

Project Requirement Document (PRD)

Project Title

HealthMate AI – Intelligent Preventive Healthcare Platform

1. Project Overview

HealthMate AI is a cross-platform mobile application built using **Flutter** that provides AI-powered preventive healthcare assistance. The application focuses on **symptom guidance, lifestyle tracking, personalized health insights, and community health trend analysis** while ensuring user privacy and non-diagnostic medical support.

The system leverages **Supabase** as the primary backend and database service, with optional **Firebase Cloud Messaging** for push notifications and analytics.

2. Problem Statement

Individuals often lack:

- Immediate access to verified symptom guidance
- Awareness of unhealthy lifestyle habits
- Data-driven preventive health insights
- Simple, multilingual health assistance

This results in delayed action, poor health habits, and misinformation. HealthMate AI addresses these issues through AI-driven decision support and behavioral analytics.

3. Objectives

- Provide AI-assisted symptom urgency guidance
- Enable lifestyle tracking and preventive alerts
- Deliver personalized health recommendations
- Analyze anonymized community trends
- Maintain secure and scalable infrastructure

4. Target Users

- College students
- Working professionals
- Senior citizens
- Health-conscious individuals

- Urban and semi-urban populations

5. Core Features

5.1 AI Symptom Guidance

- User selects or types symptoms.
- AI model predicts **urgency level** (Low / Medium / High).
- Displays general advice and next steps.
- Includes mandatory medical disclaimer.

AI Type: NLP Classification + Rule Engine.

5.2 Lifestyle Habit Tracker

Tracks daily:

- Sleep hours
- Water intake
- Steps/activity
- Exercise duration
- Screen time

Generates weekly AI insights.

AI Type: Pattern Detection + Regression.

5.3 Personalized Health Insights

- AI evaluates trends over time.
- Generates preventive recommendations.
- Health score system (0–100).

5.4 Community Health Trends (Anonymized)

- Aggregated symptom trends.
- Weekly heat maps.
- No personal data exposed.

5.5 AI Chat Assistant

- Natural language health tips.
- Multilingual support.
- Safety-restricted responses.

5.6 Medication & Reminder System

- Local notifications.
- Custom schedules.
- Snooze & repeat options.

5.7 Dashboard & Visualization

- Graphs for sleep, water, and activity.
- Progress indicators.
- Health score charts.

5.8 Authentication & User Profiles

- Email / Google login.
- Secure session management.
- Editable user preferences.

6. Non-Functional Requirements

| Category | Requirement |
|---------------|----------------------------|
| Performance | App response < 2 seconds |
| Scalability | Support 10k+ users |
| Security | Encrypted storage & HTTPS |
| Reliability | 99% uptime |
| Usability | Intuitive UI/UX |
| Privacy | GDPR-style anonymization |
| Accessibility | Multilingual + large fonts |

7. Technical Architecture

Frontend

- Flutter (Android / iOS)
- State Management: Riverpod / Provider
- Charts: fl_chart

Backend

Primary: Supabase

Optional: Firebase (Notifications / Analytics)

Database (Supabase PostgreSQL)

Tables:

- users
- health_logs

- symptoms_logs
- recommendations
- community_trends
- reminders

Authentication

- Supabase Auth (Email + OAuth)

Storage

- Supabase Storage for profile images and exports.

8. AI & Machine Learning Components

8.1 Symptom Classification Model

- NLP text preprocessing.
- Multi-label classification.
- Output: Urgency + Suggestion.

Model Options:

- TensorFlow Lite
- ONNX Runtime
- Open-source LLM inference

8.2 Habit Pattern Analysis

- Time-series anomaly detection.
- Rolling averages and thresholds.

8.3 Recommendation Engine

- Rule-based + lightweight ML.
- Contextual suggestion generation.

8.4 Chatbot NLP

- Prompt-controlled language model.
- Safety guardrails and topic restriction.

9. API Design

Example Endpoints

POST /symptom/analyze

- Input: symptom list
- Output: urgency, advice

POST /habit/log

- Input: sleep/water/activity

- Output: success

GET /insights

- Output: weekly AI insights

GET /community/trends

- Output: aggregated stats

10. Security & Privacy

- Role-based access control
- JWT authentication
- Encrypted database fields
- Anonymized analytics
- Medical disclaimer enforcement

11. UI Screens

1. Splash Screen
2. Login / Signup
3. Dashboard
4. Symptom Checker
5. Habit Tracker
6. Insights & Charts
7. AI Chat Assistant
8. Community Trends
9. Reminder Settings
10. Profile & Preferences

12. Development Phases

Phase 1 – Core Setup

- Flutter project
- Supabase integration
- Authentication

Phase 2 – Data Modules

- Habit logging
- Symptom logging
- Database schema

Phase 3 – AI Modules

- Symptom classifier

- Insight generator
- Chat assistant

Phase 4 – Visualization

- Charts
- Health scores
- Trend maps

Phase 5 – Notifications & Polish

- Reminder system
- Dark/light themes
- Accessibility adjustments

13. Evaluation Metrics

| Metric | Goal |
|----------------|---------------------|
| Accuracy | 80%+ classification |
| Latency | <2s response |
| User Retention | 60% weekly |
| Crash Rate | <1% |
| Data Privacy | 100% anonymization |

14. Risks & Mitigation

| Risk | Mitigation |
|---------------------|-----------------------------|
| Medical misuse | Disclaimers & guidance only |
| Data privacy issues | Encryption & anonymization |
| AI inaccuracies | Confidence scoring |
| Scalability | Supabase scaling tiers |

15. Future Enhancements

- Wearable device integration
- Doctor teleconsultation
- Advanced predictive analytics
- Insurance & health records sync

16. Conclusion

HealthMate AI is designed as a **scalable, AI-enabled preventive healthcare platform** combining real AI logic, secure cloud infrastructure, and user-centric design. The system emphasizes **guidance, prevention, and data-driven insights** rather than diagnosis, ensuring ethical compliance and real-world applicability while remaining technically feasible for rapid development and demonstration.