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International Journal of Research Publication and Reviews
Journal homepage: www.ijrpr.com ISSN 2582-7421

IOT- Driven Automated Pill Dispenser and Reminder for Elderly

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ABSTRACT :

This work presents an IoT based completely smart pill dispenser that automates adherence to medication regimens at predefined events, it dispenses capsules while allowing real time monitoring via an Android software.The art piece combines an Android app for user interaction, an ESP8266 Wi-Fi module for IOT connectivity with Firebase, and an Arduino Uno microcontroller to control tablet dishing out.The dispenser uses sensors that give consumers and caregivers timely signals to identify tablet retrieval in cases of missed dosages.This response is quite original, particularly for elderly or chronically sick patients who want to strictly follow their prescription plans. The machine lowers remedy non- adherence, increases fitness care efficiency, integrates automation, actual-time monitoring, and character-fine scheduling.

Keywords: IoT, Smart Pill Dispenser, Medication Adherence, Arduino, Firebase, Android App, Healthcare Automation.

INTRODUCTION :

Particularly in those who fall below continuous health conditions, medication adherence is absolutely essential in treatment. But the most often occurring limits to right medical drug adherence are forgetting to take the drug treatments, making similarly guide tracking mistakes, and the lack of supervision, which typically results in missed or erroneous doses. Standard pillboxes and reminders lack real-time tracking and automation, hence remote affected individual monitoring is hampered.Using IOT technologies in this area has attracted more attention from the healthcare zone using adaptive decision approaches.In line with a WHO survey, almost half of patients with chronic diseases are not compliant with regard to their medication, which drives avoidable diseases and increases medical expenses. The proposed system helps in accurate tuning and dosage of drugs throughout the method of improving caregivers' duties to a minimum and improving health results for sufferers by including computerized management managed through real-time tracking and notification. By means of scalable and green solutions, cloud monitoring through IoT helps to solve the medication adherence issue, so enabling an outstanding influence on healthcare management. The integration of IoT technologies into healthcare has led to the development of fresh ideas at the side of the smart tablet dispenser, meant to break free from the limitations of traditional systems.A computerized IOT tool chargeable for allocating pill referred to as the IOT basically based tablet dispenser is a machine that shops, dispenses, and tracks medicinal drug intake while also providing the affected individual and the caregiver actual time signals.Such dispensers appoint sensors, connectivity modules and cloud based systems to preserve music of medicine adherence and provide nicely timed reminders.

LITERATURE REVIEW :

Adherence to medications is a challenge faced by health care, where non-adherence exposes the patients to health risks of serious degree and increases medical expenditure. Starting from conventional pill organizers, many solutions have been offered, going as far as introducing smart dispensers that monitor adherence by IoT automation.

Traditional Medication Management and Its Challenges-2023
This research investigates the use of IOT-based tracking for the transportation of medicine utilizing sensors and the MQTT protocol .While it ensures the integrity of storage and delivery of medicines ,it does not concern adherence of medicines after they reach the patients.

The Impact of Medication Non-Adherence on Health Outcomes-2021
A review of hospital records indicates that patients with low medication adherence had a 30% greater risk of being readmitted to the hospital than those who managed to follow their prescriptions . Forgetting and also not keeping track of medications were noted to be the two most common reasons for non adherence.

A sensible Medicine box for medication management using IOT – 2020
This includes the drugs box, like health monitoring, emergency alert through SMS is given to their caretaker and automatic opening and shutting of the lid .Using IoT system, vital parameters are recorded, uploaded to cloud and reviewed by clinicians .This helps the doctor to realize the patient's health condition.This could help avoid taking the prescribed medicine in hands and can live with the technology.

PROPOSED SYSTEM :

Smart IoT-Based Pill Dispenser automates the process of medication dispensing and enhances adherence and live monitoring through the IOT . Using pre-programmed schedules ,automatic dispensing mechanisms , and realtime alerts from android application ,the system makes sure that the patients are taking their medication in correct time.

1. Automated pill dispensing via scheduled servo motor activation.
2. IoT-based real-time monitoring for caregivers and patients.
3. Custom notifications & alerts for missed doses.

These are going These three components will work together seamlessly to ensure accurate and timely tablet dispensing.

METHODOLOGY :

The automatic pill dispenser called the Smart IOT Based Pill Dispenser aims to facilitate better compliance with medication by automation of pill dosage , tracking of intake, and real-time notification . The system consists of hardware components arduino , sensors , motors and IOT connectivity ESP8266 , Firebase and mobile app to ensure ease of use and an smooth user experience.

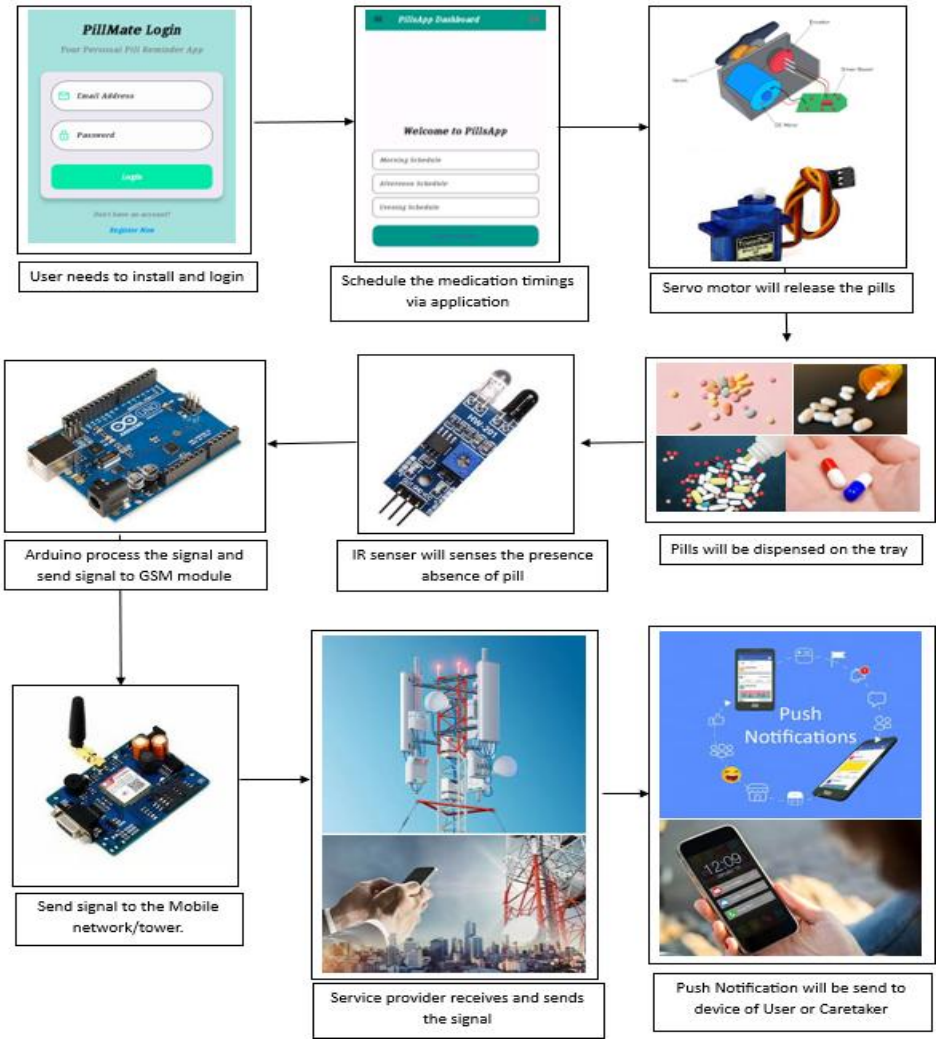

Fig 1 – Architecture Diagram

This module operates to automatically dispense pills based upon a preset schedule . Controlled by an Arduino Uno, the dispensing mechanism provides reliable dosing via a dispensing compartment that utilizes a motorized method to dispense pills based on a preset schedule . Sensors confirm that pills have been accessed, and if they have not been accessed it registers missed dosage.If a user does not consume medication, the dispensing module records it as a missed dose and enters it into the information system.This module acts to dispense medication accurately due to an automated method and reduces the opportunity human errors occur, which is especially relevant for elderly patients or patients requiring strict dosing protocols.

1. POWER SUPPLY
2. ARDUINO UNO

3. SERVO MOTOR
4. IR SENSOR
5. OLED

The software part consists of the following.

1. ARDUINO IDE
2. EMBEDDED C
3. PYTHON LANGUAGE

The next stage will involve uploading the prescribed medicines to android application. The time of the medication as per the prescription is uploaded so that it would be easy to give a custom dispense of the medication.

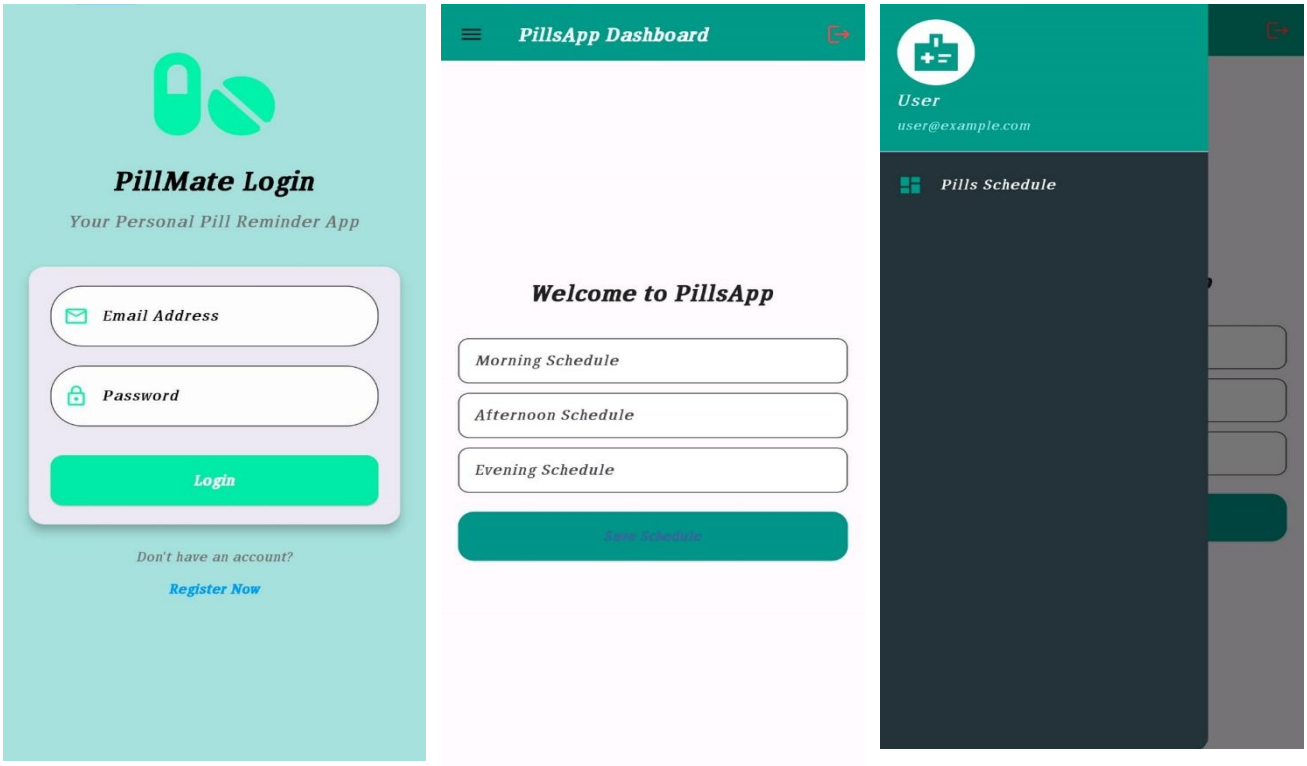

Fig 2 – Android Application

WORKING :

Hardware and software systems as well as manual to allow automated medicinal drug dispensed and real-time tracking of medicine being allocated on the affected individual's request make up the Smart IoT-Based Pill Dispenser System Implementation (SI). The hardware machine consists of an Arduino Uno as the main controller, a servo motor that dispenses treatment, an IR sensor that detects when the affected person retrieves the medication, an OLED show that presents the fame of the whole device and an ESP8266 Wi-Fi modem that connects the smart IoT-Based Pill Dispenser to Firebase because IoT connectivity.For every hardware system, the strength needs are met by the hardware electricity delivery mechanism.The machine is programmed in Embedded C using the Arduino IDE with a Python programming language processing the data and communicating with Firebase on the element of software programs.When medicinal drugs are left out, the Android software is a patron interface that lets consumers set the drugs metering out agenda, dispense treatment, and ship signals to the patron.

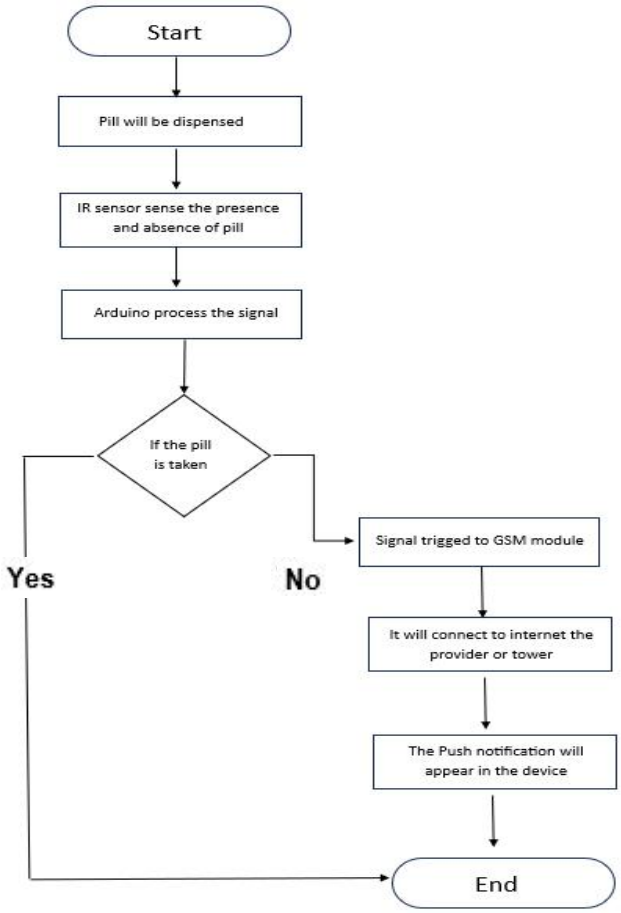

Fig 3 – Flowchart

RESULT :

The IoT-Based Pill Dispenser addresses the critical issue of medication adherence particularly in geriatric and chronically ill patients .Medication non-adherence can create several health care concerns, which is why there is a push towards automated devices .The SMD would provide for timely and proper pill dispensing, reduced interruptions from busy staff, and ensured that the patient adhered to their medications .The hardware configurations consisted of a control board, an Arduino Uno, ESP8266, servo motors, IR sensors, and an OLED display and ran continuously to dispense, monitor usage .The device also conveniently paired with a mobile Android application that allowed the user, or caregiver, to establish daily schedules for the patient taking his/her pills, as well as receive real-time alerts for missed doses .This connection established the devices' data to be synchronous using Firebase, making it easy for caregivers to stay current with the patients' medication .The dispensing of medication was done via servo motors to accurately dispense pills at designated times for the user, the IR sensor detected retrieval of medication, and used the infrared sensors to update doses in their respective databases .Furthermore, if the individual failed to retrieve the medication, the notification was created so the caregiver would notified.

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