Adaptive Mental Fitness App

AI & ML Course Project

Leveraging machine learning to create personalized mental health screening and support

Project Team

Rayapureddi Rishi SriCharan

2420030638

P. Rajendra

2420030609

Rajesh Chowdhary

2420030684

Problem Statement

Mental health challenges like depression, anxiety, and stress are increasingly prevalent among students and working professionals. Many delay seeking help due to stigma, lack of awareness, or limited access to resources.

Current self-assessment tools are often static, failing to adapt to individual needs. This limits their effectiveness in early detection and continuous monitoring, leaving a critical gap in personalized mental fitness support.

Proposed Methodology & Approach

Foundational Tech Stack

Python-based web app leveraging Streamlit for UI, Pandas for data handling, and Scikit-learn for predictive modeling.

Validated Adaptive Screening

Incorporates PHQ-9, GAD-7, and PSS-4 frameworks with adaptive questioning based on prior user responses.

Personalized Recommendations

Generates tailored support including mindfulness practices, stress-relief strategies, and essential helpline resources.

Progress Monitoring

Enables weekly progress tracking and visualization of mental health trends using local storage.

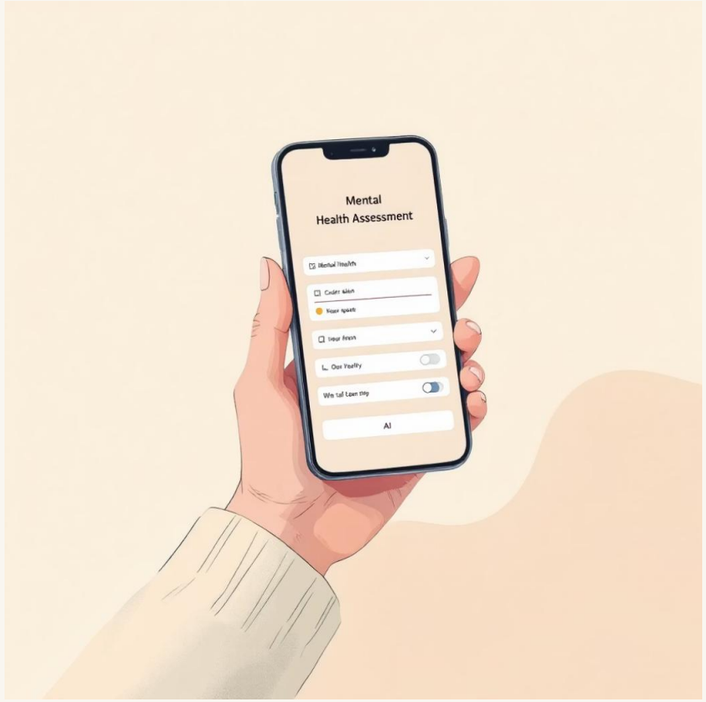
Project Overview

Our Adaptive Mental Fitness App revolutionizes mental health screening by combining validated psychological assessments with intelligent machine learning adaptation.

The application utilizes three standardized scales:

- PHQ-9 for depression screening
- GAD-7 for anxiety assessment
- PSS-4 for stress evaluation

By dynamically adjusting follow-up questions based on user responses, we provide personalized feedback while tracking mental health trends over time.



Key Innovation: Adaptive questioning reduces survey fatigue while maintaining clinical accuracy

Dataset Foundation

PHQ-9 Student Depression Dataset

Mendeley Data, 2025

Comprehensive depression scores from student populations, providing validated baseline measurements for our depression screening model.

PSY-COVID PSS-4 Dataset

2024 Research

Stress and partial anxiety data collected during the pandemic, offering real-world insights into psychological responses under pressure.

Unified Mental Health Dataset

2024 Compilation

Integrated PHQ-9, GAD-7, and PSS-10 responses, enabling comprehensive multi-dimensional mental health analysis and model training.

These carefully curated datasets provide the structured responses and validated labels essential for building robust, clinically-informed adaptive screening models.

Vision & Impact

Core Objectives

Intelligent Screening

Deploy validated psychological scales with adaptive questioning algorithms

Personalized Support

Generate tailored feedback and evidence-based coping strategies

Progress Tracking

Monitor mental health trends through longitudinal data analysis

Future Roadmap

Dataset Expansion

Incorporate diverse demographic and cultural data sources

Model Enhancement

Implement advanced ML algorithms for improved prediction accuracy

Cloud Deployment

Scale platform for widespread accessibility and real-time support

> "Democratizing mental health support through intelligent, adaptive technology that meets users where they are in their wellness journey."

Base Research Paper Reference

Our adaptive screening models and personalized intervention strategies are informed by cutting-edge research in mental health technology and machine learning, specifically drawing from the following foundational papers:

Advancements in Adaptive Mental Health Screening

This paper explores dynamic assessment methodologies, which significantly reduce assessment fatigue and improve data accuracy, directly influencing our app's adaptive questioning logic.

https://www.nature.com/articles/s41598-025-91086-w.pdf

Machine Learning for Personalized Mental Well-being Interventions

Focused on leveraging ML to deliver highly individualized support, this research provides a blueprint for our recommendation engine and continuous progress monitoring features.

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0320955

Thank You

For your time and attention to our Adaptive Mental Fitness App project.

We are committed to fostering mental well-being through innovative AI solutions and appreciate your interest in our work.