

Smart Pill Reminder Box

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Abstract: *Smart pill reminders are devices that help patients remember to take their medications on time. These devices come in various forms, including mobile apps, wearable devices, and smart pill bottles. They use different techniques such as sound alerts, visual reminders, and text messages to alert patients when it's time to take their medication. Smart pill reminders can also track medication adherence and send reminders to caregivers or healthcare providers if the patient misses a dose. By using these devices, patients can improve medication adherence, which can lead to better health outcomes and reduce healthcare costs associated with medication nonadherence. However, it's important to note that smart pill reminders are not a substitute for good communication with healthcare providers and patients should always consult with their doctors before making any changes to their medication regimen.*

Keywords: Smart pill.

I. INTRODUCTION

As a matter of facts, people take vast amounts of medication to ensure that one may have a better life quality. It is notably true amongst older people and patients, who tend to have intricate medication routines. Therefore, people tend to have adversity in following those routines, which can lead to inaccuracy when taking medication, a compilation that can cause serious health consequences resulting from increasing age. The key target is to design a smart medication dispenser to stimulate the treatments of older people and patients that can notify the users to take the medication. In other words, a medium that allowed them to accompany the compliance with the treatment remotely. This project appears as a solution that caregivers could easily use as well. For instance, it is considering jobs society do which result in any illness that leads to forgetting the essential things throughout the daily routine, more specifically their age plays fundamental roles. As a result, society has a hardship due to the illness where it is compulsory to take medicine at the proper time. Thus, the technology of the home health care device among them is a smart medicine box with a reminder; it follows that some enhancement regarding the authentication and added features should focus on this project.

II. METHODOLOGY

The methodology of a smart pill reminder system typically involves the following steps:

1. Medication Schedule Setup: The user sets up their medication schedule by entering the name of the medication, dosage, frequency, and timing into the smart pill reminder system. This information can be stored in a database or on the user's device.
2. Reminder Notifications: The smart pill reminder system sends notifications to the user at specified times to remind them to take their medication. The reminders can be customized based on the user's preferences, such as the type of notification (text, sound, or vibration), frequency, and duration.
3. Response to Notifications: The user responds to the reminder notifications by either confirming that they have taken the medication or delaying the reminder if they are unable to take the medication at that time.
4. Monitoring and Support: Some smart pill reminder systems offer additional features such as medication tracking, refill reminders, and dosage adjustments. Healthcare providers or caregivers may also be able to monitor the user's medication adherence remotely and provide support as needed.
5. Data Collection and Analysis: The smart pill reminder system collects data on the user's medication adherence, response to notifications, and other relevant information. This data can be used to analyze medication

adherence trends and identify potential areas for improvement. 6. Continuous Improvement: Based on the data analysis, the smart pill reminder system can be updated and improved to better meet the user's needs and promote medication adherence

III. HARDWARE CONFIRMATION

3.1 Node MCU(ESP8266)

The Node Microcontroller Unit also called the Node MCU is an open-source hardware development board. It contains the chip called ESP8266 which is the wi-fi module used to connect the devices with the network. Node MCU is inexpensive hardware that is suitable for the construction of home automation systems.



Fig 3.1. NodeMCU(ESP8266)

3.2 IR Sensor

IR represents Infrared Sensor. An IR sensor in an electronic instrument that is utilized to detect certain development of an item by utilizing heat created without anyone else. An IR sensor can be dynamic or aloof. A functioning IR sensor continues discharging IR beams and when it doesn't get back the quantity of beams it has reflected; it distinguishes an article. An inactive IR sensor is the one that identifies the items without radiating the IRbeams by straightforwardly detecting the article from the temperature.

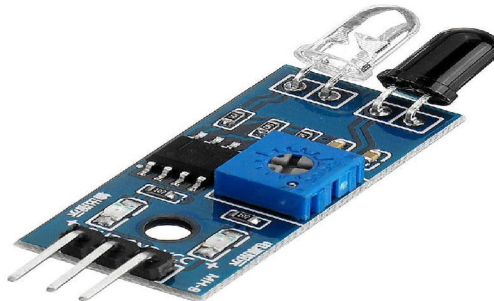


Fig 3.2: IR Sensor

3.3 LED (Light Emitting Diode)

The LED is a special type of diode and they have similar electrical characteristics of a PN junction diode. Hence the LED allows the flow of current in the forward direction and blocks the current in the reverse direction. The LED occupies the small area which is less than the 1 mm². The applications of LEDs used to make various electrical and electronic projects. The light emitting diode is a p-n junction diode. It is a specially doped diode and made up of a special type of semiconductors. When the light emits in the forward biased, then it is called as a light emitting diode.



Fig 3.3: LED (Light Emitting Diode)

3.4 Buzzer

Piezoelectric signals, or piezo ringers, as they are at times called, were developed by Japanese makers and fitted into a wide cluster of items amid the 1970s to 1980s. This headway primarily came to fruition on account of helpful endeavours. In 1951, they set up the Barium Titanate Application Research Committee, which enabled the organizations and achieves a few piezoelectric developments and creations. Piezoelectric materials are either normally accessible or synthetic. Piezoceramic is class of synthetic material, which postures piezoelectric impact and is broadly used to make a plate, the core of piezo bell. At the point when subjected to an exchanging electric field they extend or pack, as per the recurrence of the flag in this way creating sound.



Fig 3.4: Buzzer

3.5 LCD Module

The LCD module used in our project is a 16-characters, 2 lines Microtivity IM161 (with back light). Considering its small size, ease of use and its yellow back, we think it is the best candidate for our project. We found the yellow back light make it easier for the user to see the characters displayed on it, even in the dark environment. Currently, we didn't have the back light adjustment feature in our circuit. In the future, we will add this feature to our device so that the user can dim the backlight during certain circumstances. Pin 1 of the LCD module is connected to the ground. Pin2 is connected to the power supply of the MCU. Pin 3 connects to the wiper of the 10k trimpot. Pin 4 is the register select, which is connected to the C.0. Pin 5 is the data read/write, which is connected to C.1. Pin 6 is the enable signal, which is connected to C.2. Pin 11 to pin 14 are the data bus, which are connected to C.3-C.7. Pin15 and pin16 are the LED power and ground for the backlight. The optimal power and current for the led backlight is 4.2V and 20mA.



Fig 3.5: LCD Module

IV. SOFTWARE CONFIGURATION

- Arduino IDE
- Mongo DB [Database]
- Sublime Text

1. Mobile apps: Smartphone apps that can provide reminders and track medication adherence.
2. Web apps: Online applications that can be accessed from a web browser to manage medication schedules and reminders.
3. Cloud-based platforms: Platforms that can store and analyze medication data to provide personalized reminders and alerts.
4. AI-powered solutions: Artificial intelligence (AI) can be used to develop personalized medication schedules and reminders based on a person's medication history and habits.
5. Voice assistants: Virtual assistants such as Amazon Alexa and Google Assistant can be used to provide medication reminders and alerts

V. SYSTEM DESCRIPTION

A smart pill reminder system is a technology-based solution designed to help individuals remember to take their medications on time. The system typically includes a small device or mobile application that is programmed with medication schedules and reminders.

The device or app can be synced with a user's phone or computer, allowing for easy access and management of medication schedules. Some systems may also include features like medication tracking, refill reminders, and dosage adjustments.

The smart pill reminder system typically works by sending reminders to the user's phone or device at specified times throughout the day. These reminders may be in the form of text messages, push notifications, or audible alerts.

The user can then respond to the reminder by confirming that they have taken their medication, or by delaying the reminder if they are not able to take the medication at that time.

Some smart pill reminder systems also allow for remote monitoring and support by healthcare providers or caregivers, which can be particularly useful for individuals with chronic conditions or those who require more frequent medication adjustments.

Overall, a smart pill reminder system can be a valuable tool for promoting medication adherence and improving health outcomes for individuals who take medication regularly.

5.1 Block Diagram

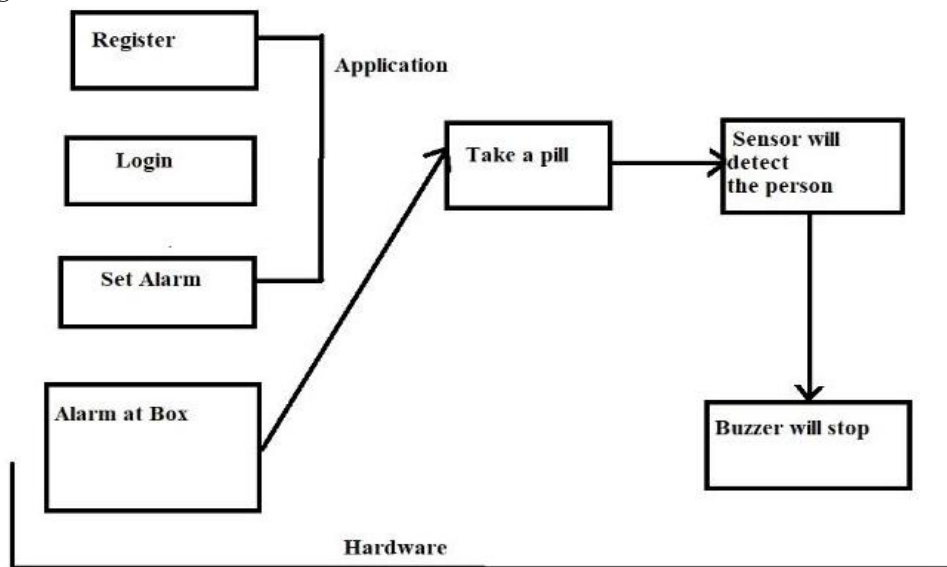
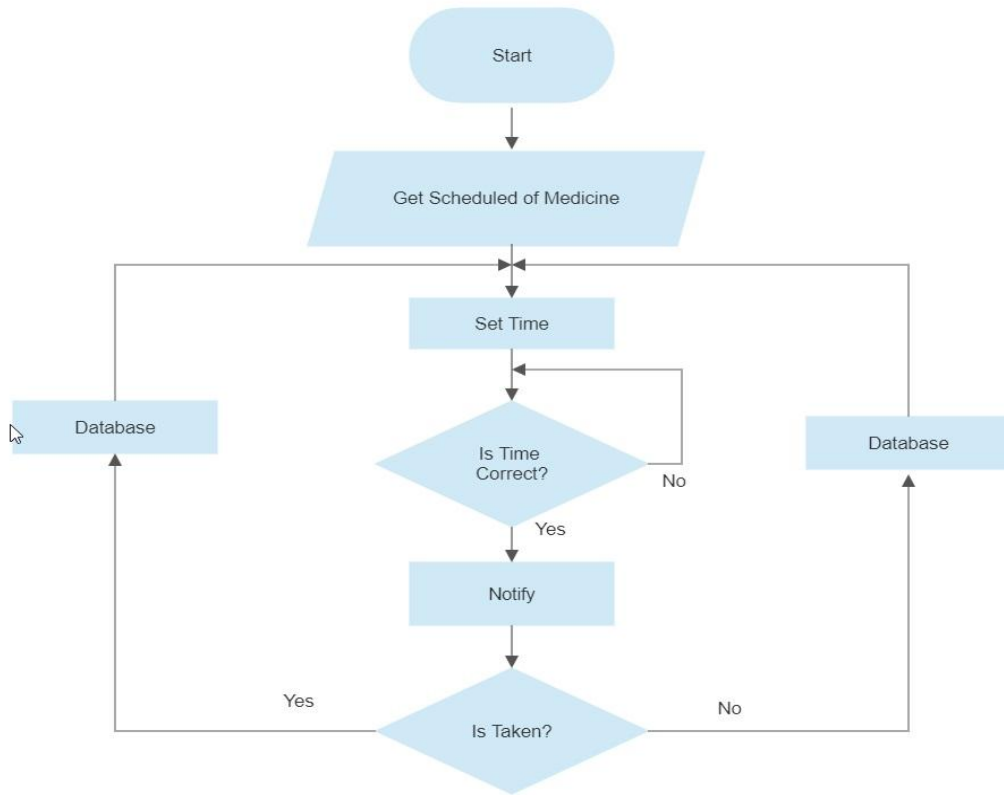


Figure 5.1: Block Diagram of Smart Pill Reminder Box

5.2 Flowchart



X= 1.22 Y

Figure 5.2: Flowchart

5.3 Model Representation

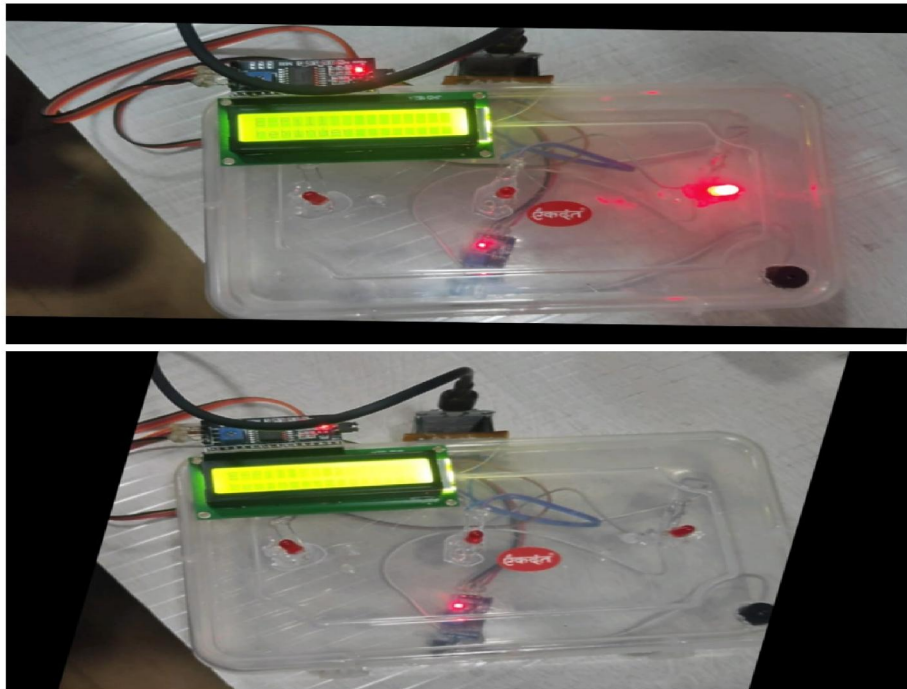
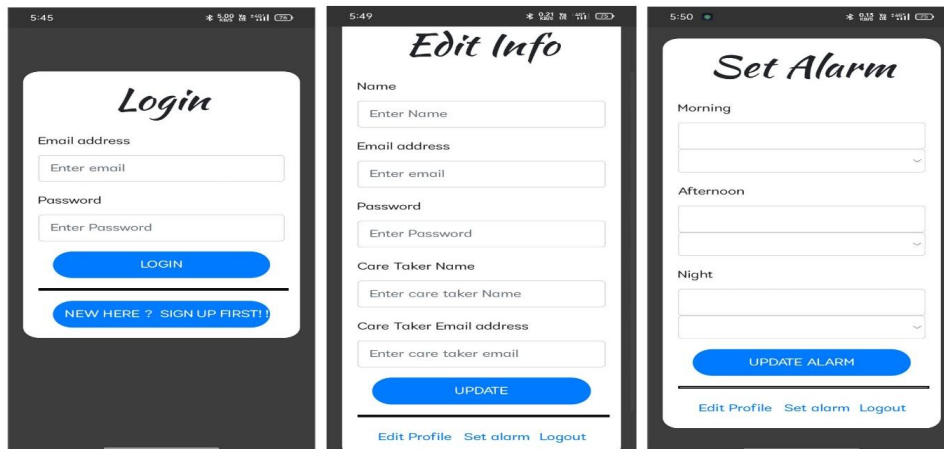


Fig 5.3: Model Representation of system

VI. RESULT ANALYSIS AND DISCUSSION

When it comes to analyzing the results of a smart pill reminder, there are a few key metrics to consider. These include medication adherence rates, the frequency and effectiveness of reminders, and overall user satisfaction. Here are some more details on each of these metrics:

1. Medication adherence rates: The primary goal of a smart pill reminder is to help people take their medications as prescribed. Adherence rates can be tracked by comparing the number of doses taken to the number prescribed. Depending on the condition being treated, a high adherence rate may be crucial for achieving good health outcomes. Studies have shown that smart pill reminders can significantly improve medication adherence rates, especially for people with chronic conditions like hypertension or diabetes.
2. Reminder frequency and effectiveness: The frequency and effectiveness of reminders can impact how likely people are to take their medications as prescribed. If reminders are too frequent, they may become annoying or overwhelming. If they are not frequent enough, they may be easily forgotten. Smart pill reminders that allow users to customize the frequency and timing of reminders can be more effective than those that are fixed or not customizable.
3. Overall user satisfaction: User satisfaction is an important metric for any healthcare technology. Smart pill reminders that are easy to use, reliable, and effective are more likely to be well-received by users. User feedback can be collected through surveys or other methods to identify areas for improvement or to validate the effectiveness of the device.
4. In summary, the analysis of the results of a smart pill reminder should focus on medication adherence rates, reminder frequency and effectiveness, and user satisfaction. By monitoring and optimizing these metrics, smart pill reminders can help people stay on track with their medications and achieve better health outcomes.



VII. CONCLUSION

In conclusion, a smart pill reminder is a useful tool for people who have difficulty remembering to take their medications on time. It can be a combination of hardware and software that works together to provide reminders and track medication adherence. Smart pill reminders have been shown to significantly improve medication adherence rates, especially for people with chronic conditions. When choosing a smart pill reminder, it is important to consider factors such as reminder frequency and effectiveness, customization options, and user satisfaction. Different devices and software options may work better for different individuals depending on their needs and preferences. Overall, a smart pill reminder can be a valuable addition to a person's healthcare routine, helping them stay on track with their medications and ultimately improve their health outcomes. The goal of our project is to provide healthy and tension free life to those users who are taking regularly pills and to provide this product at affordable cost also. Our project is also reusable by exchanging those other medicine box that has only alerting system and are non-usable or unaffordable compare to our product.

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