

MindGuard : AI-Powered Mental Health Support System

Major Project (2025-2026)



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INTRODUCTION

Mental health disorders affect over 970 million people globally, with limited access to professional services and personalized interventions. Traditional mental health applications lack intelligent conversation capabilities and comprehensive wellness tracking. Key challenges include limited accessibility, lack of personalization, poor integration between mental and physical health solutions, privacy concerns, and low user engagement. MindGuard addresses these gaps through an integrated AI-powered platform combining conversational AI therapy, comprehensive mood tracking and computer vision-based exercise analysis. The system leverages cutting-edge AI, machine learning and computer vision technologies to provide personalized, accessible and privacy-focused mental health support.

OBJECTIVE

- Develop an AI-Powered Conversational Therapy System using multiple LLM providers (OpenAI GPT, Google Gemini, Groq) with robust fallback mechanisms.
- Implement Real-Time Emotion Analysis and Mood Tracking using transformer-based models for continuous mental health monitoring.
- Create Computer Vision-Based Exercise Analysis System using MediaPipe and OpenCV for pose estimation and fitness tracking.
- Integrate Comprehensive Mental Health Assessment Tools with personalized therapeutic recommendations.

SCOPE

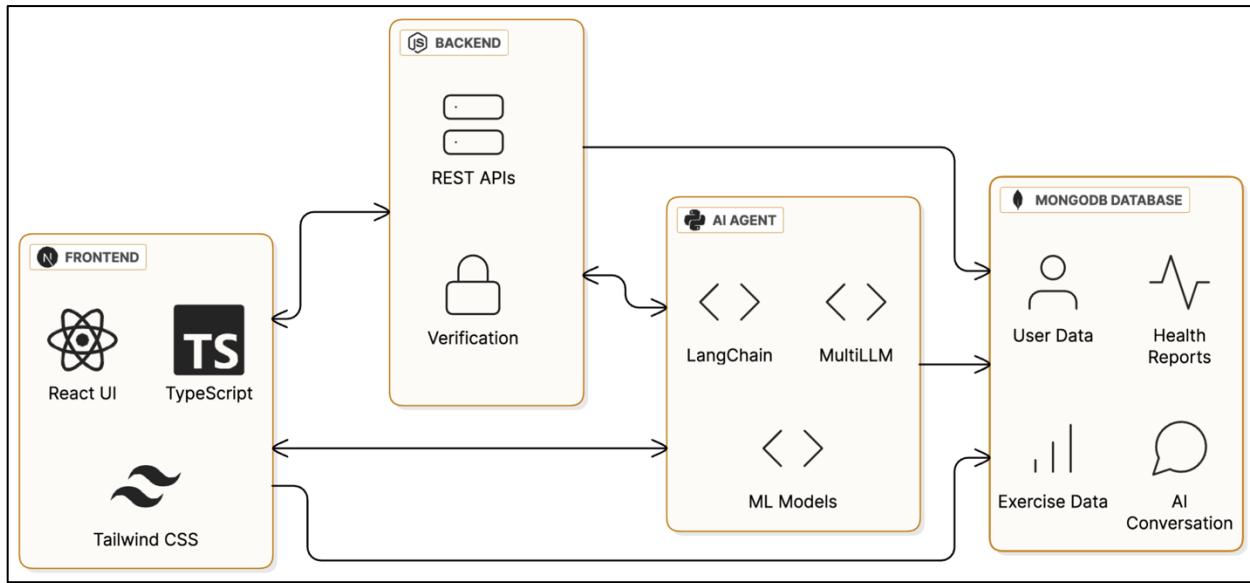
1. System Scope:

- Multi-provider AI conversational therapy with LangChain/LangGraph workflow.
- Real-time emotion recognition and mood tracking using NLP models.
- Computer vision exercise analysis for 5+ exercise types.
- Comprehensive mental health questionnaires and assessment tools.
- Real-time data visualization and interactive dashboard.

2. User Scope:

- Primary Users: Individuals seeking mental health support and fitness tracking.
- Secondary Users: Healthcare providers, therapists and mental health professionals.

SYSTEM ARCHITECTURE



DATASET

Primary Dataset: Mental Health Dataset

- Source: /mental_health_dataset.csv (5,002 records)
- Features: 16 attributes including demographics, behavioral and clinical data
- Target: Binary classification (0: Negative, 1: Positive mental health)
- Distribution: Age 18-67, multiple genders/occupations, various mental health conditions

TECHNOLOGY USED

- **Frontend Stack:** Next.js, TypeScript, Tailwind CSS
- **Backend Stack:** Node.js, Express.js, MongoDB, JWT
- **AI/ML Stack:** Python, LangChain, Transformers, PyTorch, MediaPipe
- **LLM Providers:** OpenAI GPT Models, Google Gemini, Groq

EXPECTED OUTCOMES

1. Technical Outcomes:

- Functional AI System: Multi-provider LLM system, emotion recognition, exercise analysis for 5+ exercise types.
- Integration: Seamless mental health tracking, AI therapy and fitness analysis in unified platform.

2. User Experience Outcomes:

- Mental Health Access: 24/7 AI support, personalized interventions and visual progress tracking.
- Fitness Monitoring: Real-time exercise feedback, injury prevention, comprehensive analytics and motivational gamification.
- Provider Tools: Professional dashboards, comprehensive reports and automated assessment.

IMPACT

- Personal Empowerment: Enhanced self-awareness through mood tracking, evidence-based coping skills development and improved mental health habits.
- Reduced anxiety through 24/7 AI support access and better sleep recommendations.
- Public Health: Mental health awareness, prevention-focused care, health equity community resilience building.