

IOT BASED VOICE MEDICINE BOX USING ESP8266

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Abstract

Various studies show that approximately 65% of adults are elderly individuals struggling with chronic conditions such as diabetes, high cholesterol, arthritis, osteoporosis, dementia, blindness, and Alzheimer's disease. Additionally, young adults are increasingly affected by fast-paced, demanding lifestyles, often leading them to miss their medications, which are crucial for effective recovery. Our project aims to develop a Smart Medicine Box for users with complex medication schedules, assisting both patients and their caregivers by ensuring timely medication adherence. This medicine box will be designed with 2 trays for morning and night time of the day. Medicines will be preloaded in the trays as per the prescription by the doctor. Using ESP8266 as a controller, we can monitor the medicine box tray opening and closing at exact time provided by RTC. Also, using Voice module, the audio announcement will be given following name, spelling and color of the particular medicine in 3 different regional languages i.e., Marathi, Hindi and English to remind the people to take the medicine. In addition, the entire system will be managed through an Android application.

Keywords: ESP8266, Android App, Voice Module.

Introduction

In today's world, many people need to take medication regularly due to the rise in diseases over recent years. As a result, more individuals are affected by both temporary and chronic illnesses. For managing these health conditions, it's essential to follow doctors' prescribed medication schedules accurately. However, patients often struggle with remembering to take their pills at the right times, and any change in prescription can make it harder to follow the new schedule. Missing doses, taking incorrect medications, or accidentally consuming expired pills can lead to severe health risks, impacting a person's overall well-being.

To address this issue, we are developing a smart medicine box equipped with two portable trays – one for morning doses and the other for night doses. Using a controller and Wi-Fi technology, these trays will automatically open at the scheduled times set by the user and will close after a preset delay. Additionally, a voice module will announce the medication instructions in three regional languages – English, Hindi, and Marathi – providing the medicine name, spelling, and color. This feature is especially helpful for those who may not be fluent in English, as well as illiterate users who rely on audio prompts and color indicators to identify the correct medicine. The medicine box will serve as a timely reminder, ensuring medication adherence. The entire system is controlled and monitored through an Android application over Wi-Fi, allowing users to set customizable timers for opening and closing each tray based on their specific needs. This smart solution helps users manage their medication effectively, promoting better health safety.

Objective

The project to give medicine alert and reminder from the regional language time to time to the patient. To sort the medicine time wise and automatically open the drawer to the patient for saving time to finding the medicine. Audio announcement of the medicine color and display the medicine spelling on the LCD at the time of medicine.

Literature Review

The study "Bidirectional Smart Pill Box" by Hsiu-Ling Tsai and Chun Hsiang Tseng presents a sensor network-enabled pill box that uses wireless technology to allow remote monitoring by family members, providing reminders through LCD and audio notifications. (1) "Smart Medicine Reminder Box" by Sanjay Bhati et al. introduces a system that schedules medication times with an RTC module, alerting users with sound and light and detecting if pills are taken, addressing limitations in traditional reminder devices. (2) "MediSmart" by Vaibhavi G. Raut et al. emphasizes accessibility for visually and hearing-impaired patients with audio cues, LCD guidance, and app notifications for refills, ensuring continuous medication adherence. (3) Geng Yang and colleagues' "Health-IoT Platform" integrates bio-sensors and a smart medicine box in an IoT framework but suggests further enhancements for a more interactive and user-friendly interface. (4)

System Design

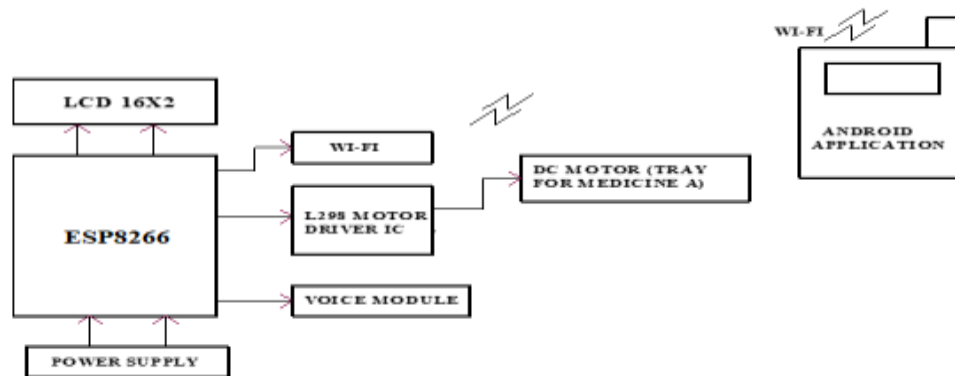


Fig. 1: Block Diagram of our system

Input System

Android Application: The Android app serves as the primary user interface for setting up and managing medication schedules. Through the app, users can input specific times for medication reminders (morning and night) and specify the types and quantities of medicines. The app sends these inputs wirelessly to the ESP8266 microcontroller via Wi-Fi, ensuring that the medicine box operates on a schedule tailored to the user's needs.

Timers and Schedules: Users can set customized timers and schedules in the Android app. These timers trigger the opening of the trays and the activation of the voice module at the specified times, providing both visual and auditory cues for taking medicine.

Power Supply: A 12V DC power supply powers the entire system, including the ESP8266, motor driver, and DC motors. This input ensures that the device has the necessary power to function continuously and reliably.

Control/Output System

ESP8266 Microcontroller: Processes input from the app and controls the system components. **Motor Driver & DC Motor:** The motor driver (L298) controls the DC motor to open and close trays at scheduled times. **Voice Module:** Announces medication details in regional languages, ensuring accessibility. **LCD Display:** Shows medicine names and dosage information. **App Notifications:** Sends reminders to the user's smartphone, enhancing convenience and adherence.

Conclusion

We have successfully studied interfacing of Voice module with ESP8266. Also, we studied the power supply design of 5V required for the project. The interfacing of LCD with is studied which will be used to display the operation of the system. The aim of our project is to offer a healthier, stress-free life to users who need to take pills regularly, while ensuring the product remains affordable. Our device is designed to be reusable and serves as an alternative to other medicine boxes that only have basic alert functions and are often either disposable or too costly in comparison to ours.

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