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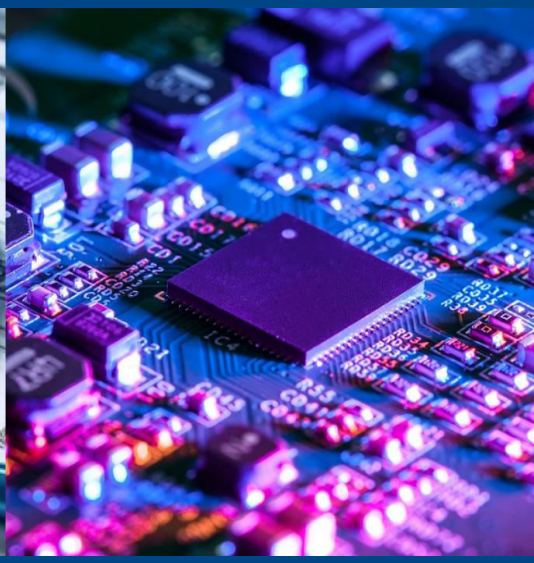

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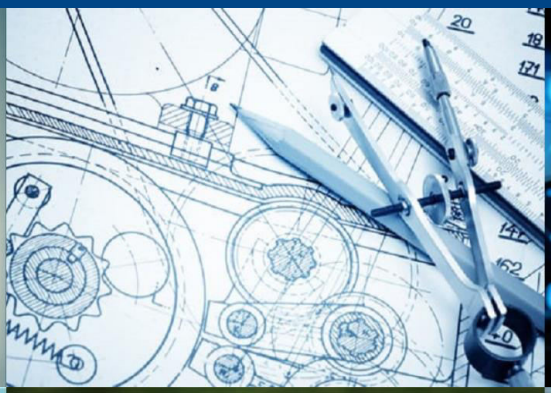

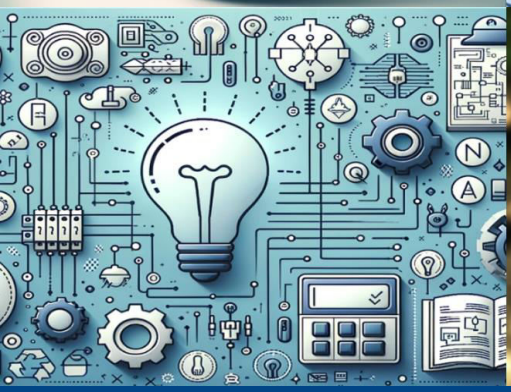

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Smart Medication Tracker using PharmaSync AI

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ABSTRACT: An inventive way to enhance medication adherence and offer intelligent healthcare support is the Smart Medication Tracker with PharmaSync AI. The system uses machine learning algorithms, location-based purchasing, and AI-driven reminders to make sure users take their prescriptions on time and to recommend natural remedies. To improve medication management, the system combines predictive analytics, real-time tracking, and an intuitive user interface. PharmaSync AI is a major advancement in digital health solutions, with the potential to decrease missed doses and improve accessibility to necessary medications.

KEYWORDS: Smart Medication Tracker Using PharmaSync AI,Medication Reminder System,AI-Powered Healthcare,Personalized Medicine Tracking,Medication Adherence,Natural Remedy Recommendations,AI in Healthcare,Notifications,Real-Time Medication Alerts,Smart Healthcare Solutions

I. INTRODUCTION

Medication non-adherence is a critical issue in healthcare, leading to adverse health outcomes and increased medical costs. This issue is resolved by the PharmaSync AI-powered Smart Medication Tracker, which offers insightful suggestions and prompt reminders. The system offers users natural remedies based on their medical history in addition to helping them remember to take their medications. Furthermore, location-based medication purchases guarantee that users can quickly obtain necessary medications when they're needed. The design, operation, implementation, and advantages of the system are covered in this paper.

II. SYSTEM DESCRIPTION

A. Software requirements

1.Front-end: HTML, CSS, JavaScript (React.js for an interactive UI) Using Redux or Context API to handle application-wide state efficiently.Secure login and registration using Firebase Authentication. Implementing reminders for medication schedules using web push notifications.

2.Back-end: Node.js with Express.js. Handling authentication,logging,andrequest validation.Implementing proper error reporting mechanisms. Using JWT for authentication and bcrypt for password hashing.WebSockets for instant updates on medication schedules.

3.Database: Firebase for storing user data and medication schedules.Enabling instant synchronization of medication records across devices. Structuring medication data efficiently using NoSQL collections.Managing user roles and permissions securely. Storing prescriptions, reports, and other medical documents securely.

4.AI & Machine Learning: Python (TensorFlow, Scikit-learn) for natural remedy recommendations.Analyzing user habits to provide personalized medication reminders. Identifying potential medication side effects using AI. Fetching verified natural remedy information from trusted sources.

5.Mobile App Development: Flutter or React Native for cross-platform support, Sending medication reminders and alerts. Allowing users to set reminders using voice commands.Scanning medicine labels for quick data entry. Tracking vitals such as blood pressure and glucose levels.

6.Location Services: Google Maps API for medicine purchasing recommendations.Showing medication prices from different locations.Providing directions to the nearest pharmacy. Notifying users when they are near a pharmacy. Identifying nearby hospitals and medical centers in case of emergencies.

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7.Cloud Services: Firebase for data storage and processing Automating backend tasks such as sending reminders. Ensuring end-to-end security for sensitive medical data. Keeping medication schedules updated across devices. Reducing infrastructure maintenance costs.Regular data backups to prevent information loss.

III. SYSTEM ARCHITECTURE

A mobile-friendly web application for medication reminders and AI-based suggestions. Provides an easy-to-use interface displaying upcoming medication reminders, adherence history, and AI suggestions.Secure login using email, phone, or social media authentication via Firebase. Enhances accessibility with personalized UI settings. Allows users to add medications using voice commands for convenience.Displays medication schedules, dosage details, and adherence progress.Database Module Stores user profiles, medication schedules, and history.Stores personal details, medical conditions, and prescribed medications. Maintains accurate records of medication names, dosages, frequencies, and refill dates. Logs past medication adherence to identify trends and provide insights. Uses Firebase Firestore for real-time data syncing across devices.Implements role-based access to protect sensitive medical information.

AI Processing Engine analyzes user medication patterns and suggests natural remedies.Tracks medication adherence patterns and identifies inconsistencies. Suggests adjustments in medication intake timing based on past adherence data. Uses AI to recommend herbal and natural remedies for mild symptoms.Analyzes interactions between prescribed drugs and suggests ways to minimize risks. Helps users determine if symptoms may be related to missed medication doses.Uses verified sources to provide scientifically backed natural remedy recommendations.Sends reminders via push notifications, alarms, or email. Users can choose between push notifications, SMS, email, or in-app alarms. Allows users to delay or reschedule reminders when necessary.Notifies a caregiver or family member if medications are missed repeatedly. Provides notifications in multiple languages for better accessibility.Notifies users when they are near a pharmacy for refills.

Location-Based Services helps users find nearby pharmacies with available medications. Displays nearby pharmacies with stock availability using Google Maps API.Allows users to compare prices of medications at different stores. Provides step-by-step directions to the nearest pharmacy. Sends reminders when users are near a pharmacy to pick up refills. Helps users locate the nearest hospitals or urgent care centers in case of emergency.Machine Learning Model Predicts and recommends natural alternatives based on user data.Suggests natural remedies based on user health history and medication patterns. Uses past behavior to predict the likelihood of missing a dose. Provides insights on medication effectiveness and potential adjustments.

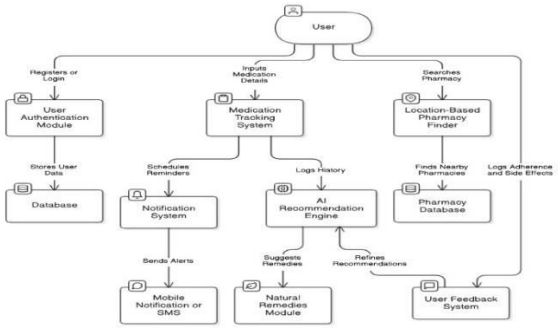

Fig.3.1

IV.WORKING MECHANISM

User Registration:

Users create an account and input their medication details. Users can sign up via email, phone number, or social media (Google, Facebook).Enhances security by adding verification steps.Users input personal details, medical history, and prescribed medications. Allows users to add medications manually or by scanning barcodes. Ensures medication data is accessible across multiple devices.

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Medication Tracking:
The system schedules reminders based on user input. Users can choose notification types (push, SMS, email, voice alerts). Allows flexible reminders for daily, weekly, or specific time intervals. Sends follow-ups if a user skips a medication.
Users can mark medications as taken, skipped, or postponed. Notifies users when medication stock is low.

AI-Based Recommendations:
Machine learning algorithms analyze user history to suggest natural remedies.Analyzes adherence patterns and recommends alternative treatments.Sources verified herbal and holistic medicine recommendations. Alerts users if a natural remedy conflicts with prescribed medication. AI assesses user-reported symptoms to refine recommendations. Continuously improves recommendations based on user feedback.

Location-Based Pharmacy Search:
Users can find nearby pharmacies stocking their required medication.Displays nearby pharmacies with real-time stock availability. Shows medication prices from different locations. Links users to e-pharmacies for home delivery.Suggests the fastest way to reach a pharmacy. Notifies users when they pass a pharmacy that stocks their needed medication.

Real-Time Notifications:
The system sends reminders through mobile notifications or alarms.Users can choose between sound alerts, silent reminders, or vibrations.Adjusts notification timing based on user habits.Ensures reminders sync across smartphones, tablets, and smartwatches. Sends notifications to caregivers if repeated doses are missed. Allows users to postpone reminders when necessary.

User Feedback:
Users can log their adherence and side effects, refining AI recommendations over time.Users report whether they took or missed doses.Logs symptoms after taking medication to detect adverse reactions.Adjusts recommendations based on user responses.Generates detailed adherence reports for healthcare providers. Allows users to rate AI-recommended natural treatments

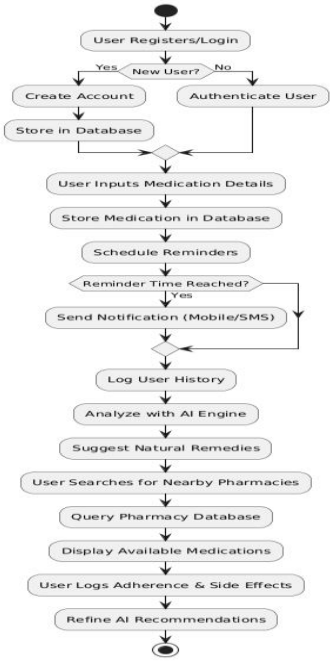

Fig.4.1

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V. IMPLEMENTATION

Front-End Development:
Using React.js or Flutter for an Intuitive UICross-Platform Compatibility Ensuring seamless performance on web, Android, and iOS devices. Implement Redux (React.js) or Provider (Flutter) for efficient data handling.Use Material-UI for React.js or Flutter widgets for a clean, modern design.Login, signup, and password recovery pages with Firebase Authentication integration. Displays scheduled medications, AI recommendations, and adherence reports.

Back-End Development:
Using Node.js and Express.js for Efficient Request Handling.Creating endpoints for user authentication, medication schedules, and AI recommendations. Implement JWT authentication, request validation, and error handling.Protecting sensitive user data with bcrypt and HTTPS encryption. Using caching mechanisms like Redis for faster responses.Enabling WebSockets for live medication tracking and alerts. A dedicated API layer to handle AI-based recommendations and symptom analysis.

Database Integration:
Using Firebase to Store User DataStoring structured medication schedules and user profiles.Authentication & User Management Firebase Authentication for email, Google, and phone number logins. Securely storing prescriptions, lab reports, and other medical documents.Implementing auto-backup features to prevent data loss. Ensuring app functionality even when users are disconnected from the internet.

AI Model Development:
Using TensorFlow to Analyze Medication History and Suggest Natural Alternatives.Developing AI models for medication adherence prediction and symptom analysis.Suggesting alternative treatments based on user history and reported symptoms.Identifying potential risks when combining prescribed drugs with natural remedies.Providing early warnings for adverse effects or potential complications.AI refines its suggestions based on user feedback and adherence logs.

Notification System:
Using Firebase Cloud Messaging (FCM) or Alarms , Push Notifications: Sends reminders for medication intake, refills, and missed doses. Users can choose notification sounds, vibration, or silent reminders.Adjusts reminders based on user behavior and adherence patterns.Alternative notification methods for users without a smartphone app.Notifies caregivers or family members when repeated doses are missed.

Location-Based Services:
Using Google Maps API for Pharmacy RecommendationsDisplays a map of nearby pharmacies with available stock.Lists medication prices from different pharmacies to help users find affordable options.Provides step-by-step directions to the nearest pharmacy. Reminds users to buy medication when passing a pharmacy.Helps locate pharmacies that are open at night.

VI. ADVANTAGES

Reduces Missed Doses:
Automated reminders enhance medication adherence.AI optimizes reminder times based on user behavior and past adherence patterns. Sends alerts via push notifications, SMS, email, and voice assistants.Users can adjust reminder sounds, vibration, or silent alerts.Allows users to postpone reminders without missing a dose. Sends additional notifications if a scheduled medication is skipped.

Enhances Convenience:
Location-based pharmacy search helps users quickly find medicines.Uses Google Maps API to find nearby pharmacies with available stock. Displays prices from different pharmacies for cost-effective purchases. Highlights pharmacies open during emergencies.Links users to e-pharmacies for home delivery options.Reminds users to purchase medication when passing a pharmacy.Provides the fastest route to the nearest pharmacy

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Personalized Health Insights:
AI-driven recommendations suggest natural alternatives.AI analyzes user history to recommend natural remedies. Provides herbal and holistic medicine options backed by medical research.Alerts users about potential conflicts between prescribed drugs and natural treatments. Uses reported symptoms to refine AI-generated recommendations.

User-Friendly Interface:
Mobile and web applications provide seamless interaction. Ensures smooth performance on smartphones, tablets, and desktops. Uses Material-UI (React.js) or Flutter widgets for a clean and engaging experience. Enhances readability for all users, including those with visual impairments.Allows users to access the app in different languages for better inclusivity.

Scalable and Secure:
Cloud-based architecture ensures data safety and scalability.Protects user data from unauthorized access. Ensures that only authorized personnel can access sensitive data.Uses Firebase to handle growing user demand without performance issues.Prevents data loss by storing backups on secure cloud servers.

VII. CONCLUSION

A ground-breaking tool that improves medication adherence and general healthcare management is the Smart Medication Tracker with PharmaSync AI. The technology offers an all-encompassing method of prescription tracking by combining location-based pharmacy searches, AI-powered reminders, and machine learning-driven suggestions for natural remedies. It is an effective tool for enhancing health outcomes and encouraging better drug management because of its user-centric design and strong implementation. Wearable device integration and sophisticated predictive analytics for individualized health monitoring are examples of potential future advancements.

REFERENCES

[1] Sankar AP, Nevedal DC, Neufeld S, Luborsky MR. What is a missed dose? Implications for construct validity and patient adherence. AIDS Care 2007;19(6):775e80.
[2] Sawand A, Djahel S, Zhang Z, Na F. Multidisciplinary approaches to achieving efficient and trustworthy eHealth monitoring systems. Commun. China (ICCC), 2014. IEEE/CIC Int. Conf.; 2014. p. 187e92.
[3] Clifton D a, Wong D, Clifton L, Wilson S, Way R, Pullinger R, et al. A largescale clinical validation of an integrated monitoring system in the Emergency Department. IEEE J Biomed Heal Informatics 2013;17(4):835e42.
[4] Lisby M, Nielsen LP, Mainz J. Errors in the medication process: frequency, type, and potential clinical consequences. Int J Qual Health Care 2005;17(1):15e22.
[5] Huang Shih-Chang, Chang Hong-Yi, Jhu Yu-Chen, Chen Guan-You. The intelligent pill box e design and implementation. ICCE-Taiwan; May 2014. p. 26e8.
[6] Ray P. Home health hub internet of things (H 3 IoT): an architectural framework for monitoring health of elderly people. Sci Eng Manag Res 2014:3e5.
[7] Ray Partha P. Home health hub internet of things (H3IoT): an architectural framework for monitoring health of elderly people. In: The proceeding of 2014 international conference on science engineering and management research; Nov. 2014. p. 27e9
[8] Srinivas P, Lingaiah J, Satish babu P, Munteanu. Work Embed Platform Web-based Monit Contr Smart Home May 2017;vol. 5(5):819e24.
[9] Rosati RJ. Evaluation of remote monitoring in home health care. In: 2009 international conference on eHealth, telemedicine, and social medicine; 2009. p. 25e7.
[10] M3DITRACK3R. A design of an automated patient tracking and medicine DispensingMobile robot for senior citizens published in computer, communications, and control technology (I4CT). 2014. International Conference on Date 2-4 Sept. 2014 at Langkawi.
[11] A smartphone-enhanced pill-dispenser providing patient identification and intake recognition C. Crema, A. Depari, A. Flammini, M. Lavarini, E. Sisinni published in medical measurements and applications (MeMeA). 2015. IEEE International Symposium on Date 7-9 May 2015 at Torino, Italy.

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