United International University

Department of Computer Science & Engineering

Project Proposal Report

Course Name and Code: Microprocessors and Microcontrollers Laboratory (CSE 4326)

Group No: 6

Project Title

Smart Medicine Management System

Motivation

- Many patients, especially elderly and chronic patients, often **forget to take medicine on time** or accidentally take the **wrong dosage**.
- Existing mobile reminder applications cannot **physically prevent misuse or overdose**.
- Medication non-adherence can lead to **serious health risks and hospitalization**.
- This project aims to provide a **low-cost, automated, and reliable solution** that ensures proper medicine intake and supports caregivers through remote monitoring.

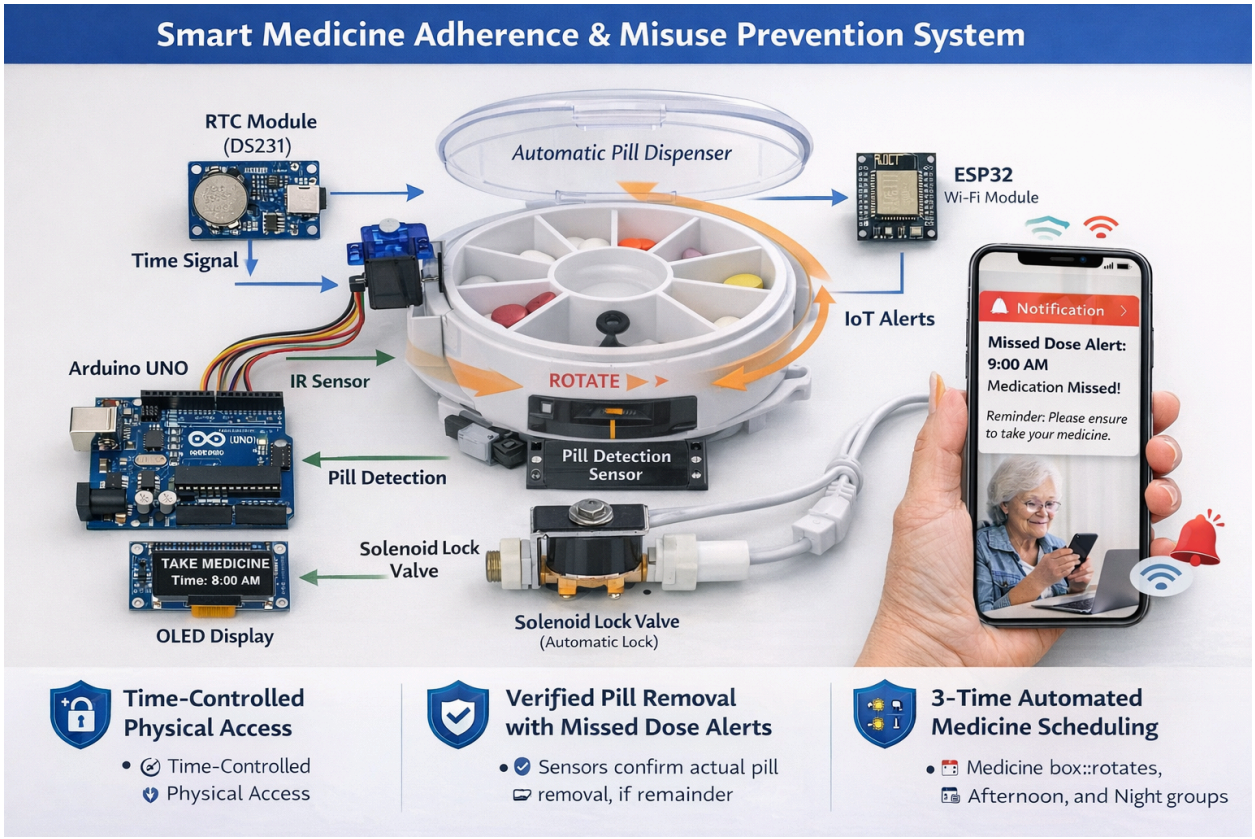
Short Introduction about the Project

This project presents a **smart medicine dispensing system** that controls medicine access based on predefined time schedules. The system ensures that patients can take medicine **only at the correct time** and prevents multiple or missed doses. It uses sensors to **verify actual pill removal** and sends alerts if a dose is missed. The system is designed to improve patient safety and medication adherence using microcontrollers and IoT technology.

Diagram of the Project (System Architecture – Description)

Working Flow:

1. The RTC module provides the current time to the Arduino.
2. Arduino compares the current time with the scheduled medicine time.
3. At the correct time, the medicine box rotates to the required slot and unlocks.
4. A sensor detects whether the pill has been taken.
5. ESP32 sends the medicine status to a mobile app or web interface.



Features of the Project

1. **Time-Based Physical Medicine Access Control**
    - The system locks and unlocks the medicine box based on scheduled times to prevent early, late, or repeated intake.
2. **Verified Dose Intake with Missed Dose Notification**
    - Sensors confirm actual pill removal.
    - If the medicine is not taken within a defined time window, the system marks it as missed and sends a notification.
3. **Automated Three-Time Medicine Organization System**
    - Medicines are divided into **morning, afternoon, and night groups**.
    - The medicine box automatically rotates to present the correct group at the scheduled time.

Apparatus / Hardware Components

- Arduino UNO
- ESP32 (Wi-Fi enabled microcontroller)
- RTC Module (DS3231)
- IR Sensor / Load Cell (Pill Detection)
- Servo Motor (for locking and rotation mechanism)
- OLED / LCD Display
- Buzzer (optional alert system)
- Power Supply
- Medicine Box / Pill Container
- Jumper Wires and Breadboard