RxAide
A Medication Reminder & Management Assistant
PROJECT PROPOSAL

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1 ABSTRACT

Medication non-adherence is a widespread healthcare challenge that leads to treatment failures, disease progression, and increased healthcare costs. Many patients, especially the elderly and those managing multiple prescriptions, struggle to follow complex medication schedules. **RxAide** addresses this problem by offering an intelligent Android application that uses AI-powered OCR to extract medication details from prescription images, generates personalized reminder schedules, and provides a conversational interface for intuitive medication management. The app delivers immediate, visual outcomes through clear dose tracking dashboards and timely notifications.

2 PROBLEM STATEMENT

2.1 BACKGROUND
Medication adherence (taking medications as prescribed) is critical for effective treatment outcomes. According to the World Health Organization, adherence to long-term therapies averages only 50% in developed countries, with even lower rates in developing nation [1]. This non-adherence results in approximately 125,000 preventable deaths annually in the United States alone and accounts for 10% of all hospital admissions [2].

2.2 CURRENT CHALLENGES
- **Complex Regimens:** Patients managing multiple medications with varying dosages, frequencies, and timing requirements often become confused or overwhelmed.

- **Manual Entry Burden:** Existing medication apps require users to manually input medication details, which is tedious and error-prone.

- **Lack of Intelligence:** Most reminder apps offer basic timers without any smart features like prescription reading or conversational assistance.

2.3 PROBLEM DEFINITION

How can we design a medication management system that simplifies the process of creating and following medication schedules while providing intelligent, accessible assistance to users of all ages and technical abilities?

3 PROPOSED SOLUTION

3.1 SOLUTION OVERVIEW

RxAide is an **Android application** designed to help users manage their medications through intelligent prescription scanning, automated schedule generation, and reliable reminders. The app combines AI-powered OCR with a conversational interface to make medication management intuitive and accessible for everyone.

3.2 CORE FEATURES

Feature	Description
Prescription Scanning	Users capture prescription images using their phone camera; the app extracts medication names, dosages, and frequencies using Gemini API [3].
Smart Schedule Generation	Automatically creates personalized medication schedules based on extracted prescription data.
Reliable Reminders	Sends timely notifications for each dose using Android WorkManager; users can mark doses as taken or missed.
Dose Tracking Dashboard	Visual display of adherence history with clear statistics on taken, missed, and upcoming doses.
Conversational Interface	AI-powered chat allows users to ask questions, update schedules, and receive safe guidance through natural language.

3.3 KEY INNOVATION

The distinguishing feature is **AI-powered prescription processing**. Unlike traditional apps that require tedious manual data entry, **RxAide** uses the Gemini API to intelligently extract medication information from prescription images. Users simply snap a photo, confirm the extracted details, and the app handles the rest—creating schedules and reminders automatically.

3.4 USER WORKFLOW

1. **Capture Prescription:** User takes a photo of their prescription or uploads an existing image.
2. **Confirm Details:** App displays extracted medication information for user verification and editing.
3. **Generate Schedule:** Personalized reminder schedule is automatically created based on confirmed data.
4. **Receive Reminders:** Notifications alert the user when it's time to take each medication.
5. **Track Progress:** Dashboard shows adherence history and provides insights into medication habits.

4 METHODOLOGY

4.1 TECHNOLOGY STACK

Component	Technology	Justification
Platform	Android	Massive user base; accessible to target demographic
Language	Java	Team familiarity; comprehensive Android support
Architecture	MVVM	Clean separation of UI, logic, and data layers
Local Database	Room [4]	Native Android ORM; reliable local storage
OCR & Chat	Gemini API [3]	Multimodal AI for image processing and conversation
Background Tasks	WorkManager	Reliable scheduling for notification delivery
Notifications	Android Notification Channels	System-integrated alerts with action buttons
Camera	Camera Intent API	Simple integration for prescription capture

4.2 SYSTEM ARCHITECTURE

The application follows the MVVM (Model-View-ViewModel) architecture pattern:

- **Model:** Room database storing medications, schedules, and dose history; Gemini API integration for OCR and chat.
- **View:** XML layouts with Activities and Fragments providing the user interface.
- **ViewModel:** Business logic layer managing data flow between Model and View; LiveData for reactive UI updates.

4.3 DATA FLOW

1. User captures prescription image via Camera Intent.
2. Image is sent to Gemini API for OCR processing and medication extraction.
3. Extracted data is presented for user confirmation/editing.
4. Confirmed medications are stored in Room database with generated schedules.
5. WorkManager schedules notifications based on medication timing.
6. User interactions (taken/missed) update the database and trigger UI refresh.

5 DEVELOPMENT TIMELINE

Phase	Week	Activities	Deliverables
Foundation	1	Project setup; MVVM architecture; Room database schema; camera integration; Gemini API OCR testing	Working app capturing prescriptions and storing data
Core Functionality	2	OCR parsing logic; medication confirmation UI; schedule generation; CRUD operations	Complete medication management system

| Notifications | 3 | WorkManager integration; notification channels; dose tracking; missed dose handling; history view | Fully functional reminder system |
| Chat & Polish | 4 | Gemini chat integration; conversational UI; comprehensive testing; bug fixes; demo preparation | Production-ready application |

6 EXPECTED OUTCOMES

Upon successful completion, **RxAide** will:

- Accurately extract medication details from prescription images using AI
- Generate and manage personalized medication schedules automatically
- Deliver reliable, timely notifications for all scheduled doses
- Track medication adherence with clear visual dashboards
- Provide conversational assistance for schedule management and queries

Learning Outcomes

- Native Android development with Java and Android Studio
- MVVM architecture implementation and Room database design
- Third-party AI API integration (Gemini multimodal capabilities)
- Background task scheduling with WorkManager
- Push notification implementation

7 CONCLUSION

The **RxAide** project addresses a critical healthcare challenge affecting millions of people worldwide. By combining AI-powered prescription scanning with intelligent scheduling and a conversational interface, we aim to deliver an application that makes medication management accessible to users of all ages and technical abilities. This project aligns with CSE299 objectives by solving a real-world problem with significant societal impact, demonstrating mobile development competencies, and producing a polished, demonstrable product.

REFERENCES

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