Smart Medical Dispenser

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CONTENT

INTRODUCTION

1. The Smart Pill Dispenser System is an innovative healthcare solution designed to assist patients in managing their medication schedules efficiently without constant supervision.
2. In the field of healthcare IoT, this system connects the pill dispenser to a network, allowing remote monitoring and timely alerts to ensure patients take their medicines correctly.
3. This project addresses the common problems of missed or incorrect medication doses, especially among elderly and chronic patients.
4. The system enables caregivers and healthcare providers to monitor medication adherence in real-time and helps patients avoid complications due to missed doses.
5. This system provides timely reminders to the user, tracks medication intake, and ensures accurate dispensing, improving overall health outcomes and reducing hospital visits.

PROBLEM STATEMENT

- In today's fast-paced life, many patients—especially elderly and chronically ill—forget to take their medications on time or take incorrect doses.
- Manual tracking of medicine schedules can be unreliable and leads to missed or double doses, which may cause serious health issues.
- In joint families or homes with multiple patients, managing different pill timings and doses becomes confusing and error-prone.
- Caregivers cannot always be physically present to monitor and remind patients, especially in remote or busy households.
- Therefore, a smart, automated, and cost-effective solution is needed that reminds, dispenses, and monitors medicine intake to improve health outcomes and reduce dependency on manual supervision.

IDEA INTRODUCTION

- The Smart Medical box is a user-friendly healthcare device designed to simplify medication management for patients by automating dose reminders and dispensing.
- Leveraging IoT technology, this system uses ESP32 WROOM for connectivity, real-time clock modules for accurate timing, IR sensors for detecting user presence, and visual feedback through LCD and 2.4-inch TFT displays.
- This project tackles the widespread problem of medication non-adherence, which can lead to serious health risks, especially for elderly and chronic patients.
- It provides caregivers and medical professionals with real-time data on medication intake, enabling better patient monitoring and timely interventions.
- With buzzer alarms and a 4×4 keypad for easy setting, the system makes sure patients get the right medicine at the right time, helping them stay healthy and avoid hospital visits.

OBJECTIVE

The proposed system aims to automate medicine reminders and ensure patients take the correct dose at the correct time using embedded technology and IoT principles.

The system consists of three main functional modules: a User Input Unit (Keypad), a Real-Time Reminder and Alert Unit (RTC, Buzzer, Display), and a Monitoring & Detection Unit (IR Sensors, ESP32).

The user schedules medicine times and compartment details using a 4x4 keypad, which are stored and monitored continuously by the system's internal clock (RTC).

When the scheduled time matches, the system triggers alerts using a buzzer and LED, and displays the medicine reminder on a 2.4" TFT screen.

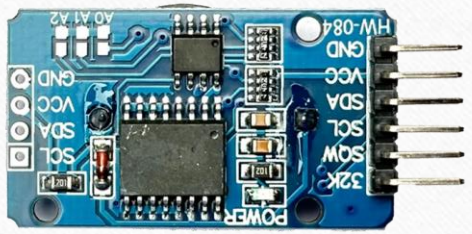
IR sensors inside the compartments detect whether the pill has been taken or not and record the status accordingly.

To ensure proper medication compliance and reduce the risks of missed or incorrect doses, especially in elderly or chronically ill patients.

HARDWARE COMPONENT

4x4 Keypad

2.4-inch TFT SPI Display



Real Time Clock
(DS3231)

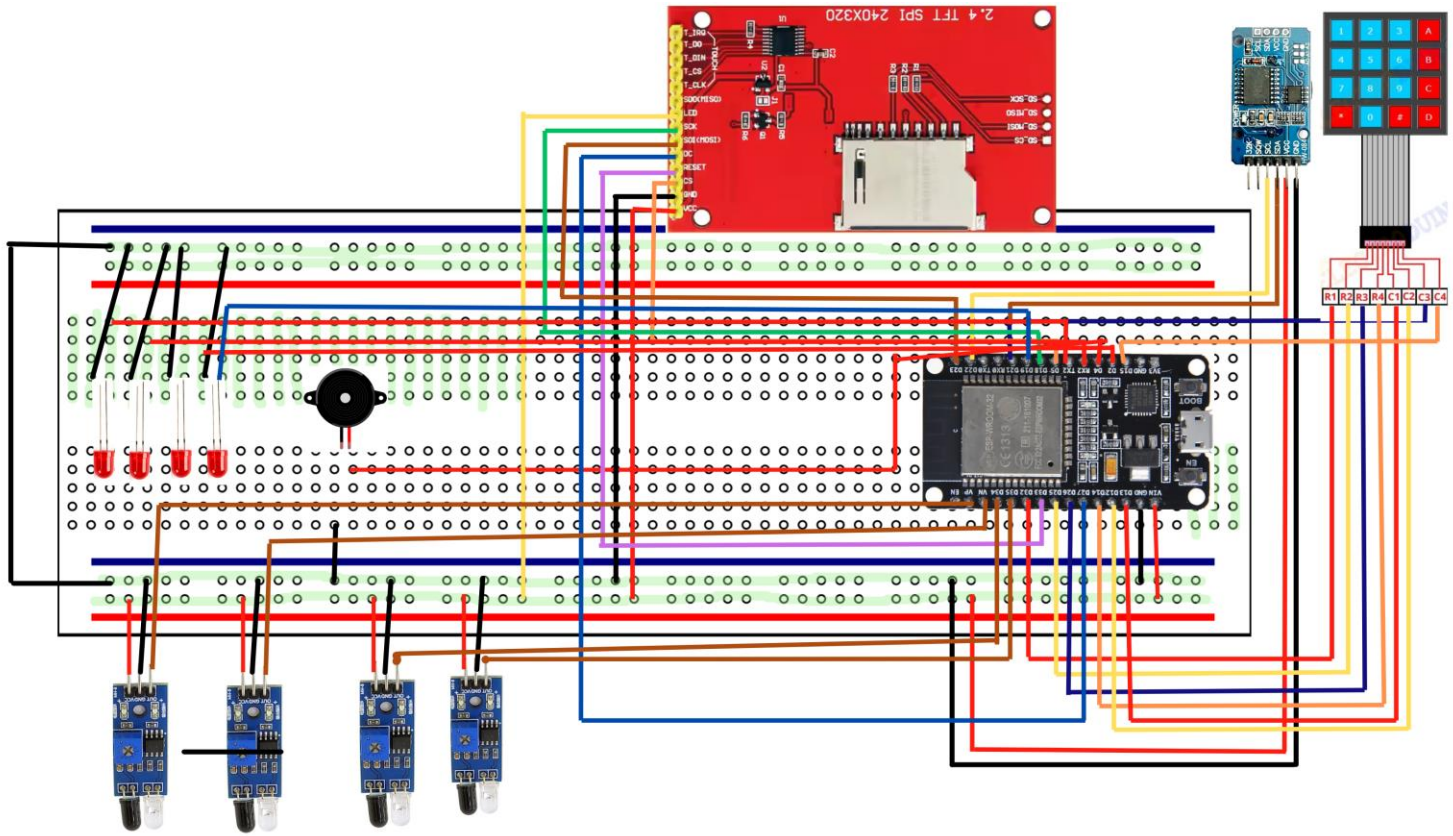
IR Sensor

Buzzer

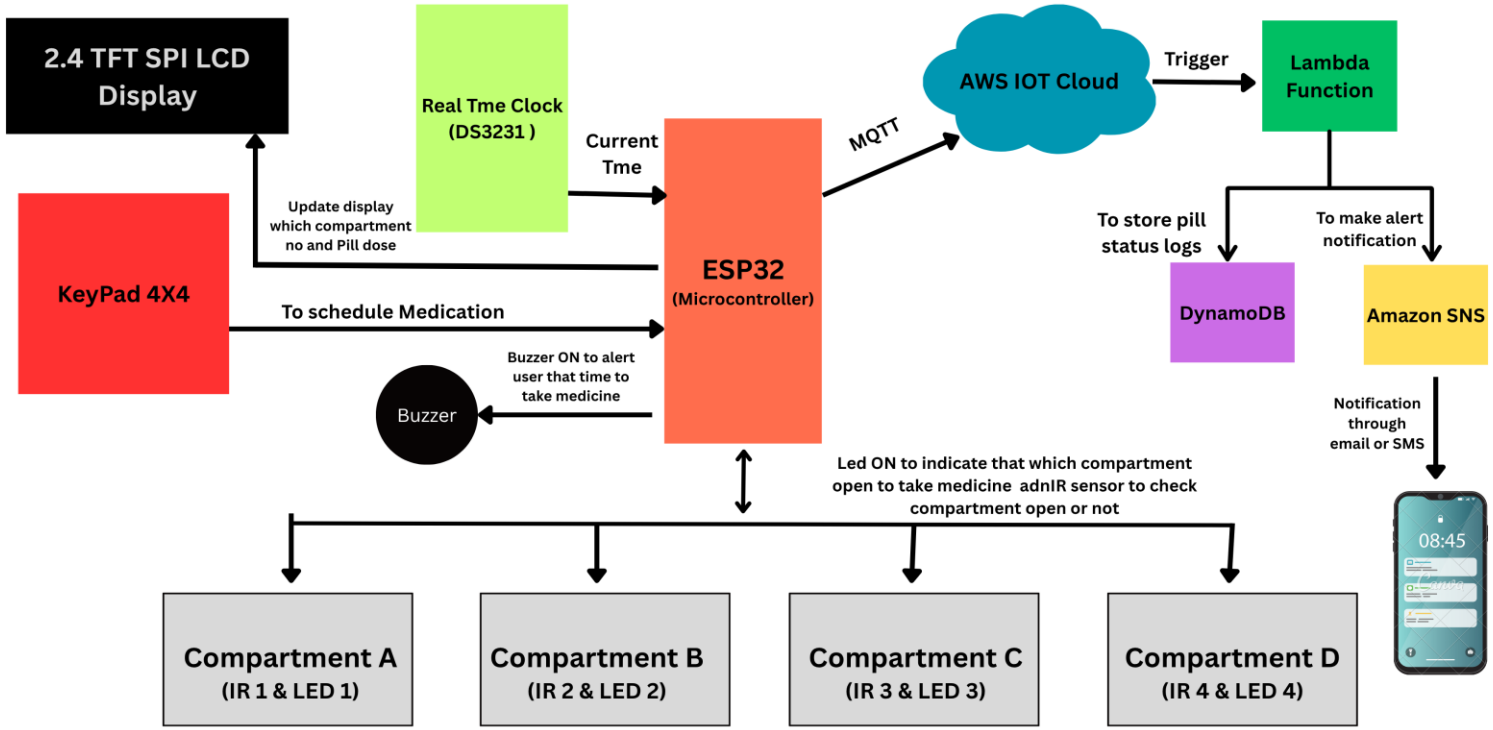
Led

ESP32 Microcontroller

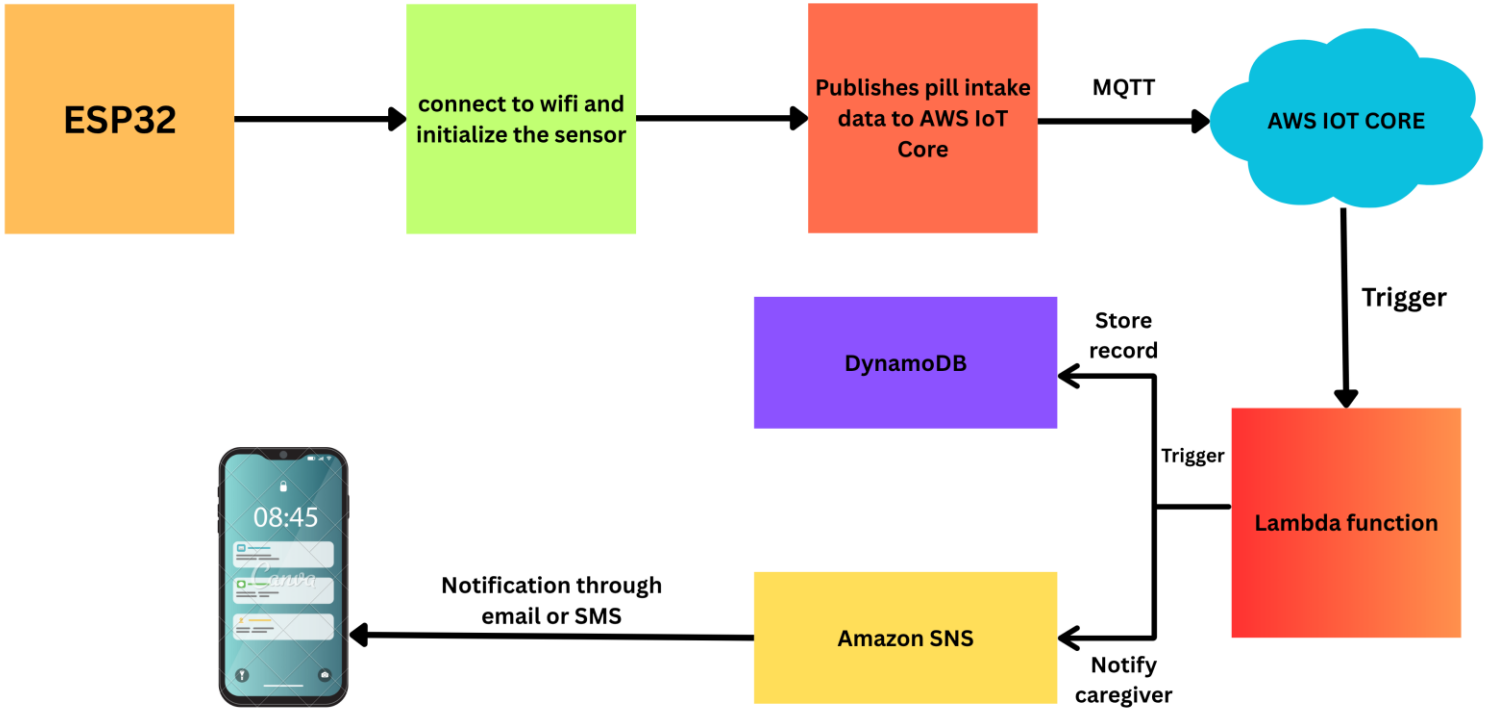
CIRCUIT DIAGRAM



SYSTEM BLOCK DIAGRAM



FLOW CHART


ESP32
connect to wifi and initialize the sensor
Publishes pill intake data to AWS IoT Core
MQTT
AWS IOT CORE
Trigger
DynamoDB
Store record
Trigger
Lambda function
08:45
Notification through email or SMS
Amazon SNS
Notify caregiver

MEDICAL BOX IMAGE

Figure:- Side View

Figure:- Top View

FEATURES OF THE SYSTEM

Provides automated medicine indicator based on user-defined schedules.

Real-time monitoring of medication intake using IR sensors.

Sends timely reminders through buzzer alerts and clear visual displays.

User-friendly interface with a 4x4 keypad for easy programming.

Accurate timekeeping with the RTC module for consistent medication alerts.

Compact and portable design suitable for home and healthcare environments.

Reduces human error in medication management, enhancing patient safety.

USE CASES

- Elderly Care at Home
- Chronic Disease Management
- Hospitals and Nursing Homes
- Remote Caregiver Monitoring
- Busy Professionals and Students

ADVANTAGES

AUTOMATES MEDICATION MANAGEMENT

IMPROVES MEDICATION ADHERENCE

USER-FRIENDLY INTERFACE

REAL-TIME MONITORING

COST-EFFECTIVE SOLUTION

REDUCES HOSPITAL VISITS

PORTABLE AND COMPACT

FUTURE SCOPE

- Mobile App Integration
- Voice Alerts and Assistance
- Automatic Refill Requests
- Multiple Compartment Expansion
- Biometric Authentication
- Battery Backup and Power Efficiency

CONCLUSION

Automates medication management, ensuring correct doses at the right time with minimal supervision.

Combines IoT and embedded tech to provide timely reminders and accurate dispensing.

Enables real-time monitoring, benefiting elderly and chronic patients.

Improves medication adherence and reduces health risks.

Supports remote caregiver monitoring for better patient care.

User-friendly and cost-effective solution to enhance healthcare outcomes.

THANK YOU