AI Wellness Guardian

DEPI Final Project Proposal

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This proposal presents the complete plan, design, and implementation approach for the AI Wellness Guardian — an intelligent health monitoring and wellness recommendation system. It aims to provide users with personalized health insights, mood tracking, and sleep analysis using modern AI and machine learning technologies.

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Executive Summary

The **AI Wellness Guardian** is an intelligent health and wellness platform designed to support users in achieving balanced physical, emotional, and mental well-being. The system integrates **AI-driven recommendations**, **sleep pattern analysis**, and **mood detection** to offer personalized and evidence-based guidance.

The project leverages advanced machine learning models, natural language processing (NLP), and credible data analytics to empower users with meaningful insights into their lifestyle and habits. It aims to provide a friendly, empathetic, and science-backed AI wellness companion.

1. Project Planning

1.1 Project Objectives

The main objectives of the AI Wellness Guardian project include:

- **Personalized Health Recommendations:** Generate tailored suggestions for users based on their physical and emotional data.
- **Sleep Analysis:** Analyze sleep duration and quality to improve recovery and daily energy.
- **Mood Detection:** Identify user emotional tone through AI-based sentiment analysis.
- **Empathetic AI Chatbot:** Create a conversational agent that provides wellness advice with empathy.
- **Credibility Detection:** Evaluate health-related information and detect false or misleading claims.
- **Data Visualization:** Present progress and wellness metrics through interactive charts and dashboards.
- **Ai fitness trainee :** Develop a real-time fitness assistant that analyzes human body posture using MediaPipe Pose Estimation to guide users during workouts.

1.2 Scope of Work

The project will cover:

- Data collection and preprocessing (user demographics, health data, mood records).
- Model design for mood and sleep analysis using AI/ML.
- Backend development with database integration.
- User interface and experience (UI/UX) design in Streamlit.
- System deployment, testing, and final documentation.

1.3 Deliverables

- A fully functional AI-driven health application.
- A backend database with secure and scalable structure.
- Analytical models for mood and sleep analysis.
- A professional and interactive web-based interface.
- A final report documenting system architecture, methodology, and evaluation.

1.4 Project Phases

1. **Requirement Analysis:** Identify user needs and define system features.
2. **Data Modeling:** Design and prepare database structures for wellness tracking.
3. **AI Model Integration:** Implement NLP and ML models for personalized insights.
4. **Frontend Development:** Build Streamlit-based interface for real-time interaction.
5. **Testing & Optimization:** Validate model accuracy and improve system responsiveness.
6. **Deployment:** Launch the AI Wellness Guardian app and conduct user testing.

1.5 Technology Stack

Component	Technology
Frontend	Streamlit (Python framework)
Backend	Python
Database	MySQL
AI/NLP Models	Google Gemini 2.5, Hugging Face Transformers
Visualization	Plotly, Matplotlib
Libraries	Pandas, NumPy, TextBlob, Joblib, Mediapipe, Requests
Authentication	Secure login with encrypted passwords
Hosting	Cloud deployment (optional)

2. Stakeholder Analysis

Stakeholder	Role	Interest / Benefit
End Users	Individuals using the app	Access personalized health and sleep insights
Developers	System builders	Implement and optimize AI/ML models
Health Experts	Medical advisors	Ensure recommendations are scientifically accurate
Project Managers	Coordinators	Monitor progress and ensure timely completion
Investors	Financial supporters	Gain ROI through app success and scalability
Data Analysts	Analysts	Maintain and evaluate accuracy of wellness predictions

3. Database Design

The system relies on a well-structured **MySQL database** to manage user profiles, activities, and AI analysis results efficiently.

3.1 Database Name:

wellness_db

3.2 Main Tables:

1. **users** – Stores user profiles and demographic data.
2. **sleep_data** – Records sleep duration, start/end times, and quality scores.
3. **mood_history** – Logs daily mood analysis and emotion detection.
4. **meal_log** – Tracks nutritional data and meal frequency.
5. **health_journal** – Records personal reflections and wellness notes.
6. **achievements** – Monitors milestones and progress levels.

3.3 Example Table: users

Column	Type	Description
id	INT	Unique identifier for each user
username	VARCHAR(255)	User login name
password_hash	VARCHAR(255)	Securely encrypted password
age	INT	User's age
gender	VARCHAR(10)	User's gender
weight	DECIMAL(5,2)	Weight in kilograms
height	DECIMAL(5,2)	Height in centimeters
mode	VARCHAR(100)	Goal mode (e.g., Bulk, Cut)
stress_level	VARCHAR(50)	Self-reported stress level
activity_level	VARCHAR(50)	Frequency of physical activity
sleep_quality	VARCHAR(50)	AI-evaluated sleep quality
mood_today	VARCHAR(50)	Current detected mood

3.4 Data Flow Overview

1. User registers → data saved to users table.
2. Sleep data collected and stored daily in sleep_data.
3. Mood input analyzed by NLP → saved in mood_history.
4. Recommendations generated using user patterns and stored for dashboard visualization.

4. UI/UX Design

4.1 Design Approach

The UI aims to create a sense of calm, trust, and motivation. Built using **Streamlit** with soft color gradients, rounded cards, and subtle animations, the layout maintains a balance between modern aesthetics and accessibility.

4.2 Design Objectives

- Create a clean, friendly interface with emotional warmth.
- Offer easy navigation through a sidebar-based structure.
- Integrate real-time feedback using interactive graphs.
- Maintain consistent design and typography across all modules.
- Support light and dark themes for user preference.

4.3 Core Interface Sections

1. **Home Dashboard:** Overview of user progress and AI insights.
2. **Profile Registration:** Simple forms to gather personal and health information.
3. **Daily Tracker:** Displays calories, water intake, sleep time, and stress level.
4. **Health Recommendations:** Personalized guidance using AI analysis.
5. **Sleep Analysis:** Visualizes sleep cycles and quality metrics.
6. **Mood Detection:** Analyzes emotional tone from text inputs.
7. **Chatbot Assistant:** Empathetic AI companion using Gemini and NLP models.
8. **Fake News Detection:** Evaluates credibility of health-related articles or claims.
9. **Report Section:** Exports personalized health reports and progress summaries.
10. **Ai fitness trainee:** An interactive real-time panel that tracks body movements using MediaPipe Pose Estimation, provides instant feedback, and counts accurate exercise repetitions.

4.4 User Experience (UX) Enhancements

- **Minimal Input Fatigue:** Reduced number of form fields and smart auto-fill.
- **Smooth Animations:** Interactive transitions enhance user engagement.
- **Responsive Layout:** Automatically adjusts for desktop and tablet displays.
- **Emotional Feedback:** Dynamic emoji or color-coded mood indicators.

5. Expected Impact

The **AI Wellness Guardian** aims to promote a data-driven, proactive approach to health and well-being. It empowers users to understand their bodies, improve their routines, and make informed lifestyle decisions. By merging AI intelligence with emotional awareness, it offers a unique blend of technology and empathy.

6. Conclusion

This project represents the future of personalized healthcare — a digital wellness ecosystem powered by artificial intelligence, emotional intelligence, and credible health science. The AI Wellness Guardian not only provides insights but also builds a supportive, understanding relationship with users, guiding them toward healthier, happier lives.