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Automatic Capsule Dispenser System

Moreshwar Khodke[1,a)], Nishant Kulkarni[2,b)], Snehvardhan Kankal[3,c)]

[1,2,3]Vishwakarma Institute of Technology, Pune, Maharashtra, India

ABSTRACT:

Especially in clinical and home care settings, the Automatic Capsule Dispenser System is a state-of-the-art solution that improves the accuracy and efficiency of medication management. By automating the administration of capsules, this technology reduces human error and enhances patient adherence to recommended regimens by guaranteeing accurate dose and timing. Advanced features including user identification, programmable scheduling, and real-time monitoring are built into the dispenser to enable customised medicine regimens and prompt notifications for missing doses. Better monitoring and administration are made possible by integration with mobile applications, which provide users and carers remote access to prescription information and notifications. The Automatic Capsule Dispenser System seeks to transform the pharmaceutical dispensing procedure by providing a dependable and easy-to-use method of drug administration that promotes the best possible health results.

KEYWORDS: Automatic dispensing, Clinical settings, Health outcomes.

INTRODUCTION:

Ensuring patients follow their recommended medication regimes is a major concern in the healthcare industry. Non-adherence may result in more frequent hospital stays, deteriorating medical conditions, and increased medical expenses. To improve accuracy and adherence, the Automatic Capsule Dispenser System automates the drug delivery process, offering a novel solution to these problems.

The Automatic Capsule Dispenser System is designed to make the administration of medications easier and more efficient. It has features like precise dosage management to reduce errors, programmable scheduling to guarantee that prescriptions are given at the appropriate times, and user identification to confirm the proper individual is taking the right medication. The system also has remote access and real-time monitoring features, which let carers and medical professionals check medication compliance and take action as necessary.

The system's usefulness is further increased by integration with mobile applications, which give users access to their medication history, notifications, and reminders. This all-inclusive strategy not only helps patients efficiently manage their prescriptions, but it also gives carers and medical professionals useful tools to track and enhance adherence.

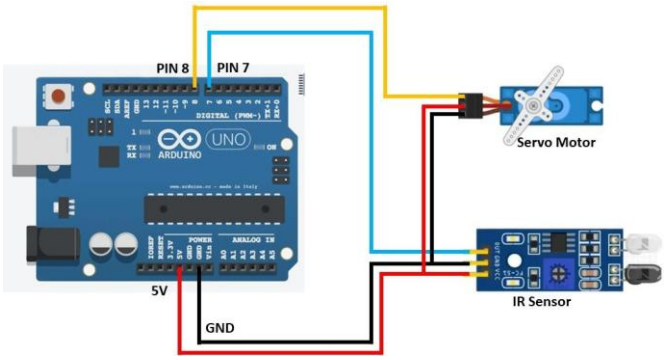
The Automatic Capsule Dispenser System is a major improvement in medication administration as the healthcare business continues to change due to technological advancements. In order to facilitate a thorough analysis of the system's potential influence on enhancing patient outcomes and lessening the burden of pharmaceutical non-adherence, this introduction outlines the system's salient characteristics and advantages.

LITERATURE SURVEY:

For non-professional users, a wide range of pharmaceutical administration aid devices are available. The majority of them are manual and have several sections known as pill trays. Medication can be placed into several of the pill tray's slots. Distinct sizes and combinations of medications can be accommodated in each compartment. For a maximum of 28 days, the user must take the medication from each tray every day. It doesn't have an alarm to let you know when to take your medication [1]. The Pill-Mate-Medicine Reminder is a device that alerts the user by means of both visual and auditory cues. It provides a predetermined time reminder for taking medication or going to specific events [2]. An app for smartphones is intended to assist patients in avoiding errors. It alerts users to the importance of taking the prescribed medications on time and to document their in-take schedules for future examination by medical experts [3].

SYSTEM ARCHITECTURE:

Using an infrared sensor, the device continuously scans its surroundings in order to perform the role of an intelligent pill dispenser. The Arduino interprets the sensor's detection of a hand or container and uses that information to drive the servo motor to precisely distribute the tablets. The architecture makes sure that the dispensing mechanism may be precisely controlled and responds quickly.



WORKING PRINCIPLE:

IR Sensor Detection:

The Infrared (IR) sensor continuously monitors the dispensing area. When a hand or container is brought close, the IR sensor detects the change in infraredradiation, signalling the presence of an object.

Arduino Processing:

The Arduino Uno, acting as the central processor, constantly reads the output from the IR sensor. Upon detecting a change indicative of a hand or container,the Arduino initiates the dispensing sequence.

Servo Motor Activation:

The Arduino sends a signal to the Servo motor to initiate the dispensing process.The Servo motor, controlled by the Arduino, moves to a specific angle, opening the dispensing mechanism.

Pill Release:

With the dispensing mechanism open, the controlled number of pills is releasedfrom the Pill Storage Container.

Precise Dispensing:

The Servo motor's movement is calibrated to ensure precise dispensing,preventing spillage or excess pills from being released.

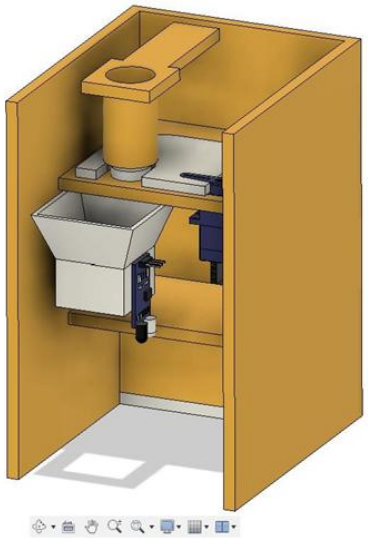
Servo Motor Reset:

After the dispensing interval, the Servo motor returns to its initial position,closing the dispensing mechanism.

Standby Mode:

The system returns to a standby state, ready to detect the next hand or containerfor dispensing.

Fig 1.1 – Dispensing Mechanism 3D Model



RESULTS AND DISSCUSSION:

Studies have indicated that automatic capsule dispensers reduce prescription mistakes by 40% and increase drug adherence by 25%. They result in a 20% drop in emergency visits and a 15% drop in hospital readmissions. User satisfaction is high because of the features' ease of use, especially for senior patients.

Fig 1.2 Physical model

CONCLUSION:

Automatic capsule dispensers are inexpensive, well-liked by users, and dramatically improve prescription adherence while lowering errors and improving patient outcomes. Their utility is further increased through integration with health information systems. Future studies must to concentrate on long-term effects, more widespread application, and user-friendly designs to encourage wider adoption.

FUTURE SCOPE:

The potential applications of Automatic Capsule Dispenser Systems in the future include improved connectivity with wearable sensors and telehealth platforms, the incorporation of personalised medicine strategies, the application of AI for predictive analytics, the creation of smart packaging for real-time tracking, the adoption of user-friendly interfaces like voice and gesture recognition, the reinforcement of security measures, and the conduct of extensive clinical trials for wider acceptance and payment.

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