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MEDICINE REMINDER SYSTEM WITH AVAILABILITY NOTIFICATION

PAVITHRA.S[1], Mrs. P. MENAKA[2]

Department of Information Technology, Dr. N.G.P Arts and Science College, Coimbatore,

Tamil Nadu, India.[1]

Professor, Department of Information Technology, Dr. N.G.P Arts and Science College, Coimbatore,

Tamil Nadu, India.[2]

Abstract: The Medicine Reminder System with Availability Notification is an Android-based application designed to assist individuals in managing their medication schedules efficiently. This system allows users to set personalized reminders for their medications, ensuring timely intake and adherence to prescribed schedules. The application sends notifications through the mobile app and SMS alerts as an alternative, reducing the chances of missed doses, especially for elderly individuals or those with busy lifestyles. A key feature of this system is its ability to notify users about the availability of medicines in nearby pharmacies or online stores, helping them restock essential medications without delays. By integrating an intuitive user interface, customizable reminder settings, and real-time medication availability updates, this solution enhances medication adherence and reduces health risks associated with skipped doses. The system caters to individuals managing chronic illnesses, complex medication regimens, or memory impairments. Additionally, it leverages SMS technology to ensure accessibility even in areas with limited internet connectivity. By addressing challenges such as forgetfulness, stock shortages, and accessibility issues, the Medicine Reminder System with Availability Notification contributes to improved health outcomes, better medication compliance, and a seamless healthcare experience for users.

Keywords: Medicine, reminder system, user interface, health risks, memory impairments

INTRODUCTION

A Medicine Reminder App is designed to help patients manage their medication schedules efficiently while enabling doctors to oversee prescriptions. The app consists of two primary modules: Doctor and Patient. Doctors can access patient data and send prescriptions, ensuring proper medical guidance. Patients can view their prescriptions and set reminders, which trigger notifications and SMS alerts to a saved contact for timely medicine intake. Developed using Java, XML, and SQLite, this app enhances medication adherence and improves communication between doctors and patients.

PROJECT OVERVIEW

The Android app Medicine Reminder System with Availability Notification helps users effectively manage their medication schedules and ensure that life-saving medications are always available. By availability of necessary drugs through the utilization of mobile technology. This is an Android-based application that seeks to allowing users to take medication reminders based on their personal needs, the app helps users avoid missing doses and improves adherence to the recommended treatment plan. The system uses SMS notifications as an extra notification method for increased dependability, ensuring that users receive reminders even when the app is not open or there is no access to the internet.
In addition to reminders, the app helps users keep their basic medications stocked on time by giving them instant information about when pills are available at nearby pharmacies or online retailers. Patients with chronic illnesses, the elderly, or those on complex medication regimens will find this option particularly beneficial. Because of its intuitive interface, the app makes it easy for users of all ages to manage and keep track of their medications.

The Medicine Reminder System with Availability Notification aims to promote healthier outcomes, prevent treatment interruptions, and enhance medicine adherence through the use of mobile technology and SMS-based communication. This software is a reliable healthcare companion for anyone seeking a methodical way to manage their medication because it incorporates reminder messages, medicine availability reminders, and convenience of use.

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OBJECTIVE

The key aim of the Medicine Reminder System with Availability Notification is to enhance medication compliance and facilitate the timely offer the user a safe platform to coordinate their medication timetable effectively while managing issues of missing doses and shortage of drugs. One of the most important objectives of the system is to allow users to personalize medication reminders to make sure they take their medication on time. For greater reliability, the app also provides SMS alerts as a backup reminder option, especially for older users and persons with hectic lifestyles who might miss app-based alerts. Another critical goal is to help users have a continuous supply of their drugs by alerting them of the availability of drugs in nearby pharmacies or online pharmacies. The feature assists users in restocking critical drugs on time, and this minimizes the chances of treatment interruption because of stockouts. The system is developed with an easy-to-use interface to support users of all age groups, including those with chronic conditions or complicated drug regimens. Through the inclusion of GPS location tracking for pharmacy accessibility and SMS-based messaging for reminders, the application provides accessibility even in remote locations with limited internet connectivity. The Medicine Reminder System with Availability Notification seeks to fill the gap between patients and successful medication management, leading to a better health outcome. By minimizing missed doses and providing assured availability of medicines, the system leads to enhanced healthcare adherence, greater patient autonomy, and overall well-being.

APP DEVELOPMENT

The implementation of the Medicine Reminder System with Availability Notification includes developing a robust, intuitive Android app that simplifies medicine management and guarantees timely access to necessary medications. The application is developed with Android Studio and the Java/Kotlin programming language, guaranteeing effortless execution and support on a range of Android devices. The backend utilizes the Firebase Realtime Database for safe storage of users' medication routines, prescription information, and pharmacy availability information.

A key aspect of the app is the medication reminder function, enabling users to create personalized reminders for their medications. These reminders initiate both in-app and SMS notifications through an SMS Gateway API, sending reminders to users even when the app is not running or the internet connection is poor. The SMS-based notification system is particularly useful for elderly patients and patients with complicated drug regimens.

Another notable feature is the real-time stock availability notification, which gives users information about the availability of their prescribed drugs in local pharmacies or online retailers. This feature uses Google Maps API and GPS location to identify pharmacies, making it easy for users to replenish medication without any delay. The app fetches pharmacy stock data using cloud-based data integration, providing a smooth experience.
The app's user interface adheres to Material Design principles to offer an intuitive and visually pleasing experience. It features a simple dashboard, responsive layouts for best display on various screen sizes, and accessibility features like large text options and dark mode for better usability.

Security is of utmost importance in the development process. The app uses AES encryption to secure sensitive user information, keeping medical records and personal data private. User authentication is also enhanced with two-factor authentication (2FA) to secure medication schedules and pharmacy information from unauthorized access.
For high reliability, the application is thoroughly tested through unit testing, integration testing, and real-world simulations to assess its performance in various scenarios. It is also optimized for low battery usage and low data usage to ensure that it works even in poor network coverage areas.

Future scalability is a top priority, with future features including AI-based medication adherence monitoring, automated prescription renewal reminders, and connection with wearable health devices for real-time monitoring of health. The Medicine Reminder System with Availability Notification is set to transform medication management through the use of leading-edge technology to enhance adherence, accessibility, and overall healthcare outcomes.

ADVANTAGES

- Timely Medication Reminders
- Multi-Mode Alerts (App & SMS)
- User-Friendly Interface
- Customizable Reminders
- Beneficial for Various Users

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PROBLEM STATEMENT

Personal security is a pressing issue, and people are subject to unpredictable crises from physical harm to medical emergencies. Technology has improved, but the current emergency response systems and mobile safety apps are not very effective due to huge limitations. Most safety apps are dependent on manual intervention and so are not useful during stressful situations where quicker responses are called for. Navigation of complicated interfaces by users slows down response times when every second counts.

One of the main drawbacks of existing safety solutions is their dependence on pre-established emergency contacts, who might be unavailable or unresponsive at a given time. Additionally, most apps rely strongly on internet connectivity for sharing locations and sending alert messages, rendering them ineffective in networks with weak or no coverage. The lack of default communication channels, such as SMS alerts, further restricts their effectiveness in emergencies.

Another urgent problem is the absence of integration with medical emergency services. In emergencies, rapid access to a person's medical history can be a matter of life and death for paramedics, but most solutions currently available do not include this functionality. Most safety apps also do not allow hands-free usage, which means they are inconvenient to use when the victim cannot operate their phone manually.

Privacy and security issues also present a major hurdle. Most apps do not have strong authentication and encryption processes in place, which expose user information to unauthorized users. If an attacker takes over the phone of a user, they can easily turn off the safety app, rendering the victim helpless. The apps also ask for excess permissions, exposing information for invasion and keeping people away from these solutions.

Additionally, the response time of law enforcement officials is still a critical problem. Even after alerts are sent through emergency notification services, waiting too long to send assistance increases victims' risk levels. Public spaces do not make most people feel secure, especially women, senior citizens, and persons with disabilities, due to the ineffectiveness of timely alerting platforms. High power consumption of the available safety software also diminishes their usability because they will automatically cease working whenever they are required most.

With these challenges in mind, it is crucial to have a dependable, effective, and easy-to-use mobile app that fills the gap in current solutions. A system that provides real-time location tracking, immediate emergency alerts, voice commands without hands, and immediate access to medical data can greatly improve personal safety. The proposed One-Tap Emergency Help Guardian Alert application seeks to offer an inclusive, easy-to-use, and effective emergency assistance solution, which guarantees instant support during emergency cases.

PROPOSED SYSTEM

The Smart Medicine Reminder & SMS Alert App is the proposed system, which is a mobile app that will improve medication compliance and timely medical reminders, especially for the elderly and patients with chronic diseases. The app incorporates smart notification functionality, SMS notifications, and emergency contact features to avoid missed doses and give caregivers real-time feedback on a user's medication regimen.

Key Features & Functionalities

- Automated Medicine Reminders: The application will enable users to schedule medication intake by entering information such as the medicine name, dosage, frequency, and timing. It will provide timely reminders through push notifications and SMS reminders, helping users adhere to their prescribed medications.
- Caregiver SMS Alert System: In contrast to traditional reminder apps that simply offer local notifications, this system will automatically send SMS reminders to pre-registered caregivers or family members when a user fails to take a scheduled dose. This feature guarantees that a responsible individual is alerted in the event of medication non-adherence.
- Smart Alarm with Snooze Functionality: If a user does not respond to a reminder, the system will trigger a snooze function that reappears at given intervals until medication is recorded as taken. The app will also record missed doses and present a summary to the user and caregivers.
- Emergency Medical Help: If there is an overdose or a medical emergency, the app has an Emergency Help Button whereby users can send an SOS SMS together with their current location and medical history to emergency contacts or medical professionals in an instant.
- Offline Mode Support: To minimize dependency on an active internet connection, the app will support offline functionality. While internet connectivity is required for cloud synchronization, SMS alerts and local notifications will function without an internet connection, ensuring uninterrupted reminders.

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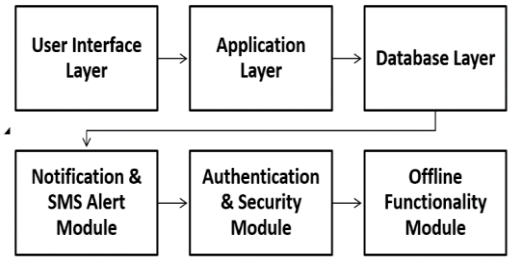
- Data Security & User Authentication: The application will use PIN-based authentication to ensure that unauthorized access is not allowed. Moreover, all user information, such as medication reminders and emergency contacts, will be encrypted to ensure privacy and avoid misuse of data.
- Minimal Battery Consumption & Optimization: In contrast to current reminder applications that consume a lot of battery power through constant GPS tracking and background services, this system will be optimized for battery usage by running in a light mode and minimizing resource-hungry operations

PROJECT DESIGN

Block Diagram



MODULE DESCRIPTION

After analyzing carefully, it has been found that the system is comprised of the following modules:

1. User Interface Layer
2. Application Layer
3. Database Layer
4. Notification & SMS Alert Module
5. Authentication & Security Module
6. Offline Functionality Module

1. User Interface

The User Interface (UI) module of the Medicine Reminder and SMS Alert application is designed to provide a simple-to-use and user-friendly interface for users across all age groups. The interface is such that it enables users to navigate around the application without any technical knowledge. It has a dashboard that displays future medicine schedules, reminders, and notifications in plain sight. The look is minimalistic and accessible with clear fonts, high contrast, and easy-to-use buttons to enable ease of use, especially by older users.

1. The UI module contains various interactive components such as adding or modifying medicine reminders, selecting alert preferences (SMS or push), and viewing the history of medicines. Input forms are designed to enter data rapidly so that users can easily input medicine names, dosage, time, and frequency. A calendar view also displays a preview of medicines scheduled.

2. Application Logic Layer

The application layer is tasked with the management of the core functions of the medicine reminder and SMS alert program. It serves as the interface between the user interface and the underlying data processing elements to facilitate smooth interaction and execution of user requests. It manages reminder scheduling, notification, user authentication, and SMS alerts effectively.

Once a user schedules a medicine reminder, the application layer interprets the input, saves it to the database, and schedules reminders depending on the provided time and interval. It works with the notification system of the device to send timely reminders using push notifications, sound signals, or vibrations. It also initiates SMS reminders to caregivers or emergency contacts in case the user is not in proximity to the device.

The application layer also handles user authentication and security, so only legitimate users can access and edit reminder settings. It has functionalities such as data validation, error handling, and cloud service synchronization, enabling users to access their medication schedules on multiple devices. The layer facilitates the effective execution of the app's functionalities, giving users a trustworthy and automated medicine reminder system for better healthcare management.

3. Data Storage Layer

The database layer is tasked with storing, maintaining, and fetching all the data related to the medicine reminder and SMS alert system. It acts as the foundation of the application, providing smooth data handling and access to user data. The layer keeps organized records of users, medication, reminder schedules, and emergency contacts.

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When a user creates a new reminder, the database layer stores information like medicine name, dosage, frequency, and alert time securely. It also maintains a record of missed doses and sends SMS alerts for future reference. The layer provides data consistency by using proper indexing and optimization methods, enabling fast retrieval and updating of the records.

Security is a paramount feature of the database layer, wherein encryption methods are applied to secure confidential user data, including personal data and medical history. Backup and recovery systems are also implemented to avoid loss of data during system crashes. Furthermore, cloud storage synchronization allows users to access reminders on different devices, providing improved accessibility and dependability. This layer is very important in providing data integrity, security, and effective management of the medicine reminder system.

4. Notification & SMS Alert Module

The notification and SMS alert module is tasked with ensuring timely reminders of the users' medications via in-app notifications and SMS alerts. This module is very important in enhancing medication compliance by sending automated reminders based on the user's reminder schedule.

Upon setting a medicine reminder, the system sends an alert notification at the set time, reminding the user to take medicine. If the user does not respond to the notification within a set time, the system increases the level of alert by sending an SMS to the registered mobile number or emergency contacts. The feature is designed to prevent the user, particularly the elderly or those with long-term illnesses, from missing their scheduled doses.

The module is coupled with the device's notification framework to offer continual reminders in terms of sound and vibration notifications. Users can set reminder sounds, snooze notices, or tweak notification settings to suit their convenience. SMS notification is also set to function regardless of low internet connectivity zones to ensure reminders reach the user without any network problems.

This module improves the overall dependability of the medicine reminder app by offering multiple notification avenues for users, reducing the likelihood of missing doses, and keeping caregivers or relatives aware in case a user needs support.

5. Authentication & Security Module

The security and authentication module controls registration and login for users to safely access the medicine reminder application. Upon registration, users enter details like name, mobile number, email, and password. Such credentials are saved securely by using encryption methods for safeguarding personal information.

For login, users are required to input their registered mobile number or email and password. For security, the module has password hashing and authentication methods in place to block unauthorized access. Features like OTP verification during registration or login can also be included for enhanced security.

This module keeps access to one's personalized medicine schedule and reminders limited to only authenticated users, ensuring that reminders cannot be modified in an unauthorized manner. It also has fundamental security features like recovery of accounts in the event of users' inability to remember passwords.

RESULT AND DISCUSSION

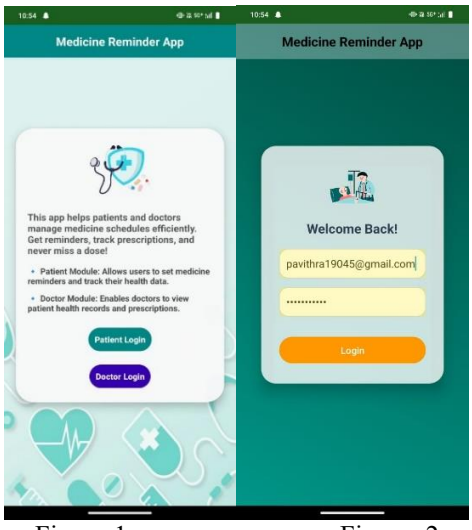

Figure-1 Figure- 2

The figure 1 shows the home page and , figure 2 is login page for patient.

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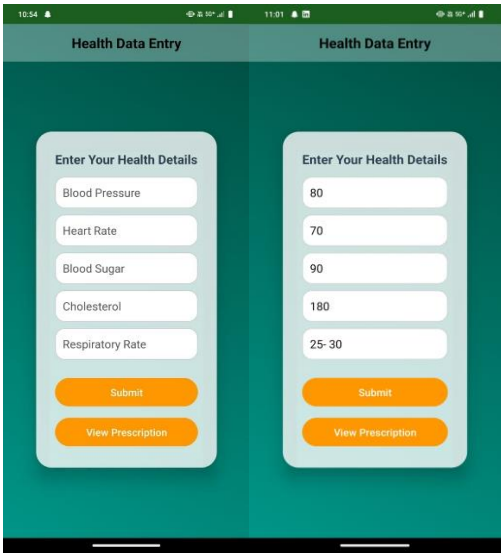

Figure-3 Figure-4

This figure-3, 4 shows that to enter the health details of patient.

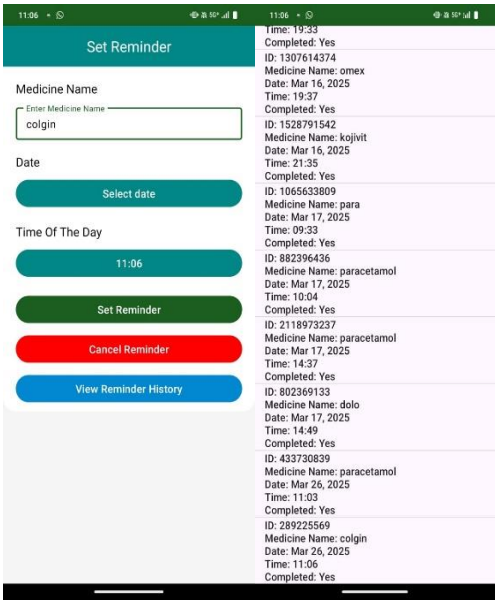

Figure-5 Figure-6

Figure-5 shows that getting input of medicine name and setting remainder for medicine, Figure-6 shows the database of notifications.

CONCLUSION

The medicine reminder and SMS alert application provides an efficient and user-friendly solution for individuals who need assistance in managing their medication schedules. By integrating features such as automated reminders, SMS alerts, and secure authentication, the system ensures that users never miss their prescribed medications. The intuitive user interface and real-time notifications enhance accessibility, making it suitable for people of all age groups, including elderly patients and individuals with chronic illnesses. The application's ability to send alerts via SMS also makes it effective in reaching users who may not always have access to the internet.

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FUTURE ENHANCEMENT

For future enhancements, additional features can be incorporated to improve the application's functionality. Integration with wearable devices such as smartwatches can provide real-time health monitoring and automatic reminders based on the user's daily activity and vital signs. AI-based medication adherence tracking can be implemented to analyze user behavior and suggest improvements in medicine intake patterns. Furthermore, multi-language support and voice-assisted reminders can be added to cater to a wider audience, making the application more inclusive. Cloud storage for medical history and prescriptions could also be introduced to ensure seamless access to health records across multiple devices.

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