



SMART PILL REMINDER BOX

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ABSTRACT

The paper presents a Smart Pill Reminder Box (SPRB) prototype. The System reminds the patient and caregiver of the medication's timing. Smart Pill Reminder Box will allow doctors to monitor patients' health status. The Smart Pill Reminder Box can reduce the responsibility of an elderly family member to administer the appropriate doses of medication at the right time without the human intelligence required to recall the exact date or time. Also, SPRB provides users with an Android application on their smartphone that allows them to manage and control medicine schedules and usage data remotely.

KEY WORDS: Smart Pill Reminder Box, Node MCU, IoT, Pillbox, Stepper Motor, etc.

1. INTRODUCTION

In today's hectic life, the elderly face problems remembering and taking their medicines on time. They often cannot recognize which pills to take at that particular time. Because of this, a dose of medication may be missed.

One of the most common reasons for unsuccessful progress in a patient's health is not taking the correct medication at the prescribed time. Over 50 people may face diseases such as high blood pressure, diabetes, and Alzheimer's. This type of person must be constantly monitored for medication. These people would be significantly harmed if they missed a dose of medicine.

Patients and their caregivers, or even people who often forget to take their medication, will find this System helpful. This System will provide information on whether the patient has taken their medication. If the patient has not taken his medicine, the System will alert him to do the same by sending alerts or messages or through calls. It also stores this information in the cloud or the developed application.

In section 2, we present some related works of medication systems. Then, the objectives of the System will be given in section 3. Finally, the Smart Pill Reminder Box (SPRB) methodology is described in section 4. Similarly, the conclusion in section 5 is followed by the references in section 6.

2. RELATED WORKS

Several types of pill dispensers are available in the market and have been produced by different companies consisting of built-in alarms to notify the users without having an online database to save the users and pills or having remote access functionality.

To state a few:

This article proposed a Smart and Secure Medical Box using IoT in which they have used Fingerprint Sensor, Arduino UNO, and Global System for Mobile Communication (GSM) Module, WiFi Module, LCD, Power Bank, Real Time Clock, Servo Motors, Weight Sensor, Switches, etc. The System kept track of patients by notifying them of their medication timings through notifications such as messages or phone calls. A fingerprint Sensor was used to identify the user for Security purposes. The weight Sensor was used to calculate the proper medicine dosage patient would take. Real-Time Clock sets the time and date the user is notified of



medication. Notifications are generated with the help of the GSM Module. All the process is uploaded to the cloud so that the user and the doctors can have detailed information about the patient. But there might be some difficulties in handling such a complex hardware structure [1]

This System is an Android application where users can set their medicine time. In this application, some features will help the user to have more details about their medicine. It will keep track of the medication, that is, how much medication the user has to take, and that can be fixed in the Android application. The device setup consists of an IoT-enabled pill box, and that pillbox consists of multiple compartments and an IR sensor will be attached to it. The IR sensors are used for observations and reporting the state of medications. The Arduino device fetches real-time data and sends it to the application. [2]

According to this Paper, The proposed System is targeted at Online Health Communities (OHC). It is based on a Medical Dispenser, modeled using various components such as BeagleBone, Servomotors, and Pill Containers. A Dispenser can dispense the medicines to the patients according to the prescribed time by the doctors. Here they have used the Barcodes for security purposes. The Pharmacies own these dispensers. [3]

The proposed SPRB system takes the idea of an automated dispenser to the next level, as it has some functionalities not included in any other automatic dispensers. An account is provided for each patient, and no one else can access it except the patient and the caregiver if the credentials were provided to them. Also, some statistics are provided about the pills taken with their alarms and the already existing ones. An online database of the users, tablets, and their notices is also a great feature that helped design the project. The alarms can be edited and created using an Android application remotely through smartphones.

3. SYSTEM OBJECTIVE

The Below section will describe the Objectives of our Proposed System.

- a) To create user-friendly wireless electronic apparatus.
- b) To achieve automation where appropriate pills come out at appropriate times.
- c) To notify the patient and the caretaker of the patient about the timings of patient medicines.
- d) To keep the records of each pill whether it is taken or not by the patient.

4. SMART PILL REMINDER BOX METHODOLOGY

This section describes the whole methodology of the SystemSystem. The method includes internal processing and its related data flow. In this paper, we built an Android application responsible for controlling the SystemSystem.

It's the primary way of interacting with the SystemSystem; the application stores its data and performs synchronization upon login. The phone will automatically connect to NodeMCU and sends commands indicating from which container the Servo Motor should be rotated, as shown in Figure 1.

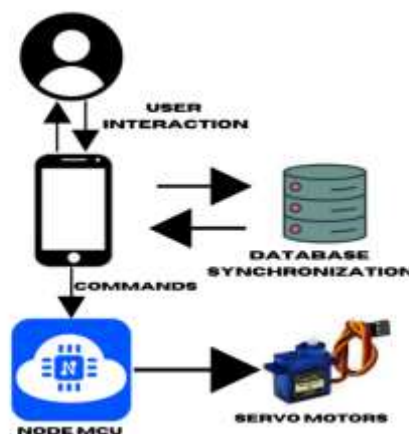


Fig 1. Design Breakdown

A. Overview of Android Application

The whole System of the SPRB relies on its Android application that provides the user interface to the patients and their caregivers, controls the medicine dispenser, and also manages user schedule and usage data.

The user authentication is performed on the login screen shown below in Figure 2.

If the user is new, they can Sign Up with their details in the Sign-Up form instead of logging in, as shown above in Fig.3.

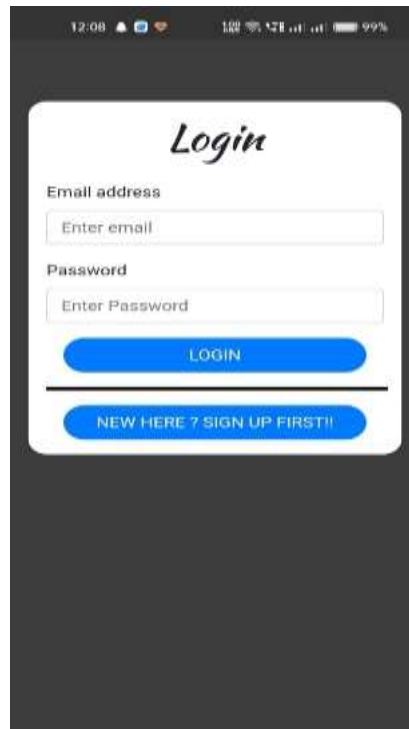


Fig 2. Login Screen

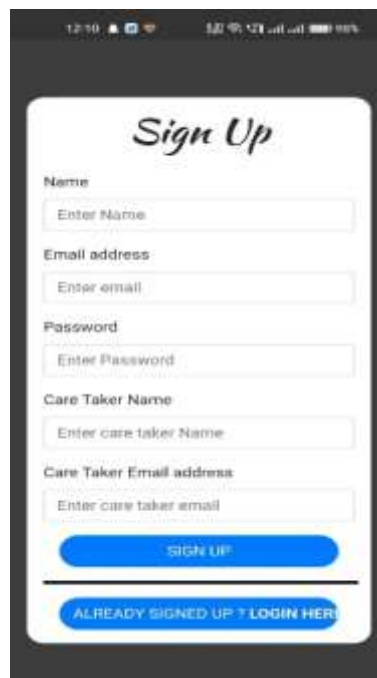


Fig 3. Sign Up Screen

To add a new pill reminder user should click on the "Set alarm" label, and then he needs to specify which pill and at what time it should be taken. The view of adding an alarm is shown in below Figure 4.

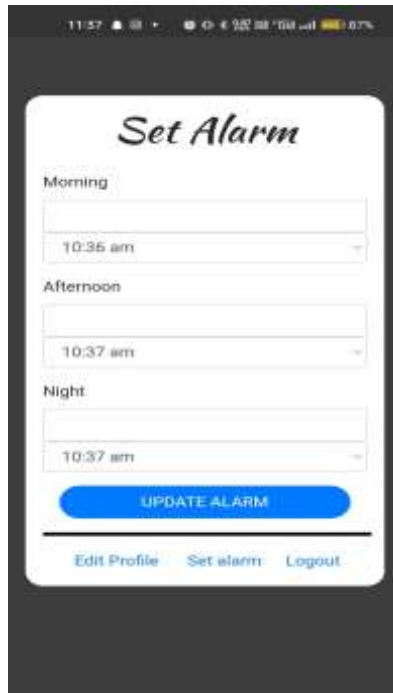


Fig.4. Set Alarm

If the user wants to change the details, then he can update the details in the "Edit Profile" Section. Then, according to the set time, the corresponding pill comes out of the box.

B. Database Management

The pill alarms and usage data are stored on an online Database. This database is hosted on the 000webhost.com servers for free whenever the user enters the application or changes something in the schedule using PHP and JSON to communicate and transfer data between databases.

C. Hardware Design

Figure 5 shows the prototype of the Smart Pill Reminder Box (SPRB). The box containers will operate separately with their servo Motor and Buzzer. The servo motors here are used to rotate the pins of the servo. All the servo motors are controlled by the Node MCU microcontroller using signals that make the servo rotate for a bit, then stop, and are connected, as shown in Figure 5.

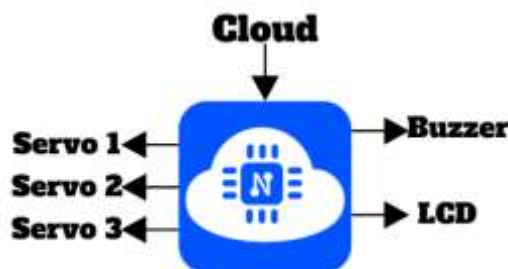


Fig 5. Hardware Architecture

5. CONCLUSION

When the user wants to take his pills, his smartphone will connect to the Node MCU via WiFi-, and sends it to which container should be rotated.

This paper summarized the significant points about our SPRB. Elderly patients, especially those with chronic and periodic medicine, will benefit the most for the SPRB since it will significantly increase their medication adherence, ensuring better treatment effectiveness or even saving their lives.



Insurance companies will surely benefit from the SPRB since it will help their customers to live a healthier lifestyle away from life-threatening accidents caused by forgetting to take their medicines on time or with the correct dosage. Moreover, in case of skipped pill, the Caretaker will get alerted almost instantly via a notification on the application. Finally, the user interface, which is the same on all the devices, including the machine, is intuitive, straightforward, and easy to use, even for elderly patients. In addition, the design allows the user to add more containers or more pills per serving.

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