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Medication Management and Reminders

Dr.P.S. Vachaspati[1], M. Pallavi[2]

Computer Science & Engineering, Bapatla Engineering College, Bapatla, India[1]

M.Tech, Computer Science & Engineering, Bapatla Engineering College, Bapatla, India[2]

Abstract: Medication adherence is an important challenge among patients, as missed or incorrect doses can lead to poor treatment outcomes and medication-related errors. This paper proposes a Smart Medication Reminder System enhanced with Machine Learning to help patients take their prescribed medicines correctly and on time. The proposed system provides timely medication reminders, maintains medication history, and analyzes patient medication patterns to predict the possibility of missed doses. It also enables family members and healthcare providers to monitor medication adherence and support patients when necessary. By combining automated reminders, medication tracking, and machine learning-based prediction, the system aims to improve medication adherence, reduce missed doses and medication errors, and provide a reliable solution for different groups of patients.

I. INTRODUCTION

Taking medicines regularly and on time is essential for maintaining good health and achieving effective treatment outcomes. However, many patients, especially elderly people and those with long-term health conditions, often forget or delay their medication doses. Missing medicines regularly can increase health risks and may reduce the effectiveness of treatment.

Existing medication management methods, such as handwritten notes, alarms, and calendars, provide only basic reminders and do not offer proper medication tracking or adherence monitoring. These traditional methods are therefore not always reliable for patients who require regular medication.To overcome these limitations, this paper proposes a Smart Medication Reminder and Management System using Machine Learning. The system provides real-time medication alerts through sound, vibration, and push notifications. It also maintains medication history and uses machine learning techniques to identify patterns and predict the possibility of missed doses. Furthermore, the proposed system allows family members and healthcare providers to monitor a patient's medication adherence remotely. The system is designed to support different groups of users, including elderly patients, busy professionals, and long-term medication users. Thus, the proposed solution aims to improve medication adherence, reduce missed doses, and support safer and more effective medication management.

BACKGROUND & RELATED WORK

Patients commonly depend on manual methods such as handwritten notes, calendars, and phone alarms to remember their medication schedules. However, these methods only provide reminders and do not track whether the patient has actually taken the prescribed medicine. As a result, the actual medication intake and consumption status often remain unknown.Elderly and dependent patients may also rely on family members or caregivers for regular medication reminders. Existing systems generally lack automatic missed-dose detection and pattern recognition to identify patients who frequently miss their medicines. In addition, insufficient medication adherence data makes it difficult for doctors and healthcare providers to understand patient behavior and personalize treatment effectively. Therefore, forgetfulness, incorrect doses, and missed medicines remain common problems that can negatively affect patient health.

II. METHODOLOGY

The system was developed using a structured and iterative methodology to ensure reliability, usability, and accuracy in medication tracking. The process began with requirement analysis, where existing medication management challenges were examined and user needs were identified, especially for patients requiring continuous monitoring and support.Based on these requirements, the system architecture was designed to include automated reminders, real-time intake logging, and adherence verification features. The implementation phase focused on developing core modules responsible for scheduling medication alerts, recording intake activities, and securely storing adherence data.A user-friendly interface was created to ensure accessibility for patients across different age groups, while separate dashboards for caregivers and healthcare providers were included to support remote monitoring and decision-making. The system was then evaluated through simulated and real-world testing scenarios to assess its effectiveness in detecting missed doses, recording accuracy, and notification reliability.Feedback from testing was used to refine and optimize the system, improving its responsiveness, stability, and overall performance. This iterative development approach ensured that the

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final system is practical, efficient, and effective in addressing medication non-adherence

[1.1] Presently Available System:

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[1.2] Proposed System:

The proposed system is designed to improve medication adherence by combining reminder automation with intake tracking and data analysis. The methodology involves the following key steps:

1. User Registration and Profile SetupPatients or caregivers create a profile by entering basic details such as age, medical conditions, prescribed medicines, dosage, and timing schedules.
2. Medication Scheduling ModuleThe system generates a structured medication timetable based on the prescription. This schedule is stored in a database and used to trigger reminders at predefined intervals.
3. Smart Reminder SystemAutomated alerts are sent to the user through mobile notifications, alarms, or messages. These reminders continue until the user confirms medication intake.

[1.3] Viability of the System:

The system validity is evaluated through a structured methodology involving implementation testing, user interaction analysis, and performance assessment. The system is tested under simulated and real-world conditions to verify its ability to accurately record medication intake and detect missed doses. Data collected from user interactions is analyzed to measure consistency, reliability, and responsiveness of the system.In addition, feedback from users and caregivers is incorporated to assess usability and practical effectiveness. Key performance indicators such as detection accuracy, notification reliability, and adherence tracking efficiency are used to validate system performance. This combined approach ensures that the system is both functionally reliable and effective in improving medication adherence outcomes.The software is a web application which can be run on a windows operating system having Javaplatform (JDK 1.6 or higher) .

RESULTS

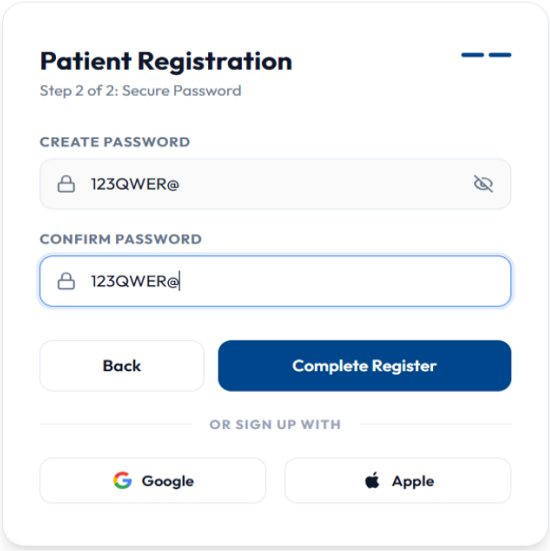

Fig 1: Patient Registration Page

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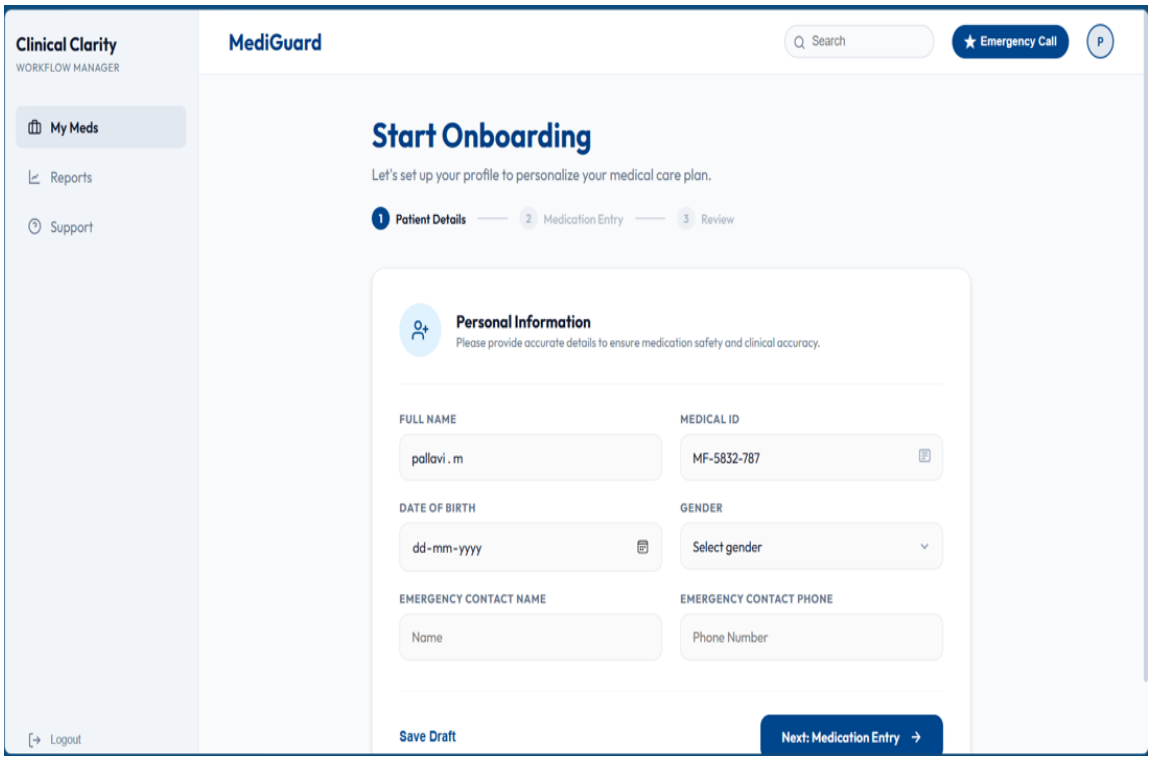

Fig 2: Medication Input Page

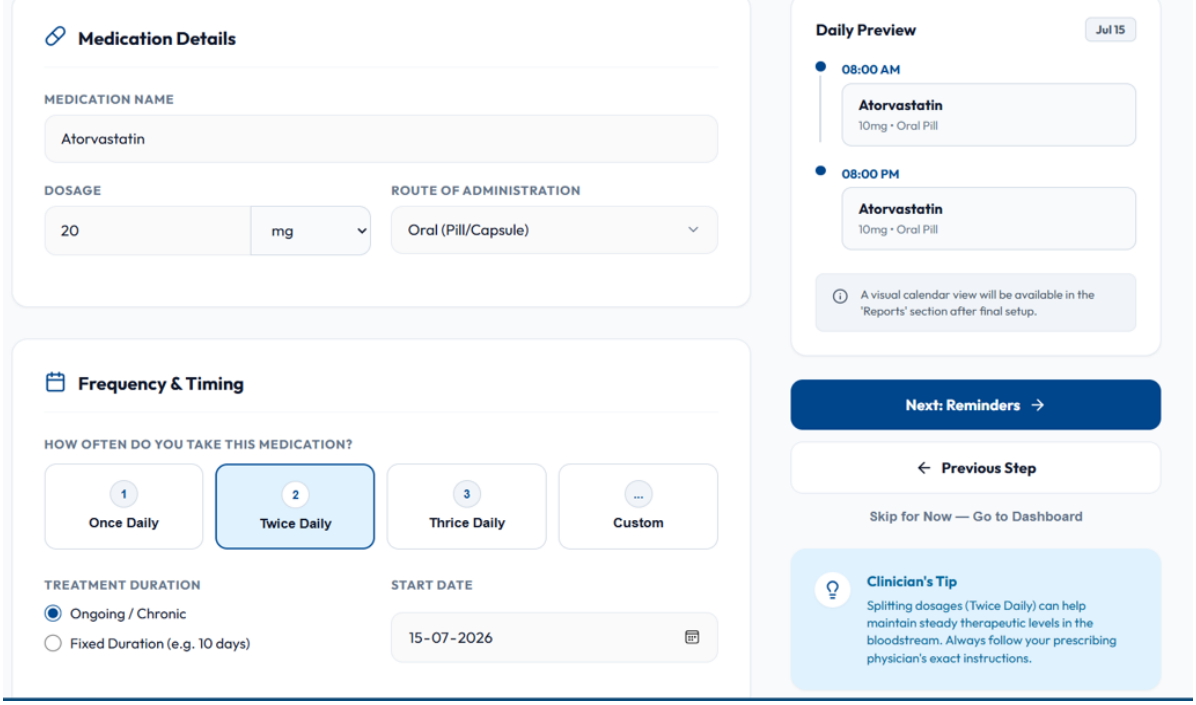

Fig 3: Schedule Setup

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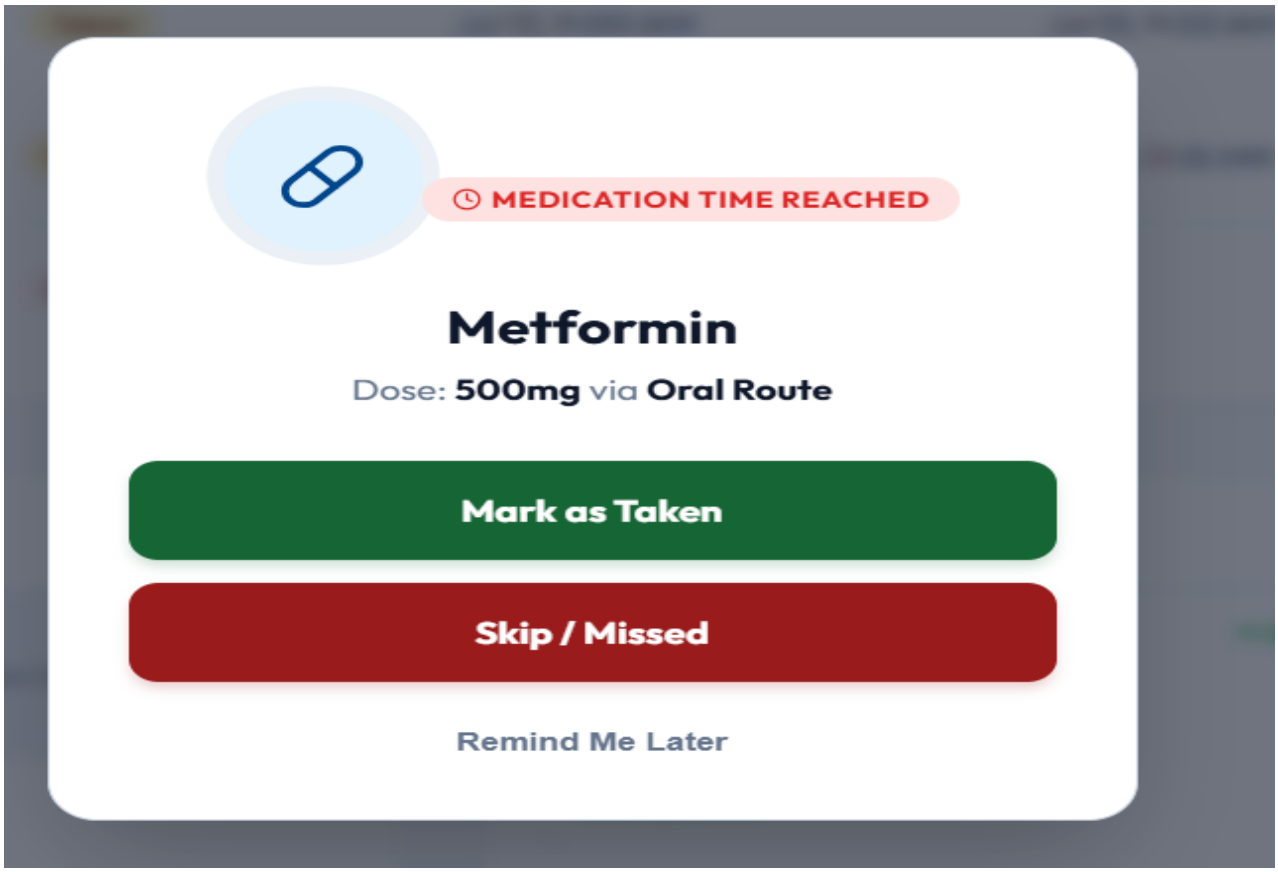
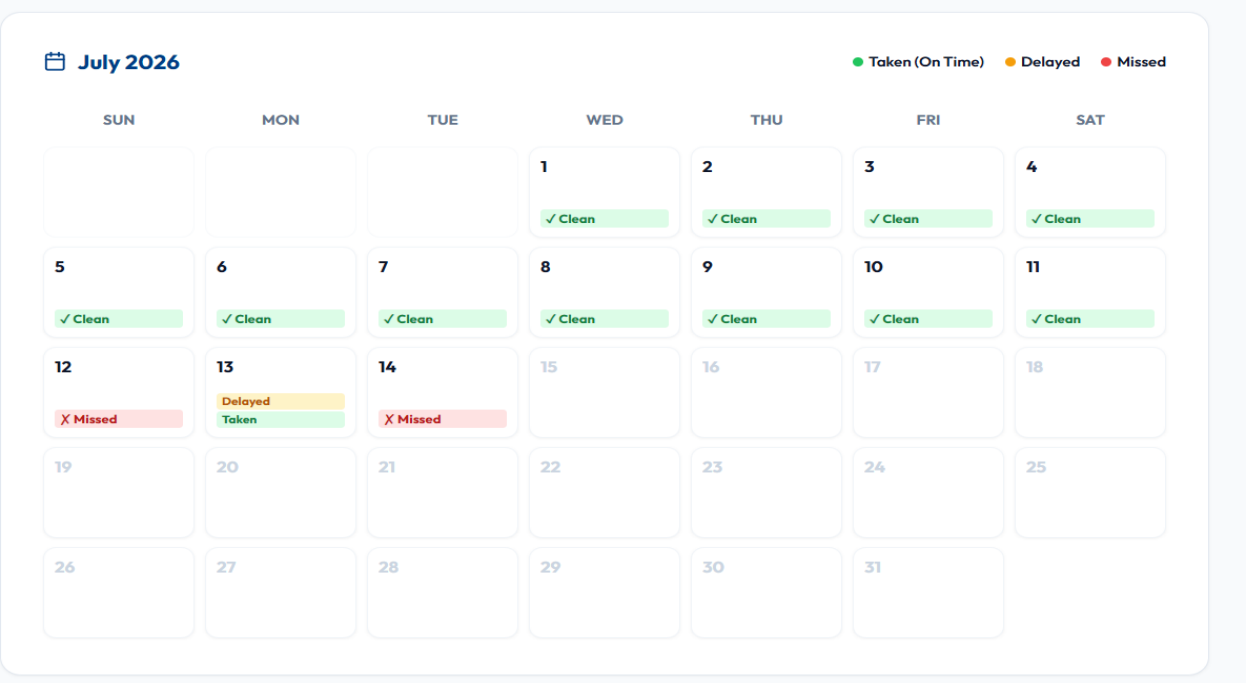


Fig 4: Reminder setup page



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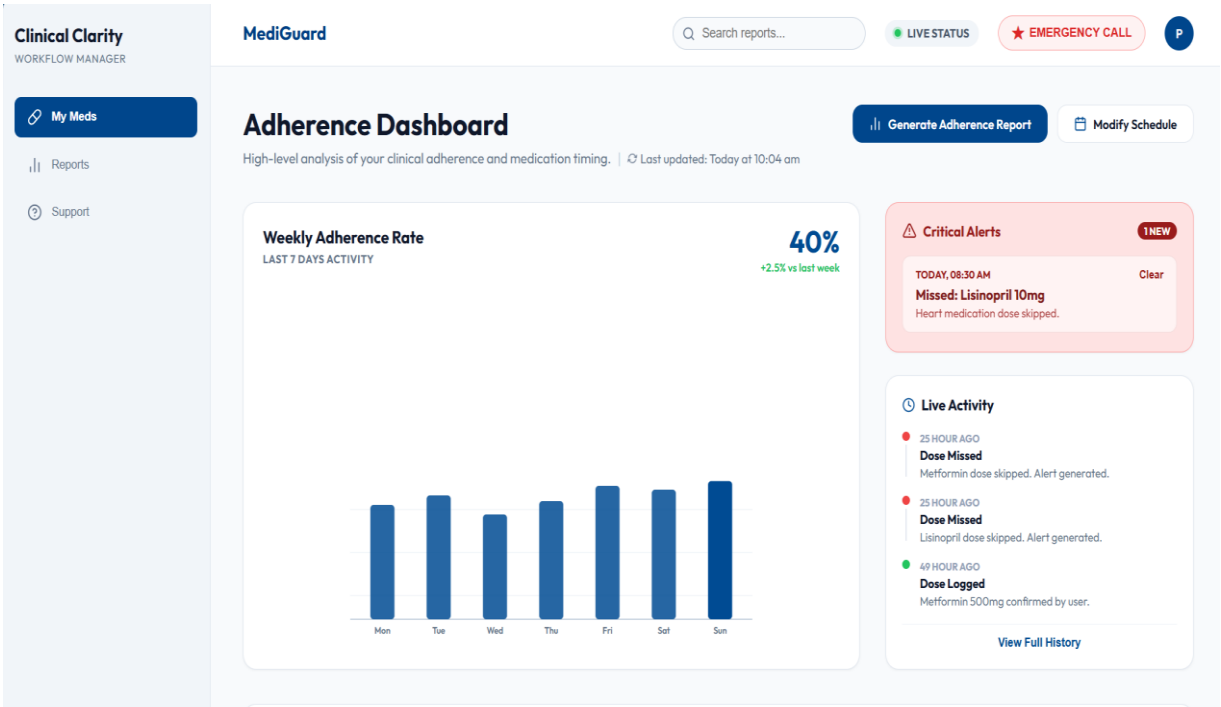

Fig 5: Monitoring & Recording

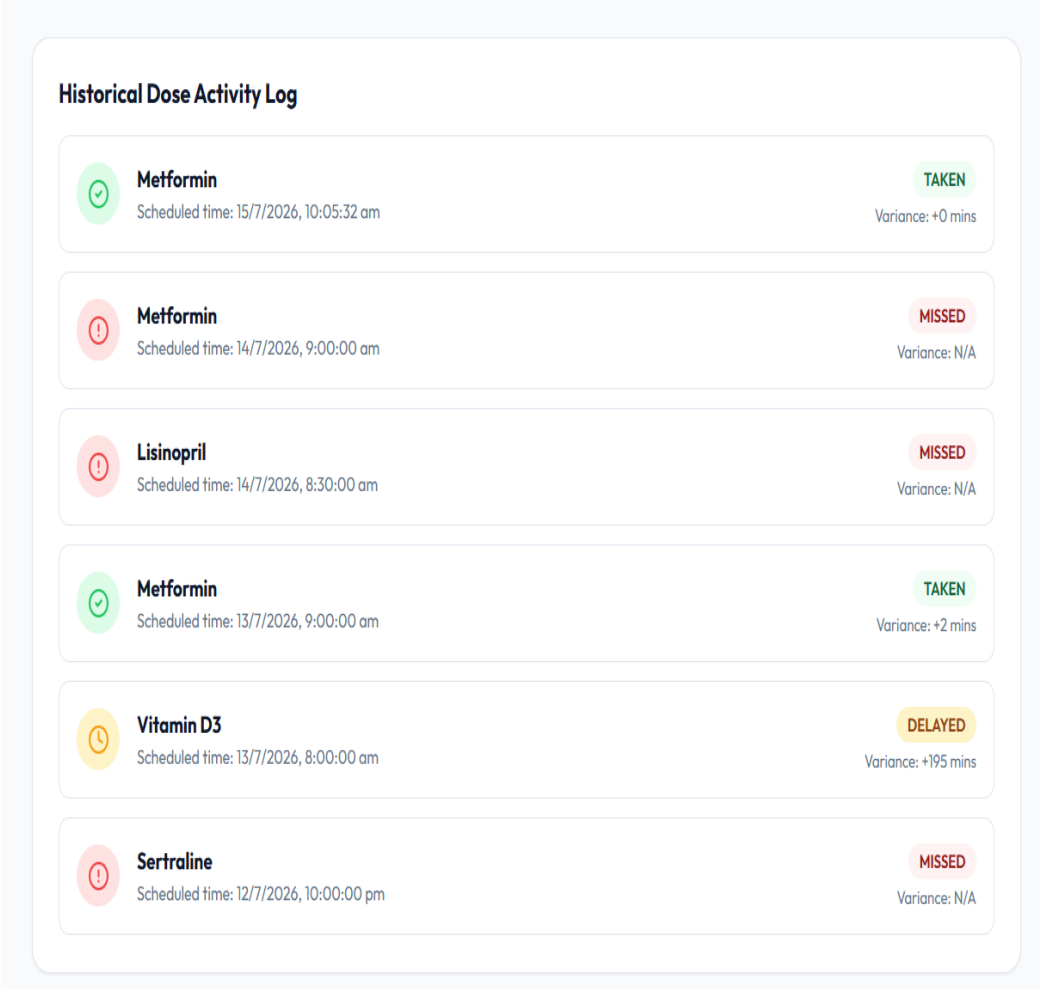

Fig 6: Final Output

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III. CONCLUSION

In conclusion, the proposed medication management system successfully demonstrates an improved and more reliable approach to ensuring patient adherence compared to traditional methods. By integrating automated tracking, real-time monitoring, and intelligent reminders, the system effectively reduces the risk of missed or incorrect medication intake. It bridges the gap between patients and healthcare providers by offering accurate, timely, and verifiable adherence data.The system not only enhances patient safety but also supports caregivers and medical professionals in making informed decisions based on dependable records. Its ability to minimize human error and eliminate reliance on manual reporting significantly improves the overall quality of medication management.Furthermore, the system is scalable and adaptable, making it suitable for a wide range of healthcare environments, from individual home care to institutional settings. With continued improvements and potential integration of advanced technologies such as AI-based prediction and wearable sensors, the system can further evolve to provide even more personalized and proactive healthcare support.

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