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Review on: Development of Smart Pill Expert System Based on Iot

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ABSTRACT

These research papers tackle the critical problem of people not taking their medicine correctly by using smart technology. The solutions range from identification to verified consumption. The Med Glasses system is unique: it uses AI built into smart glasses to identify the correct pill in a user's hand, specifically helping visually impaired patients avoid mistakes. The IoT Smart Medicine Dispenser Model provides a basic, reliable system that dispenses pills on time and sends alerts to caregivers. More advanced is the Smart Pill Container, which uses both a camera with AI (YOLOv5) to confirm the pill's identity and weight sensors to verify the correct dosage was removed. Finally, the Smart Pill Dispenser with Smart Cup offers the most complete solution by pairing the dispenser with a special cup that uses motion sensors to definitively check if the patient actually drank the water and swallowed the pill, going far beyond simply dispensing it. Overall, these innovations demonstrate a clear path towards making medication management safer and more reliable.

INTRODUCTION

The challenge of medication non-adherence—where patients fail to take their prescribed drugs correctly—is a major global healthcare crisis, leading to worsened health outcomes, increased hospitalizations, and substantial economic costs. As the world's population ages and chronic diseases become more prevalent, reliance on patient memory and traditional pillboxes is proving utterly insufficient. To address this critical gap, recent advancements in the Internet of Things (IoT), Deep Learning, and smart sensor technology have driven the development of sophisticated automated solutions that promise to dramatically improve patient safety and compliance. The four papers under review—Med Glasses, An IoT based Smart Medicine Dispenser Model, A Smart Pill Container, and Smart Pill Dispenser with Smart Cup—represent distinct and innovative approaches to solving this problem, each focusing on a different critical point of failure in the medication process. These systems move beyond simple reminders toward solutions that offer real-time verification of pill identity and, crucially, confirmed consumption. While the IoT based Smart Medicine Dispenser offers a necessary foundation for automated scheduling and alerting using microcontrollers, the other three papers integrate more powerful AI and advanced sensing to tackle the complexity of visual verification or physical consumption tracking. This comparative analysis will highlight the evolution of medication management technology, ranging from specialized visual aids for vulnerable populations like visually impaired to comprehensive, closed-loop systems that monitor every step from dispensing to ingestion, offering valuable insights into the future direction of smart healthcare devices.

LITERATURE SURVEY

A Smart Pill Container for Improved Medication by Thangam. S, T. Sudeep Reddy, Dhanush, T. Krithin, J. Jesy Janet Kumari, This paper proposes a smart pill container system to address medication non-adherence, a significant healthcare problem that leads to the gradual worsening of patient health, increased hospitalizations, and higher costs.

An IoT based Smart Medicine Dispenser Model for Healthcare by Chetan H. Patil, Nakia Lightwala, Mehul Sherdiwala, Amol Dattatraya Vibhute, Sachin A. Naik, and Shankar M. Mali, This paper presents an IoT-based

smart medicine dispenser model designed to automate medication management, ensuring patients, especially the elderly, take their medications on time, at the correct dosage, and without the possibility of missing pills.

Smart Pill Dispenser with Smart Cup by Sergio R Minera,Abulaiti Nuerbiya,Alonso Espinoza,Kiran George, This paper presents a smart pill dispenser integrated with a smart cup to ensure accurate medication reminders and verification of pill intake for improved patient safety.

MedGlasses: A Wearable Smart-Glasses–Based Pill Recognition System Using Deep Learning for Visually Impaired Chronic Patients by Wan-Jung Chang,Liang-Bi Chen,Chia- Hao Hai,Jheng-Hao Chen,This paper introduces MedGlasses, a wearable smart-glasses system that uses deep learning–based pill recognition to help visually impaired chronic patients accurately identify medications and improve treatment safety.

PAPER COMPARISON

RESEARCH PAPER	COMPARITIVE STUDY
A Smart Pill Container for Improved Medication Thangam. S, T. Sudeep Reddy, Dhanush, T. Krithin, J. Jesy Janet Kumari	The study implements a smart pill container that enhances medication adherence by providing timely alerts, tracking pill intake, and preventing missed or double doses, offering a practical, low-cost, and user-friendly solution that is more reliable than traditional pill boxes and far simpler to use than advanced smart dispensers or AI-based medication management systems, ultimately improving convenience, safety, and compliance for patients in their daily medication routines.
MedGlasses: A Wearable Smart-Glasses– Based Pill Recognition System Using Deep Learning for Visually Impaired Chronic Patients by Wan-Jung Chang,Liang-Bi Chen,Chia-Hao Hai,Jheng-Hao Chen	MedGlasses provides a wearable, AI-powered solution that enables visually impaired patients to accurately identify and manage their medications, offering greater independence, reliability, and safety compared to traditional pill boxes and standard smart dispensers, while significantly reducing the risk of medication errors in daily use, improving adherence through real-time feedback, and enhancing user confidence by simplifying complex medication routines.
Smart Pill Dispenser with Smart Cup by Sergio R Minera,Abulaiti Nuerbiya,Alonso Espinoza,Kiran George	The Smart Pill Dispenser with Smart Cup provides an automated solution that ensures accurate medication dispensing and intake verification, offering improved adherence and safety compared to traditional pill boxes, while being more practical and user-friendly than many high-tech, complex smart dispensing systems.
An IoT based Smart Medicine Dispenser Model for Healthcare Chetan H. Patil, Nakia Lightwala, Mehul Sherdiwala, Amol Dattatraya Vibhute, Sachin A. Naik, and Shankar M. Mali.	The IoT-based Smart Medicine Dispenser Model improves medication adherence by providing automated dispensing, real-time monitoring, and remote caregiver notifications, offering a more connected and efficient solution compared to traditional pill boxes and simpler smart dispensers, while reducing the risk of missed or incorrect doses, enhancing patient safety, and enabling better integration with healthcare management systems.

CONCLUSION

In conclusion, all systems demonstrate a powerful application of modern technology to mitigate medication non-adherence, but each addresses a distinct facet of the problem. The MedGlasses project excels in providing a specialized, non-dispensing, real-time safety check for the visually impaired. The "IoT based Smart Medicine Dispenser" offers an accessible and reliable timing and alert mechanism for general chronic patients. The "Smart Pill Container" introduces a robust, dual- sensor method for post-dispensing verification of dosage and identity. Finally, the "Smart Pill Dispenser with Smart Cup" offers a sophisticated, sensor-based solution to the core challenge of verifying consumption itself. Future research should focus on integrating the strengths of these designs, potentially combining the

vision-based pill identification of MedGlasses or the Smart Pill Container with the consumption verification of the Smart Cup to create a comprehensive system that can not only dispense and identify but also confirm actual ingestion and seamlessly integrate with electronic health records for remote monitoring.

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