records of patients; and provision of a reminder to take medication only when the patient has forgotten to take his/her medication .

3. Eagleton J, Walker for, barber n : An investigation into patient compliance with hospital discharge medication in a local population. int j pharm pract 1993; 2: 107- 109 [google scholar]

Reading of prescription data represented in two- dimensional barcodes using the smartphone camera and getting the photographic images of the pills and Real-time medication monitoring by novel user-friendly wireless pillboxes. The SMSS is acceptable to patients and has the advantage of supporting ubiquitous medication self-management using a smartphone. We believe that the proposed system is feasible and provides an innovative solution to encourage medication self-management.

3. OBJECTIVES

The aim of this project is to process of overseeing the medications prescribed for a patient to ensure they are taken properly and achieving their planned.

1. To select appropriate mechanism and materials used to design AUTOMATIC PILL MANAGEMENT.

   1. This framework is driven by an LCD display board, Buzzer to remind about taking pill, using ARDUINO UNO and DS3231 which is an real time clock (RTC).

   2. Every time the person needed to take the pill buzzer buzz with sound then LED displays the exact pill which is to be taken by the person which is pre-programmed earlier.

   3. This paper proposes persistent prescription update is a framework which helps in medicine organization and checking.

4. SCOPE OF THE PROJECT

The present work is such an attempt to prevent medication management using Arduino uno and RTC DS3232 module. As this helps the patients to take the medicine at the prescribe time suggested by the doctor. The led helps to display the tablet which as to be taken and the buzzer helps to remind the patient at what time the tablet has to be taken. The medication-taking occurrence was improved using this system which is also known as "Smart Medication Box".

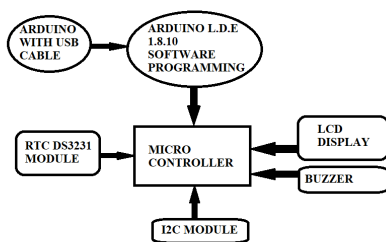## 5. BLOCK DIAGRAM AND DESCRIPTION

Fig1. Block Diagram

We are making a simple medicine reminder using Arduino UNO which reminds to take medicine one or two or three times a day. The time slot can be selected using push buttons also it shows current date and time. Connect the VCC or the 5v pin of Arduino UNO with the positive Rail on the I2C MODULE for making positive connections and similarly connect the ground (GND) pin of Arduino UNO with the negative Rail on the breadboard for making negative connections. Connect the VSS pin of 16*2 LCD with negative rail on the I2C MODULE. Connect the VDD pin of 16*2 LCD with the positive rail on the I2C MODULE. Connect the RS pin of 16*2 LCD with the digital pin 12 of the Arduino UNO. Connect the R/W pin of 16*2 LCD with the negative rail on the I2C MODULE. Now Connect the E pin of 16*2 LCD

with digital pin 11 of Arduino UNO. Connect the D4 pin of 16*2 LCD with the digital pin of I2S MODULE then connect the D5 pin of 16*2 LCD with the digital pin 5 of the I2C MODULE then connect the D6 pin of 16*2 LCD with the digital pin 4 of the I2C MODULE. Connect the D7 pin of the 16*2 LCD with the digital pin 3 of I2C MODULE. Connect the cathode pin of 16*2 LCD with the negative rail on the I2C MODULE. Attach the RTC module with the I2C MODULE. Connect the GND pin of the RTC module with the GND rail on the I2C MODULE. Connect the VCC pin of the RTC module with the VCC rail on the I2C MODULE. Connect the third pin that is SDA of RTC module connect it to the Analogue 4th pin of Arduino UNO. Connect the 4th pin that is the SCL of the RTC module connect it to the analogue 5 pin of Arduino UNO. Attach the push button with the I2C MODULE. Now connect all the internally connected one side of all push button with the ground rail on the I2C MODULE for making the common connections then connect another internally connected side of all the push button with the positive rail on the I2C MODULE. Connect the push button to the 7 pin that is digital pin 7 of Arduino UNO. Connect the Buzzer to I2C MODULE here buzzer acts as alarm indicator. Connect the positive terminal of the buzzer to digital 13 pin of Arduino UNO then connect the negative terminal of the buzzer with negative rail on the I2C MODULE. The circuit is completed. Now from the software part download all the RTC library of Git hub community and then back to Arduino code then compile the code for the pile reminder management project

6. HARDWARE COMPONENTS

a) ARDUINO UNO:

Arduino UNO is a microcontroller board based on the ATmega328P (datasheet). It has 14 digit input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53R0), a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC to-DC adapter or battery to get started. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards

Fig2.Arduino UNO

b) LCD DISPLAY:

The term liquid crystal is used to describe a substance in state between liquid and solid but which exhibits the properties of both. Molecules in liquid arrange themselves until they all point in the same specific direction. This arrangement of molecules enables the medium to flow as a liquid.
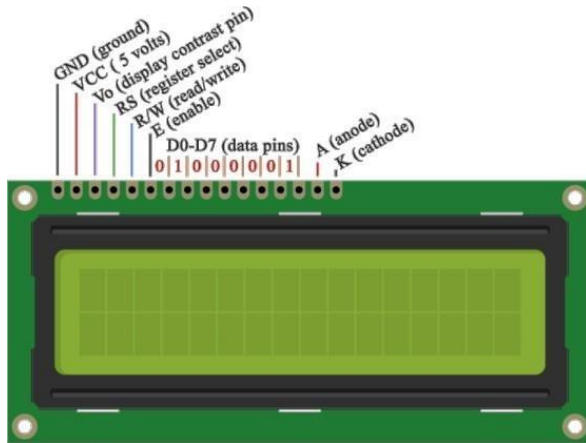

Fig3. LCD DISPLAY

c) RTC DS3231 MODULE

The DS3231 is a real-time clock (RTC) module that is commonly used in various applications where accurate

timekeeping is required. It is particularly popular in projects that involve timing and scheduling, such as medication management systems.

Fig4. RTC DS3231 Module

d) I2C MODULE

A breadboard is a construction base used to build semi –permanent prototypes of electronic circuits. Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holes.
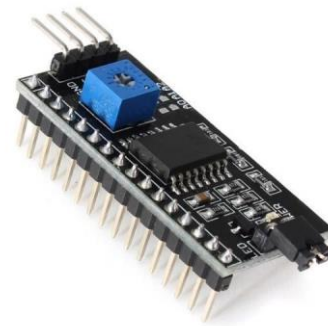

Fig5. I2C Module

e) JUMPER WIRE

A jump wire is an electrical wire, or group of them in a cable, with a connector or pin at each end, which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

Fig6. Jumper Wire

f) BUZZER

An electrical device that makes a buzzing noise is used for signalling. It is also a basic audio devise thatgenerate noise for the incoming signal.

Fig7. Buzzer

7. SOFTWARE COMPONENTS

The Arduino programming language is used to program microcontroller boards such as the Arduino Uno to interact with sensors, actuators, and other devices connected to the board. In fact, the language is based on C++. The Arduino Integrated Development Environment - or Arduino Software (IDE) - connects to the Arduino boards to upload programs and communicate with them. Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved.

Arduino Uno is a microcontroller board, developed by Arduino.cc, based on the Atmega328 microcontroller and is marked as the first Arduino board developed(UNO means "one" in Italian).

The software used for writing, compiling & uploading code to Arduino boards is called Arduino IDE (Integrated Development Environment), which is free to download from Arduino Official Site.

Fig8. Arduino UNO

8. *RESULT*

a)   The DS3231 RTC module is particularly useful in medication management systems where precise timing is used model will significantly improve safety of line man crucial. By integrating the DS3231, we can schedule medication reminders, track dosage times, and ensure accurate record-keeping. The module's alarm functionality can be utilized to trigger alerts when it's time for medication administration.

b)   Although the DS3231 is highly accurate, occasional calibration may be required to ensure long-term precision. Some libraries or code examples provide functionality for calibration adjustments if necessary.

The below figure depicts the smart medication box at what time the medicine has to be taken.
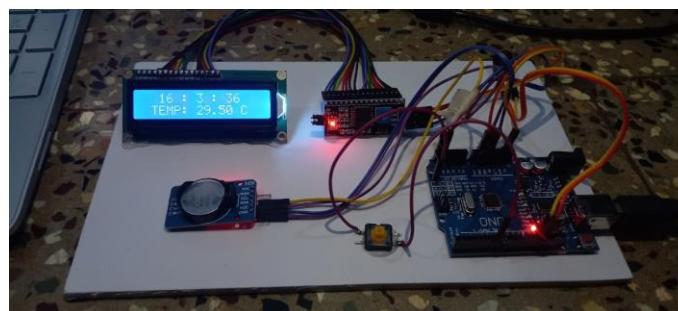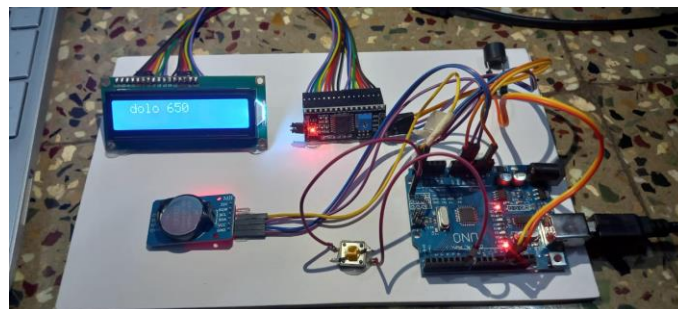
Fig9. Smart Medication Timer

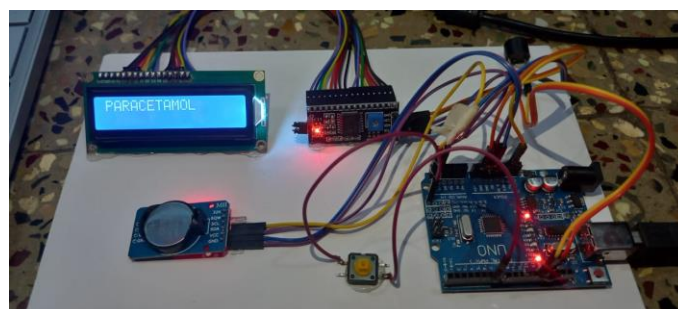Fig10.Medicine detecting as per the time in morning

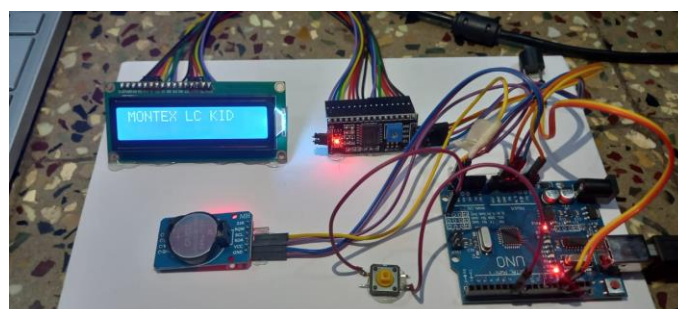Fig11. Medicine detecting as per the time in afternoon

Fig12. Medicine detecting as per the time in evening

9. CONCLUSION

Numerous Medication Reminder Systems have been created on various stages. A considerable lot of these frameworks require unique equipment gadgets to remind the patients about the drug in-take timing. Acquiring new equipment gadgets turns out to be expensive and additional time and cash devouring so in the given work an endeavor has been made to actualize a framework which will be prudent, effectively available and improves drug adherence. Persistent Medication update

framework will decrease the viability of a treatment and forces money related trouble on medicinal services frameworks.

The patients will get the calendar of medication in-require some investment with medication portrayal, beginning and completion date of medication, warning through fluid precious stone presentation (LCD), programmed alert ringing framework. The booked update will propose the sort of medication the patient will take at the specific time of caution.

10. FUTURE SCOPE

During the system testing it was observed that can use for three or four medication give that the user for one patient. For instance, when the use microcontroller became limit because capacity of microcontroller is for three or four medication such cases could be avoided by memory insert and change code od microcontroller. This would involve creating a model of the code and memory which contains the possible to get from one Patient to multi patient

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