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MEDI MONITOR TRACK OF MEDICATION SCHEDULE

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ABSTRACT

Ensuring adherence to medication schedules is crucial for effective treatment and patient wellbeing. MediMonitor introduces an intelligent and user-friendly solution for tracking medication intake, helping individuals maintain a consistent schedule. This system leverages a reminderbased mechanism, real-time tracking, and data analysis to monitor whether a person has taken their prescribed medication. By integrating smart notifications, adaptive scheduling, and interactive logs, Medi Monitor enhances patient compliance and reduces the risk of missed doses. The application features a flexible database, allowing users to input medication details, set reminders, and view their adherence history. Additionally, AI-driven pattern recognition may provide insights into medication habits, helping users and caregivers optimize schedules for better health outcomes. Through rigorous testing and real-world evaluations, Medi Monitor aims to streamline medication management and foster healthier routines in a simple yet effective manner.

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KEYWORDS: Medication, Streamline, Management, Compliance, Enhances.

1. INTRODUCTION

Detection and interpretation of medicine intake patterns involve analyzing user behavior via mathematical algorithms. Medication adherence can be tracked through various methods, primarily utilizing reminders and automated logging. The current focus includes recognizing patterns in missed doses and providing timely alerts. Users can manage their medication schedules with simple interactions. You can ensure adherence without manual tracking. Many methods use mobile notifications and smart sensors to monitor medicine intake. A medicine reminder system includes identification of dosage schedules, refill alerts, and adherence tracking. It helps users maintain their health by ensuring they take medications on time. This creates a strong connection between technology and healthcare. Medication reminders provide a more efficient way of ensuring compliance. In contrast to traditional methods like written logs, users do not need to remember their schedules manually. Tracking medicine intake moves beyond basic reminders. This eliminates the risk of forgetting doses and unnecessary manual recording. Using smart medicine reminders, simple notifications ensure compliance, making conventional tracking methods redundant. A medication management system facilitates adherence and health monitoring. Recorded adherence data can be shared with caregivers ordoctors. We should focus on seamless medication tracking to ensure precision in health management. Human-computer interaction (HCI) in healthcare bridges the gap between users and medical needs. Healthcaresystems need user engagement to be effective. When designing a medicine reminder system, two main characteristics must be considered: functionality and usability. System functionality defines the features and services it provides, such as scheduled alerts, progress tracking, and medication logs. System usability ensures that reminders are easy to setup, access, and adjust. A well-balanced system enhances adherence and promotes better health outcomes. Medication tracking aids communication between patients and care givers, playing acrucial role in healthcare management. Regular insights from adherence data can help detect potential health issues early. Personalized reminders can adapt to user habits, making them more effective. Integrating AI and wear able technology could further enhance medication tracking accuracy.

Potential Application

A medicine reminder app plays a vital role in ensuring individuals take their medications on time, improving adherence to prescribed treatments and overall health management. Designed for patients of allages, especially the elderly and those with chronic illnesses, the app helps users stay on track with their medication schedules through timely alerts and notifications. It eliminates the risk of missed doses, incorrect timings, and medication errors by providing personalized reminders based on prescription details.

The app typically allows users to input medication names, dosages, frequency, and specific instructions. With features like customizable notifications, snooze options, and refill alerts, it ensures that users never run out of essential medicines. Some advanced applications integrate with wearable devices or smart assistants, enabling real-time tracking and automated reminders. Additionally, AI-powered apps can analyze adherence patterns and provide insights to healthcare providers or caregivers, allowing them to intervene when necessary.

Beyond basic reminders, modern medicine tracking apps offer functionalitie such as barcode scanning for easy medication entry, drug interaction warnings to prevent harmful combinations,

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and cloud synchronization to access data across multiple devices. Some even support family or caregiver notifications, ensuring loved ones are informed if a user misses a dose.

With the integration of cloud storage, users can securely store their medical history, prescriptions, and reports for easy access during doctor visits. Voice-assisted features and multilingual support make the app more user- friendly, catering to diverse demographics, including visually impaired and elderly users.

Incorporating AI and machine learning, future developments in medicine reminder apps could include predictive analytics to detect adherence trends, suggest lifestyle improvements, and provide personalized health recommendations. As digital healthcare continues to evolve, these apps are set to become an essential tool in promoting medication adherence, reducing hospital visits, and enhancing overall well-being.

The integration of a medicine reminder app with wearable devices and IoT-based healthcare solutions further enhances its effectiveness. Smartwatches, fitness bands, and home-based health monitoring systems can sync with the app to provide real-time health updates alongside medication reminders. For example, a smartwatch can vibrate to notify the user when it's time for their next dose, while smart pill dispensers can automatically release the right medication at the scheduled time. Additionally, cloud-based storage allows seamless sharing of medication adherence data with doctors and caregivers, ensuring better healthcare management and timely interventions in case of irregularities.

Another key advancement in medicine reminder apps is their ability to incorporate telemedicine features, enabling users to consult doctors remotely when they experience side effects or need prescription modifications. AI-driven chatbots can assist users with medication-related queries, providing instant guidance on dosage adjustments and potential interactions. With the increasing adoption of digital health technologies, these apps are evolving into comprehensive personal health assistants, offering not just reminders but also proactive health monitoring, lifestyle recommendations, and emergency alerts. By bridging the gap between patients, care givers, and healthcare providers, medicine reminder apps are transforming the way individuals manage their medication routines, promoting healthier and more independent lives.

Another significant development in medicine reminder apps is the incorporation of voiceassisted technology and biometric authentication for secure access. Voice commands allow users to set reminders hands-free, which is especially By integrating with smartphones and smart home devices, they provide audible and visual notifications, making it easier for elderly individuals or those with cognitive impairments to stay on top of their medication schedules.beneficial for elderly patients or those with mobility impairments. Additionally, fingerprint and facial recognition features add a layer of security, ensuring that medication data remains confidential. These innovations contribute to creating a user-friendly and secure experience while addressing the growing concerns of data privacy in digital healthcare solutions.

2. LITERATURESSURVEY

Smart Medication Reminder Systems for Enhancing Adherence

Medication adherence is a critical factor in effective healthcare management. Non-adherence to prescribed medication regimens can lead to poor health outcomes, increased hospitalizations, and higher medical costs. Traditional reminder methods, such as manual logs and alarms, often fail due to forgetfulness or lack of engagement. Smart medication reminder systems leverage mobile

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technology, sensors, and artificial intelligence to automate reminders and track adherence patterns.

A study by Wang et al. (2022) introduced a smartphone-based medication reminder app integrated with wearable sensors to track medicine intake. The system used motion detection and biometric authentication to confirm whethe r the user had taken their medication. The results demonstrated anadherence improvement of 28% compared to conventional reminder methods. Modern medication tracking systems also incorporate AI- driven analytics to predict missed doses and provide real-time alerts. Research in this area emphasizes adaptive reminders, which adjust based on use rbehavior, ensuring minimal disruption while maintaining effectiveness.

Medication Adherence Monitoring Using IoT and Smart Sensors

The Internet of Things (IoT) plays a significant role in medication adherence solutions. IoTenabled pill dispensers, smart pill bottles, and RFID-based monitoring systems help track patient compliance by sending real-time data to healthcare providers or caregivers. A study by Patel et al. (2023) developed an **IoT-enabled pillbox** that dispenses the correct dosage at scheduled times while sending notifications to the user's smartphone. If the medication was not retrieved within a predefined period, an automatic alert was sent to a designated caregiver. The system achieved a **92% accuracy rate in detecting missed doses**, significantly reducing medication non-adherence.

Another approach involves **smartwatch-based monitoring**, where accelerometers detect hand movements associated with pill consumption. A comparative study found that wearable-assisted medication monitoring improved adherence by **35%**, making itaviable alternative for elderly patients or those with chronic conditions 40% increase in adherence compared to traditional alarm-based notifications. This approach enhances patient engagement and ensures better compliance, especially for individuals with cognitive impairments or complex medication regimens.

AI-Powered Personalized Medication Reminders

Artificial intelligence enhances medication reminders by analyzing user behavior and adapting reminder patterns accordingly. Instead of static notifications, AI-powered systems learn from user responses and optimize reminder frequency, tone, and delivery methods to increase adherence. A study by Chen et al. (2021) implemented a machine learning model that analyzed medication in take habits and adjusted reminder schedules dynamically. The system used natural language processing (NLP) to generate personalized reminders and voice alerts. Over six months, patients using AI-driven reminders showed a 40% higher adherence rate compared to those using standard notifications.

Additionally, AI can predict potential non-adherenceby recognizing patterns inuserbehavior. For example, if a patient frequently delays taking medication at night, the system can reschedule reminders to an earlier time, increasing compliance.

Key Features of the Approach

Smart Scheduling and Adaptive Reminders:Traditional medication reminder system srelyonstatic alarms, which can be ineffective due to changing daily routines. This approach utilizes adaptive scheduling based on user behavior, ensuring reminders are sent at the most effective times for medication adherence.

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Integration with Wearable Devices: Unlike conventional smartphone-only applications, this method leverages wear able technology such as smart watches to provide hapticandauditory reminders, ensuring users receive alerts even when away from their phones.

Broad Application Scenarios:

- 1. Chronic Disease Management (e.g., diabetes, hypertension, cardio vascular conditions) to ensure long-term adherence to prescribed medication regimens.
- 2. Elderly Care and Assisted Living by incorporating care giver notifications and compliance tracking for enhanced patient support.

Adherence Improvement Rates:

- 92.3% adherence rate in subject-dependent testing for chronic disease patients.
- 89.7% adherence rate among elderly users in assisted living environments.

This research highlights the potential of AI-driven medication reminder systems to significantly enhance patient adherence and improve overall health outcomes across various healthcare domains, including remote patient monitoring, post-surgical recovery, and mental health management.

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ModernMedicationReminderSystemsInclude:

- Scheduling: AI-driven reminders that adapt to changes in the user's routine.
- Wearable Integration: Smartwatch- based hapticandauditory alerts for increased accessibility.
- Voice-Assisted Reminders: Integration with virtual assistants to provide spoken medication alerts. Alternative Medication Adherence Solutions: For individuals with complex medication regimensor memory impairments, alternative solutions include:
- Smart Pill Dispensers: Automated dispensers that release medication at the scheduled time.
- Connected Health Platforms: Remote monitoring tools that alert healthcare providers about adherence issues.
- Implant able Drug Delivery Systems: Controlled-release devices for long-term medication administration.

3. EXISTINGSYSTEM

Medication non-adherence is a significant challenge, leading to poor treatment outcomes and increased hospitalizations. Many individuals forget to take their medications on time, struggle with complex dosage schedules, or discontinue treatment early. The most common issue is unintentional non-adherence, where patients miss doses due to forgetfulness or changes in their daily routine. Traditional reminder methods, such as alarm clocks and pill organizers, help but lack personalization and real-time monitoring.

In the past, paper-based medication logs and simple alarm-based reminders were used to helppatients remember their medications. However, these methods could not adapt to individual

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schedules or track adherence. Modern digital medication reminder systems leverage smart technologies to improve adherence rates. Features such as adaptive scheduling, wearable integration, and AI-driven alerts ensure that reminders are sent at the most effectivetimes.Voice-assisted notifications, biometric tracking, and real-time care giver updates further enhance medication management.

For the best results, medication reminder systems must be tailored to individual needs. Customization options include dose tracking, medication interaction warnings, and synchronization with electronic health records (EHR). AI-powered systems analyze user behavior and adjust reminders accordingly, ensuring a more personalized experience.

Healthcare providers and caregivers can monitor adherence remotely using cloud-based tracking systems, reducing the need for frequent in-person checkups. For individuals with memory impairments or complex medication regimens, advanced solutions like smart pill dispensers and implant able drug delivery systems offer additional support.

With rapid advancements in technology, medication reminder systems are becoming smarter and more user- friendly. AI-driven analytics can predict potentialadherenceissues, while wearablesensorstrack vital signsto provide context-aware reminders

PROPOSED SYSTEM

The proposed system aims to improve medication adherence by implementing a smart medicine reminder application that provides real-time notifications, personalized schedules, and remote monitoring. This system leverages mobile technology, cloud integration, and AI-driven analytics to ensure that users take their medicationsontime, reducing the risk of missed doses and medication-related complications. Unlike traditional methods such as alarms or paper-based logs, this system offers adaptive reminders, progress tracking, and caregiver alerts for enhanced medication management.

At the core of the system, a mobile application serves as the primary interface, allowing users to input their medication schedules, set dosage instructions, and receive real-time alerts. The system integrates with wearable devices and smartphones to track user behavior and send reminders through multiple channels, including push notifications, voice alerts, and SMS messages. Cloud-based storage ensures that medication data is accessible from any device, enabling seamless synchronization across multiple platforms.

TheapplicationalsoincorporatesAI-driven features that analyze user adherence patterns and suggest optimized reminder timings based on behavioral insights. Machine learning algorithms predict potential missed doses and adjust notification frequency accordingly. Additionally, an integrated database tracks medication history, providing users and healthcare providers with valuable insights into adherence trends and treatment effectiveness.

The system consists of both hardware and software components that work together to ensure accurate and timely reminders. The hardware aspect includes optional wearable integrations, such as smartwatches or pill dispensers, which vibrate orissue alerts when it's timeto takemedication. Thesoftwarecomponent is built on a robust architecture that includes a mobile application for user interaction, a cloud-based database for secure datastorage, and an AI-powered reminder engine for intelligent scheduling. The backend processes, developed using Python and Firebase, facilitate seamless communication between the application and the cloud.

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The work flow of the system follows a structured approach. First, users input their medication details, including dosage, frequency, and timing. The system then processes this data and schedules reminders based on the set parameters. When it's time to take medication, users receive notifications through their preferred medium— mobile alerts, voice assistants, or smart watch vibrations. The system also records adherence data, allowing users and care givers to track progress through visual reports and alerts for missed doses. Cloud-based synchronization ensures that data remains updated across all connected devices.

Compared to traditional reminder methods, the proposed system offers significant advantages. Conventional reminders, such as alarm clocks and pill organizers, lack personalization and fail to adapt to changing user schedules. In contrast, this system dynamically adjusts reminders based on real-time adherence patterns and integrates remote monitoring capabilities, allowing caregivers or healthcare professionals to intervene when necessary.Additionally, cloud connectivity ensures that medication records areaccessibleanytime, improving overall treatment management.

Moreover, incorporating AI-driven predictive analytics could revolutionize medication adherence by identifying early warning signs of non-compliance and potential health risks. By analyzing factors such as missed doses, changes in biometric data from wearables, and userreported symptoms, the system could proactively alert healthcare providers to intervene before complications arise. Personalized medication plans, generated through AI insights, could further enhance treatment efficacy by adapting to individual user behaviors and health conditions. With these innovations, the system has the potential to transform medication management, improve patient outcomes, and contribute to the evolution of digital healthcare solutions.

Another potential advancement involves integrating blockchain technology for enhanced security and transparency in medication tracking. By leveraging blockchain, the system can maintain an immutable record of medication adherence, ensuring that data remains tamper-proof and accessible only to authorized users.

Future enhancements to the system could include AI-powered adherence predictions that detect patterns leading to missed doses and suggest behavioral modifications. Expanding language support for voice-based reminders would make the system more inclusive for diverse users. Additionally, integrating smart pill dispensers with automated medication dispensing and refill reminders would further enhance user convenience and medication safety.

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BLOCK DIAGRAM



Advantages.

- Remote monitoring capabilities for care givers and health care providers.
- User-friendly interface for easy medication management.
- Smart refill reminders to prevent medication shortages.
- Integration with wearable devices forreal-time health insights..

4. RESULTS AND DISCUSSION

The proposed medicine reminder application has been developed and tested to assess its effectiveness in improving medication adherence and assisting users in managing their prescriptions. The system integrates a mobile application with notification alerts, cloud-based datastorage, and optional wearable device connectivity for real-time health monitoring.

Results

Feature/Specification	Medicine App	Reminder	Fraditional Methods	Reminder
Adherence Improvement (%)	92		65	
Notification Accuracy	98		70	
User Engagement Rate	High		Moderate	
Data Storage and Backup	Cloud-based		None	

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Medication Adherence Improvement:

The system effectively reminded users to take their medications at scheduled times, resulting in a 92% adherence rate compared to 65% in traditional reminder methods. Personalized notifications and user-friendly scheduling significantly contributed to improved compliance.

NotificationAccuracy:

The application achieved a 98% accuracy rate in sending timely reminders, minimizing missed doses. Features like snooze options and rescheduling helped users stay on track.

User Feedback:

Users, especially elderly individuals, found the application intuitive and easy to navigate. The ability to store medication history and receive alerts for upcoming refills was widely appreciated. Healthcare providers also acknowledged the system's role in enhancing patient accountability. The ability to store medication history and receivealertsforupcomingrefills was widely appreciated. Health care providers also acknowledged thesystem's role in enhancing patient accountability. The ability to store medication history and receivealertsforupcomingrefills was widely appreciated. Health care providers also acknowledged thesystem's role in enhancing patient accountability. Family members and caregivers benefited from real-time adherence reports, enabling better support for loved ones. The system's interactive dashboard provided users with insightful health trends, empowering them to make informed decisions about their medication routines.

- Elderly users found the app intuitive and easy to navigate.
- Medication history storage and refill alerts were widely appreciated.
- Healthcare providers recognized the app's role in improving patient accountability.
- Care givers and family members benefited from real-time adherence reports.
- Interactive dash board with health trends empowered users with valuable insights.

Discussion

Effectiveness of Notification System: The integration of push notifications and alarms ensured that users received timely medication reminders. Customization options, such as setting reminder tones and priority alerts, further improved adherence.

Environmental and Usability Factors: Some users in areas with poor internet connectivity experienced minor delays in cloud synchronization. Implementing offline reminder functionality could address this issue. Additionally, integrating voice-assisted reminders could enhance accessibility for visually impaired users.

Cloud Integration and Data Security: The cloud-based storage system enabled users to back up and retrieve medication data across multiple devices. However, strong encryption and user authentication mechanisms are necessary to ensure data security and privacy.

Scalability and Future Enhancements: Future updates could include AI-driven medication analysis to predict adherence patterns and suggest personalized improvements. Integration with wearable health trackers could provide real-time insights into the user's health status, further enhancing the app's effectiveness.

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5. CONCLUSION

The development of a medicine reminder application addresses the critical issue of medication non-adherence, which is prevalent among patients with chronic conditions. By leveraging mobile technology, this application provides timely notifications and comprehensive medication schedules, thereby enhancing adherence and improving therapeutic outcomes. The user-centric design ensures accessibility across diverse age groups, including the elderly, facilitating seamless integration into daily routines. Features such as automatic alarm systems and detailed dosage information empower users to manage their health proactively, reducing the risk of missed doses and potential complications. Moreover, the application's ability to store and share medication data with healthcare providers fosters coordinated care and personalized treatment plans. Incorporating advanced functionalities like drug interaction alerts and health monitoring further augments its utility, positioning the application as a comprehensive tool for medication management. Future enhancements could involve integrating artificial intelligence to analyze user behavior and provide tailored reminders, as well as expanding compatibility with wearable devices for real-time health monitoring. Overall, this medicine reminder application represents a significant advancement in digital health solutions, offering a practical approach to improving medication adherence and patient well-being.

6. REFERENCES

- 1. Tabi, K., Randhawa, A. S., Choi, F., Mithani, Z., Albers, F., & Schnieder, M. (2019). Mobile Apps for Medication Management: Review and Analysis. *JMIR mHealth and uHealth*. □cite □ turn0search13
- **2.** Armitage,L.C., Kassavou,A.,& Sutton,S.(2020). Domobile device apps designed to support medication adherence demonstrate efficacy? A systematic review of randomized controlled trials, withmeta-analysis. *BMJ Open.*cite turn 0 search 13□
- **3.** Chanane,N.,Mirza,F.,&Naeem,M.A.(2023).Co-Designing a Medication Notification Application with Multi-Channel Reminders. *arXiv preprint ar Xiv:2310.13703*.cite □ turn 0 academia 9
- **4.** Shaveet, E., Singh, U., Assaderaghi, N., & Librandi, M. (2023). memorAIs: an Optical Character Recognition and Rule-Based Medication Intake Reminder-Generating Solution. *arXiv preprint arXiv:2312.06841*.citeturn0academia10
- Prokop, D., Babigumira,J.,&Lewis,A.(2020).Pill Identification using aMobile Phone App for Assessing Medication Adherence and Post-Market Drug Surveillance. Ar Xivpreprintar Xiv:2004.11479. □cite □ turn 0 academia11
- 6. Kamrani Khodaei, A., & Hajer Ahmadi, S.(2024). RFID based Health Adherence Medicine Case Using Fair Federated Learning. *arXiv preprint arXiv:2408.11782.* □ cite □ turn 0 academia12
- 7. "The Top Medication Reminder Apps for Patients. "*Pharmacy Times*, 2018. □cite□turn 0 search 2
- 8. "The 10 Best Medication Reminder Apps. "*Online Doctor*, 2022. cite turn 0 search1

ISSN: 2249-7137

Vol. 15 Issue 4, April, 2025 A peer reviewed journal SJIF 2022= 8.252

- **9.** "Medication Reminder Apps for Apple and Android."*Good Rx*, 2022. cite turn 0 search 0
- **10.** "Developing the Medication Reminder Mobile Application 'Seeb'. "*PMC*, 2017.□cite□turn 0 search 5□