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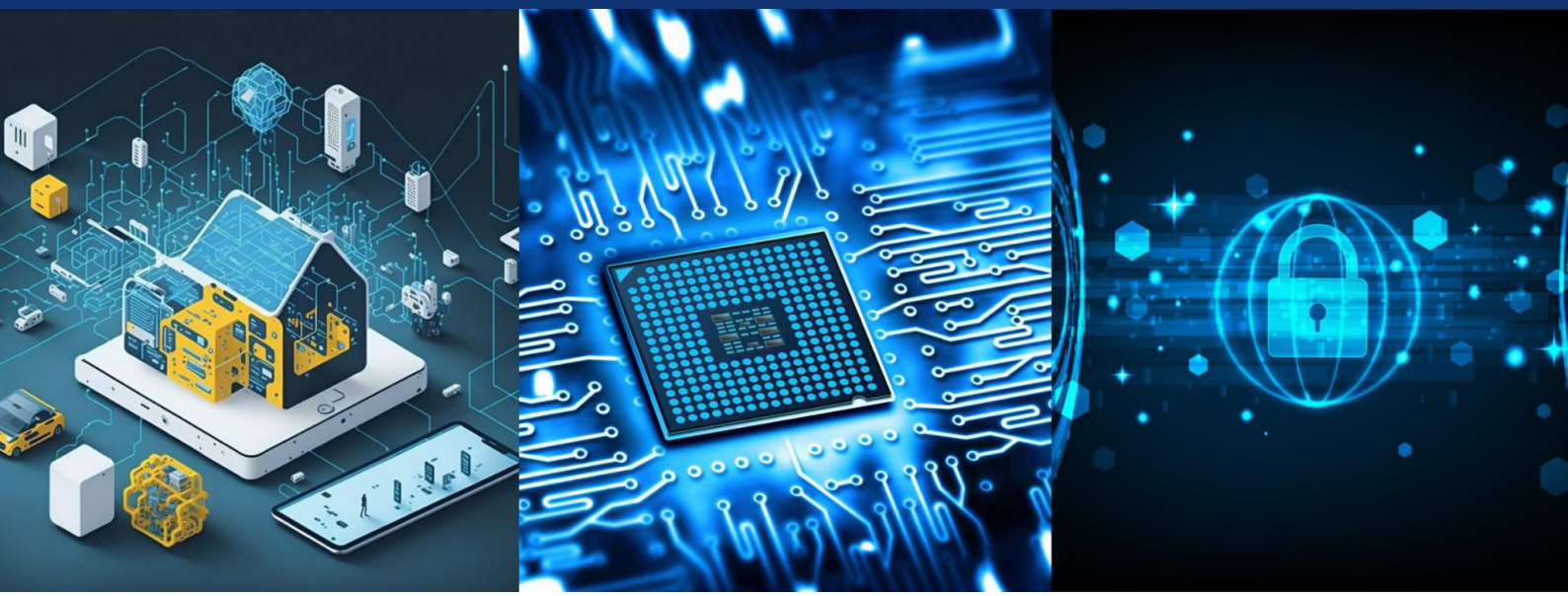

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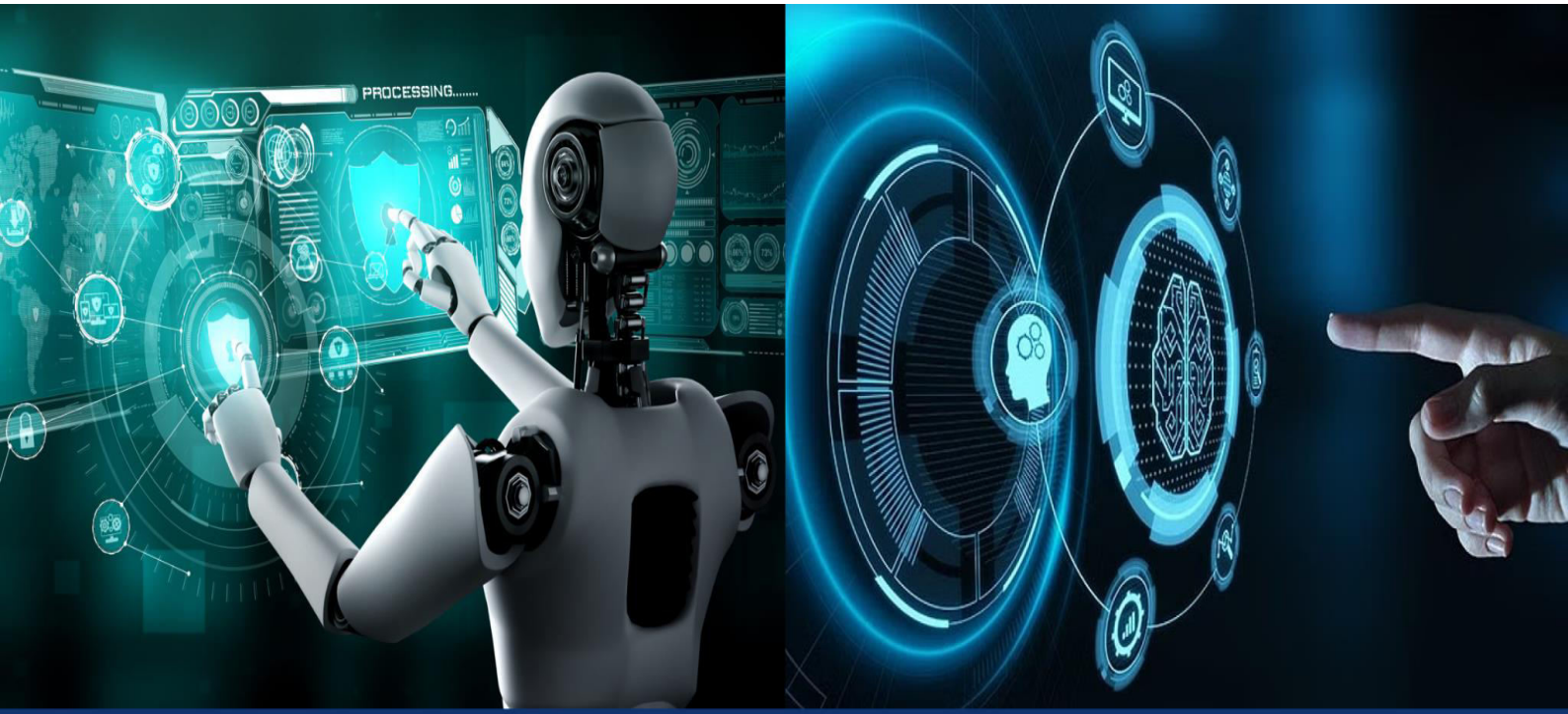

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Automated Pill Dispenser

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ABSTRACT: The research paper medical automated pill dispenser is an innovative system to solve the challenges faced by medically disabled persons, patients in hospitals, and persons cared for at home concerning managing their medications. Advanced device designed to help them who cannot recall certain specific timings for different drugs.

The medicine pill dispenser is a multi-purpose machine that contains different types of medication pills in its compartments. The user can easily reconfigure the compartments to accommodate other types of medication according to his or her needs. The device is programmed to dispense the right medication at the right time to ensure patients take their medication according to prescription.

In addition to its dispensing functionality, the medicine pill dispenser is integrated with a continuous 24/7 camera monitoring system. The feature allows caregivers and family members to monitor the patient's medication intake remotely, providing peace of mind and ensuring compliance. To further enhance its utility, the dispenser includes an alarm system that activities when medication is dispensed. This alert reminds the patient, which would be very effective if the patient is sleeping or otherwise distracted. If that patient fails to remember to take the drug or needs additional assistance, then the system automatically sends alerts to the relatives or care-providers assigned to them. These alerts ensure that caregivers are quickly notified of medication-related events or problems.

KEYWORDS: NFC Tag - Near Field Communication. PIR Sensor - Passive Infrared Sensor. RFID - Radio Frequency Identification. ESP32 – Espress if System Platform 32

I. INTRODUCTION

The Medicine Pill Dispenser is an innovative solution designed to address the challenges faced by individuals with medical conditions that hinder their ability to manage medication schedules effectively. This advanced device is tailored for patients who are either hospitalized or receiving care at home, particularly those with cognitive impairments or mobility issues that make it difficult to remember and adhere to prescribed medication regimens. The Medicine Pill Dispenser can automate the process of medication taking, thus allowing patients to take the right drugs in the right dose at the correct time. Patients will experience high health outcomes and quality of life. The versatility of the Medicine Pill Dispenser lies within its compartmental system, in which different pills of medication types can be placed and dispensed. The compartments can be programmed to addminister medication at a scheduled time according to the patient's prescription. Thus, every form of medication would be dispensed at the correct time, decreasing the chances of missed doses and improper usage. The system flexibility makes it flexible to change medication or schedule requirements if they change at any time. With further support toward patient care and safety, the medicine Pill Dispenser has an integrated camera with a 24/7 monitoring system. Through this feature, caregivers, family members, and health professionals can monitor the patient and further ensure that medications are followed suit. As an extension, the dispenser has an alarm system set to remind the patient when it's time to take their medication. This alarm is particularly helpful in waking patients who may be sleeping, so they do not miss their medication. The system also sends real-time notifications to the contacts, such as relatives or doctors, regarding the patient's medication intake and adherence. In a nutshell, the Medicine Pill Dispenser is a significant advancement in medication management for patients with special needs. The system addresses the most significant challenges of medication adherence and patient safety through automated dispensing, customizable scheduling, continuous monitoring, and real-time notifications. This innovative device not only makes it

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easy to administer medications at the right time but also brings peace of mind to caregivers and healthcare providers for better patient care and health outcomes.

II. PROBLEM STATEMENT

The medicine Pill Dispenser is one product designed to tackle challenges in the community that is met by medically disabled people, patients, and those with other forms of forgetfulness on their medication schedule. Its key problems are as follows:

1.Medication Adherence: Patients struggle to remember when they should take their medication or experience multiple medication schedules that create confusion, either missing some doses or else due to an incorrect intake scheme, causing them a lot of harm.

2. Monitoring :Both the caregiver and the family must see a means to monitor if the patient adheres to taking his medication and how he is faring, especially in a hospital setting or at home.

3. Alert System : Patients as well as their caregivers require a system that will definitely inform them on the time for medication and to alert on non-adherence to medication dose, or other issues with the patient.

Solution Summary:

The Medicine Pill Dispenser solution provides:

●Medication Dispensing: Automatically dispenses the right medication at pre-set times.

●Monitoring: It has a 24/7 camera for real-time monitoring of the patient.

●Notifications: It sends alarms and notifications to caregivers or doctors when medications are dispensed or if there are issues. This system enhances medication adherence, provides effective monitoring, and ensures timely alerts, thereby improving patient care and safety.

III. OBJECTIVE OF PROJECT

1. *Automated Medication Dispensing*:

Create a device capable of holding pills of various forms of medication in it and deliver them automatically through a pre-programmed schedule to ensure that these medications are received at the proper time without anyone's intervention.

2. *Customized Scheduling*

Design a device that allows any caregiver or the patient to readily set, adjust, and edit the medication time for each variety of pill for the different varieties of dosages and frequencies, as needed.

3. *24/7 Remote Monitoring*:

Implement a camera-based continuous video monitoring system whereby the patient is remotely monitored by caregivers, relatives, or even healthcare professionals. The camera system should offer clear and secure visualization of the patient and the dispenser.

4.*Alert and Notification System*:

Implement an alarm system that goes off when the medication is dispensed. It should be able to produce an audible alarm, especially if the patient is sleeping. It is also possible to set up SMS or other digital means of sending notifications to selected contacts, including relatives or health care providers.

5. *Simple User Interface*

Design an intuitive interface for setting up and managing medication schedules, including easy-to-use controls and a clear display. This should accommodate both patients and caregivers.

6. *Reliability and Accuracy*:

Ensure the dispenser operates reliably and dispenses medications accurately according to the programmed schedule. Regular maintenance and calibration procedures should be established to uphold the device's functionality.

7. *Safety and Security*:

Implement security measures against illegal access to the device and to its configuration. The video monitoring system has to comply with privacy rules, ensuring confidentiality of the patients.

8. *Integration with Healthcare Systems*:

The device should be integrated with any of the existing healthcare management systems or EHRs so that all medication tracking could be done in cooperation with other health care providers.

9. *Feedback Mechanism*:

Incorporate the feature of allowing users to provide feedback on the device's performance, report problems, and give recommendations for improvement. This will help improve and fine-tune the dispenser in the long run.

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10. *Flexibility and Expandability*:
Design the dispenser to hold a variety of drugs and be adjusted to the changing needs of the patients so that it is usable both at home and in the hospital.

IV. SCOPE

The present project encompasses comprehensive development and implementation of an IoT multipurpose tracker. It basically involves design and fabrication of hardware in the tracker device, creating the firmware responsible for communication and data processing, and SIM service integration. The scope is quite broad for applications.
First, we would detail the design of the form and functionality of the tracker by specifying its features and capabilities. Then, we would proceed to develop the hardware components, manufacturing the electronic components that would comprise the device.
After the hardware development, we will develop the firmware. Firmware is the intelligent software that enables communication and efficient processing of data within the tracker. This is the key to ensuring that the device operates smoothly.
This SIM service will be added to the hardware and firmware parts along with implementing a unique identifier to function as a tracker identifier to transfer data with ease to destinations.
Most importantly, the scope of this project is not restricted to a single purpose but instead encompasses various applications. The goal is to design an IoT multipurpose tracker, with versatility and adaptability for multiple functionalities. This project aims to provide a sophisticated and versatile solution to meet the needs of different use cases.

V. EXISTING SYSTEM

Automated pill dispensers are increasingly used in both healthcare setting and for individual use at home to help ensure proper medication management, adherence, and safety. These systems are designed to automatically dispense pills according to a pre-set schedule and can be particularly beneficial for individuals who take multiple medication or have difficulty remembering when to take them.

LIMITATION:
Cost: Automated pill dispensers can be expensive to purchase and maintain, and insurance may not cover these devices, which limits access for some individuals.
Battery Life and Charging: Many devices require regular charging, and low battery levels may cause the dispenser to stop functioning properly, potentially leading to missed doses.
Security and Privacy Concerns: Automated dispenser is the often collect personal health information.
Maintenance and Cleaning: Some devices require regular maintenance and cleaning to ensure they continue to work effectively, and failure to do so can lead to dispensing errors or hygiene issues.

VI. IMPLEMENTATION

1. *Design and prototyping*:
Develop detailed design specification for the pill dispenser, including compartments for different pills ,a timing mechanism ,and a dispensing system.
Create prototypes using 3d printing or other suitable methods to ensure all components fit and function as intended

2. *Medication Management System*:
Implement a software interface that allows users to input and schedule medication time for different pill.
Develop a user–friendly mobile or desktop app to manage medication schedules, track dispensed pills ,and update settings.

3. *Monitoring and Alarm system*:
I).Intigrate a 24/7 camera for patient monitoring ,ensuring it has night vision and secure data transmission.
II).Implement an alarm system that triggers when medication is dispensed, with adjustable volume and snooze option for different times of the day.

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4. Notification system:

I). Set up a notification system that sends alerts to relatives or doctors via messages, email, or app notification is dispensed or if a dose is missed .

II).Ensure the system can handle multiple contact numbers and allow easy updates to notifications settings

5.*Testing and Quality Assurance*:

I).Conduct through testing of the dispenser mechanical and electronic components to ensure reliability and accuracy in dispensing pills

II).Perform usability testing with potential users(patients, caregivers, doctors)to gather feedback and make necessary improvements .

6.*Regulatory and quality assurance* :

1.Ensure the device complies with relevant medical device regulations and standards.

2Create comprehensive documentation, including user manuals, maintenance guides, and safety instructions

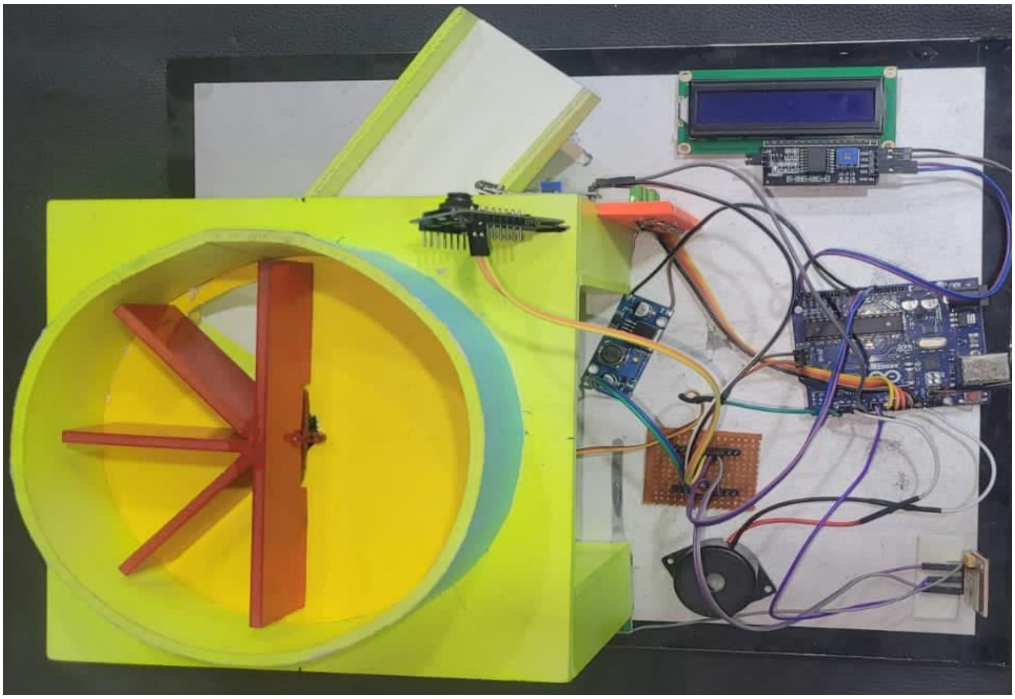

Fig: developed project model

VII. CONCLUSION

In this paper, the automatic pill dispenser offers a thorough and effective method of medication management, making it a revolutionary advancement in the world of healthcare technology. The gadget has proven to be useful in making the difficult work of following prescription regimens easier, especially for people who require assistance or have complex dose requirements. The medicine experience has been greatly enhanced for both users and caregivers by the dispenser's exact dosage distribution, user-friendly interface, and safety measures.

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