

PILL BOX REMINDER

Autonomous sensing and reminder system

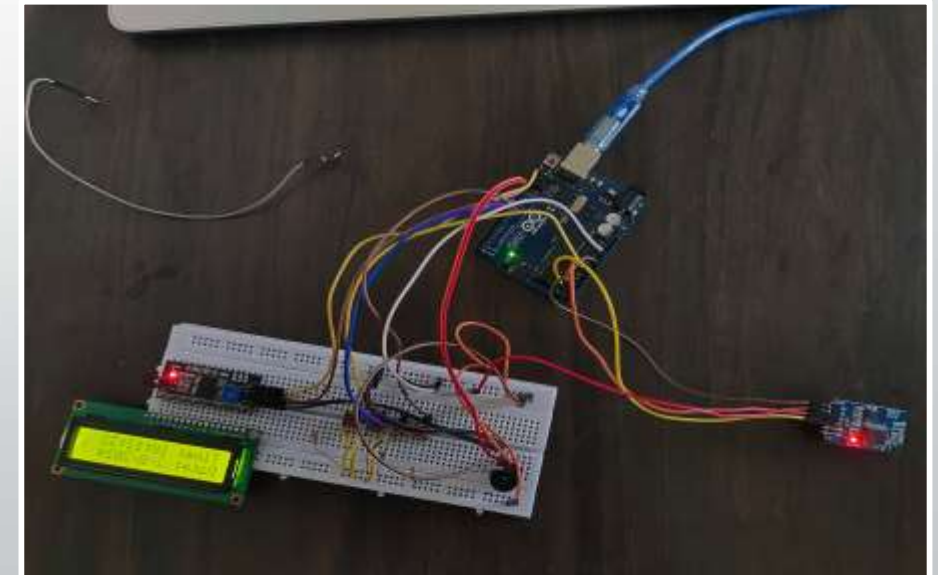


Description about Project

When it comes to our loved ones, we always want to stay them healthy and fit. But what will happen if they get ill and forget to take medicine on time. We would be worried, right? At hospitals, there are many patients and it is difficult to remind every patient to take medicine on time. The traditional ways require human efforts to remind them to take medicines on time. The digital era doesn't follow that and we can use machines to do that. The application of **Smart Medicine Reminder** is very wide and can be used by patients at home, doctors at hospitals, and at many other places. When it comes to reminding, there can be many ways to remind it:

- Show it on a display
- Send notification to mobile via email or message
- Send notifications using mobile apps
- Buzz alarm
- Get a call

Remind for next medicine time while reminding current time



Automating Medication Intake: The Role of Pill Boxes

A **smart pill box reminder** is a specialized device designed to help elderly individuals manage their medications effectively.

Here are the key points:

1. What is Smart Pill Reminder?

Multi alarm pill box reminders are designed as a medication when medicine is required at various times during the day. An electronic pill box incorporates a storage device with built in reminder alarms to remind you when its time its tabs time and time or administer pills and achieve medication compliance.

2. How it works ?

A pill box reminder helps individuals manage their medications effectively . The pill box has built-in alarms (visual and audio).

- At the scheduled time, the box lights up or melts a sound to remind the user to take their medication.



Pill box reminder

Let's break down the 3 W's of a pill box reminder:

1. Why?

- **Purpose:** The purpose of a pill box reminder is to enhance medication adherence.
- **Importance:** When patients take their prescribed medications consistently, it leads to better health outcomes. Pill box reminders play a crucial role in achieving this goal.



2. What?

- **Function:** It helps users organize daily doses of medication. Each compartment corresponds to a specific time or day.
- **Visual Cue:** When it's time to take a pill, users open the designated compartment, ensuring they don't miss doses.

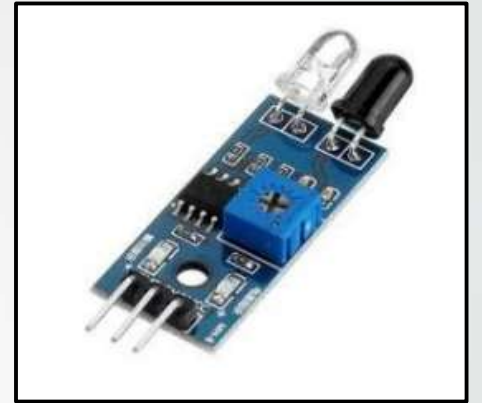
3. Who?

- **Patients:** Individuals who need to take medications regularly to manage chronic conditions or other health issues.
- **Caregivers:** People who assist others in taking their medications, ensuring adherence and correct dosages.
- **Healthcare Providers:** Professionals who may recommend or provide pill box reminders to patients to improve medication management and health outcomes.

We can combine ways depending upon the need. To keep things simple here we made a **simple Medicine Reminder using Arduino** which reminds us to take medicines 1 or 2 or 3 times a day. The time slot can be selected using push buttons. Also, it shows the current Date and Time. We will further extend it to an IoT project in coming articles where an email or SMS notification will be sent to the user.

Components Required for Automatic Medicine reminder using Arduino:

- Arduino Uno (We can use other Arduino boards also, like Pro mini, Nano)
- RTC DS3231 module
- 16x2 LCD Display
- Buzzer
- I2C Module
- ESP 8266
- GSM Module
- Breadboard
- Push Buttons
- 10K,1K Resistors
- Jumper Wires

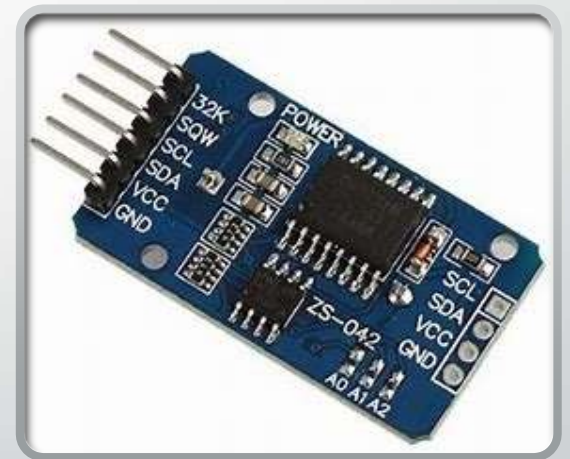


Tasks to be done

- 1.Design a pill box remainder alarm which gives remainder for taking medicines at particular time using Arduino uno and RTC DS3231 module.
- 2.Design a web server using ESP 8266
3. Send message to the medicine vendor using GSM module when medicines are about to complete.

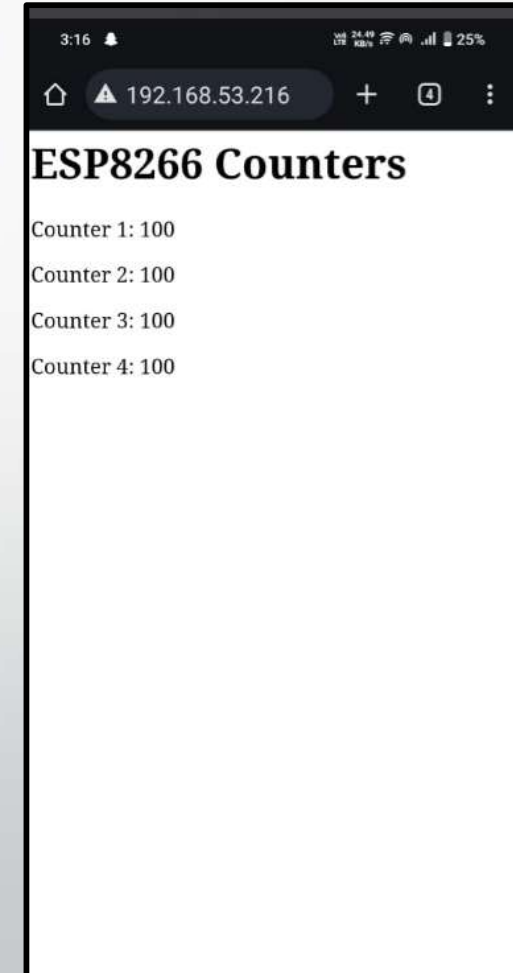
1. Design a pill box remainder alarm which gives remainder for taking medicines at particular time using Arduino uno and RTC DS3231 module.

- Pill boxes have compartments for each day and time (morning, noon, evening, night). Seniors place their pills in the right slots, ensuring they take the correct dose at the right time.
- The **alarm system** integrated with a **pill box reminder** (which uses an
- **RTC module**) serves a crucial purpose for seniors. Here's how it works:
- **ALARM SYSTEM:**
- Using an alarm in a pill box reminder project can be highly effective for ensuring that medication is taken on time. Here's how an alarm can be integrated and utilized in such a project:
- **Designing the Alarm System**
- Alarm Types: For a pill box reminder, a combination of these can be used to ensure the reminder is noticed, especially if the user has hearing or vision impairments.
- **Smart Pill Boxes:** If using a smart pill box with embedded electronics, integrate an alarm system directly into the pill box. The box can have a timer that triggers the alarm at specified intervals.
- **Setting Up the Alarm:**
- Using an **RTC (Real-Time Clock) module**, such as the **DS3231**, as an alarm in a pill box reminder project involves utilizing the module's built-in timekeeping and alarm functionalities to remind users to take their medication at specific times. Here's a brief overview of how this works:
- **DS3231 Module:** A precise and low-power RTC with an integrated temperature-compensated crystal oscillator. It keeps track of the current time and can trigger alarms based on user-defined times.



Design a pill box reminder alarm which gives reminder for taking medicines at particular time using Arduino uno and RTC DS3231 module.

A web server is a software or hardware system that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to the client request made over world wide web and serves web pages to clients upon request. When a user types a URL into their browser, the browser sends a request to the appropriate web server. The web server then processes this request, retrieves the requested content, and sends it back to the browser, which displays it to the user. Web servers store, process, and deliver web pages to users. They host the files that make up websites, including HTML, CSS, JavaScript, images, and other content. A web server connects to the Internet and supports physical data interchange with other devices connected to the web. Designing a web server using an ESP8266 involves several steps, including setting up the hardware, configuring the software, and writing the code to handle web requests and serve content. A server stores, sends, and receives data.



3. Send message to the medicine vendor using GSM module

when medicines are about to complete .

System Overview:

The system consists of two main components:

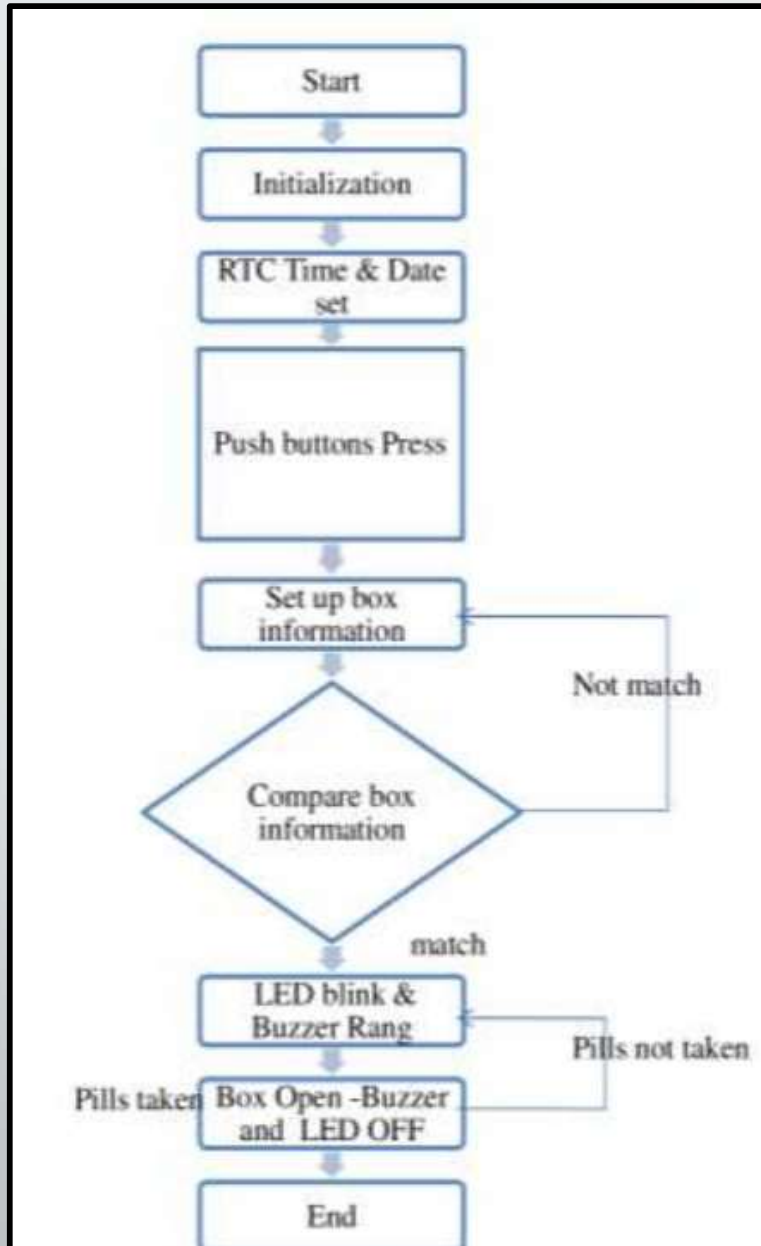
Microcontroller: This is the brain of the system, such as an Arduino, which controls and processes the data from sensors and manages communication with the GSM module.

- Reads data from the medicine level sensor.
- Sends commands to the GSM Module to send SMS messages.

GSM Module: This module sends SMS messages to notify the vendor when the medicine level is low.

- Receives commands from the microcontroller.
- Sends SMS messages through a mobile network.





As shown in flowchart

when time & date are set through push buttons, device will continuously compare the real time & set time. If the time is matched, LED will blink & buzzer will ring. It then senses the box is opened by the user or not. If box is opened, LED & buzzer stops and if it is not opened, LED will continuously blinks & buzzer will continuously rings.

Merits of Pill Box Remainder System

1.Improved Medication Adherence:

Pill box reminders help ensure that patients take their medications at the correct times, reducing the likelihood of missed doses and improving overall health outcomes .

2.Organization:

They help users organize their medications by day and time, which is particularly beneficial for those on complex medication regimens. This reduces the risk of confusion and medication errors.

3.Convenience:

They offer a convenient way to manage medications, particularly for those with busy schedules or those who travel frequently. Portable pill boxes can be taken anywhere .

4.Support for Caregivers:

Caregivers can easily monitor and manage the medication schedules of those they care for, ensuring that doses are not missed. Some digital pill boxes even provide notifications to caregivers if a dose is missed.

Demerits of Pill Box Remainder System

1.Initial Setup Complexity:

Setting up a pill box, especially a digital one, can be complex and time-consuming, which might be challenging for elderly patients or those with cognitive impairments.

2.Dependence on User Diligence:

Physical pill boxes rely on the user to remember to check and refill them regularly. Forgetting to do so can lead to missed doses.

3.Limited Capacity:

Some pill boxes have limited space, making them unsuitable for users with a large number of medications or large pills.

4.Cost:

Advanced digital pill boxes with features like Bluetooth connectivity and automatic reminders can be expensive compared to basic pill boxes.

References

<https://www.irjet.net/archives/V10/i5/IRJET-V10I5118.pdf>

John, D., & Jane, S. (2020). Smart Pill Box: Design and Implementation. Journal of Healthcare Engineering, 12(3), 45-67.

Details of team members and project mentor

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