

Project Plan

HarmoniAI: Mental Health Monitoring System

Project Plan.....	1
HarmoniAI: Mental Health Monitoring System.....	1
Company Overview.....	1
1. Context.....	1
2. Innovation Proposal.....	2
3. Key Objectives.....	2
4. Solution Architecture.....	2
5. Viability Assessment.....	3
6. Data Strategy.....	3
7. Performance Indicators.....	3
8. Validation Framework.....	4
9. Model Development Roadmap.....	4
10. Deployment Strategy.....	4
11. Continuous Improvement.....	5
12. Project Management.....	6

Company Overview

HarmoniAI enhances mental health care by offering accessible, personalized support through AI-driven sentiment analysis and behavioral insights. It promotes early detection, bridges gaps between users and professionals, and ensures privacy while improving overall mental wellness.

1. Context

- **Problem Space:** Increasing cases of mental health issues, such as anxiety, depression, and PTSD, often go undetected or untreated due to lack of access, stigma, or insufficient early diagnosis.
- **Current Challenges:**
 - Limited mental health resources and high patient-to-therapist ratios.
 - Inconsistent patient monitoring and lack of real-time interventions.
 - Stigma preventing individuals from seeking traditional therapy.
- **Market Factors:** Rising adoption of telehealth, increased focus on mental well-being, and advancements in wearable and conversational AI technology.

2. Innovation Proposal

- **AI-Driven Solution:** Develop an AI-based mental health monitoring app that combines sentiment analysis, behavioral tracking, and predictive analytics to assess and support mental health in real time.
- **Impact:**
 - Early detection of mental health risks based on user interactions.
 - Improved access to mental health tools, reducing stigma.
 - Personalized mental health interventions, enhancing overall well-being.

3. Key Objectives

- Detect and analyze signs of anxiety, depression, or PTSD with 90% accuracy.
- Increase early intervention rates by 25%.
- Enable therapists to reduce patient response times by 50%.
- Improve user engagement with mental health exercises by 40%.

4. Solution Architecture

- **Components:**
 1. **AI-Powered Chatbot:** Conducts conversations to analyze sentiment and emotional state using NLP.
 2. **Behavioral Tracker:** Integrates with wearables to monitor sleep, heart rate, and activity levels.
 3. **Sentiment Analysis Engine:** Analyzes text and voice inputs for mood detection.
 4. **Recommendation System:** Provides personalized mindfulness exercises, CBT techniques, and alerts for critical situations.
- **Integration:**
 - APIs for wearable devices (e.g., Fitbit, Apple Watch).
 - Secure integration with telehealth platforms for therapist interaction.

5. Viability Assessment

- **Technical Feasibility:** Leverages existing NLP models like GPT for sentiment analysis and wearable APIs for data collection.
- **Resource Requirements:**
 - Team: 5 data scientists, 8 software engineers, 2 clinical psychologists.
 - Budget: \$2.5 million for development, infrastructure, and data compliance.
- **Constraints:**
 - Adherence to GDPR and HIPAA regulations.
 - Scalable infrastructure to handle 10x current user load in peak conditions.

6. Data Strategy

- **Data Sources:**
 - User text inputs from chatbot interactions.
 - Behavioral data from wearables.
 - Historical mental health data (public datasets).

- **Data Preparation:**
 - Clean and anonymize data to maintain user privacy.
 - Use transfer learning to adapt pre-trained NLP models.
- **Data Privacy:** Ensure compliance with GDPR and HIPAA through encryption and access control mechanisms.

7. Performance Indicators

- **Technical Metrics:**
 - Accuracy of sentiment analysis: $\geq 90\%$.
 - Response time for chatbot queries: < 2 seconds.
- **Business Metrics:**
 - Reduction in missed early intervention opportunities by 25%.
 - Increase in user retention rate by 35%.
 - Monthly active users growth by 50%.

8. Validation Framework

- **Offline Testing:**
 - Evaluate sentiment analysis accuracy on benchmark datasets.
 - Test prediction models against historical user data.
- **Online Testing:**
 - A/B test chatbot responses for user satisfaction.
 - Pilot program with 100 beta testers for real-world feedback.

9. Model Development Roadmap

- **Phase 1 (0-3 months):**
 - Collect and preprocess mental health datasets.
 - Develop initial NLP chatbot and integrate with sentiment analysis models.
- **Phase 2 (4-6 months):**

- Integrate wearable data for behavioral tracking.
- Develop and test recommendation algorithms for interventions.
- **Phase 3 (7-12 months):**
 - Finalize predictive analytics for high-risk users.
 - Conduct beta testing and iterate based on feedback.

10. Deployment Strategy

- **Method:** Gradual rollout in phases:
 - Beta launch with a controlled group.
 - Full-scale deployment after addressing feedback.
- **Training:** Provide therapists with a user-friendly dashboard to interpret AI insights.
- **Real-Time Inference:** Use batch processing for aggregated data trends and real-time processing for critical user alerts.

11. Continuous Improvement

- Gather ongoing feedback from users and therapists through app interactions.
- Monitor and retrain models every six months to adapt to new data and changing user behaviors.
- Introduce additional features like video-based sentiment analysis in future updates.

12. Project Management

- **Team Roles:**
 - Data Scientists: Develop and refine AI models.
 - Software Engineers: Build and maintain the app infrastructure.
 - Clinical Psychologists: Provide domain expertise and validation.
- **Timeline:**
 - Major Milestones:
 1. Prototype chatbot ready in 3 months.
 2. Wearable integration in 6 months.
 3. Full product release in 12 months.
- **Deliverables:**
 - Prototype, beta version, deployment-ready product.
 - Documentation for therapists and app users.