



Assignment: Personalized Wellness AI

This assignment assesses your ability to design and outline a machine learning system for personalized wellness, demonstrating technical skill, problem-solving, and passion for impactful solutions.

Estimated Time: 2 hours

Phase 1: Technical Proof-of-Concept (90 minutes)

Design a proof-of-concept for your Wellness AI using **synthetic data**. Focus on demonstrating your understanding of the ML pipeline. This is for **design and thought process**, not a production-ready system.

Q1: Synthetic Data Design & Insights (25 minutes)

Describe your synthetic data generation strategy.

- **Features:** What specific features (e.g., `daily_steps`, `sleep_duration_hours`, `mood_score`, `dietary_category_intake`, `stress_level`) did you include, and why are they crucial for wellness recommendations?
- **Realism & Assumptions:** How did you create realistic relationships and variability? What key assumptions did you make about user behavior or wellness factors?
- **Visual Insights:** Include **1-2 key visualizations** of your synthetic data (e.g., scatter plot of activity vs. sleep, histogram of mood scores). Explain the patterns or "story" these visuals reveal.

Q2: Model Selection & Justification (45 minutes)

Choose **one core ML problem** within your Wellness AI (e.g., predicting mood, recommending activities, identifying wellness trends).

- **ML Approach:** Which machine learning algorithm(s) did you choose (e.g., Regression, Classification, Clustering, Recommendation System, Time-Series Forecasting)?
- **Justification:** Explain *why* you selected this model. Discuss its strengths for wellness data and the trade-offs considered (e.g., interpretability, non-linear relationships).

Q3: Evaluation Strategy (20 minutes)

How would you evaluate your chosen model on your synthetic data?

- **Metrics:** What specific evaluation metrics (e.g., RMSE, Accuracy/F1, Silhouette Score) would you use, and why are they appropriate?
- **Validation:** How would you validate your model's performance (e.g., train-test split, cross-validation)?
- **Future Refinements:** With more time, what specific steps would you take to refine your model's performance and robustness?

Phase 2: Impact & Reflection (44 minutes)

Q4: Real-World Impact & Considerations

Based on your design, what **actionable insights or potential value** could "Personalized Wellness AI" provide in a real-world scenario? What are the primary **risks, ethical considerations (e.g., data privacy, recommendation bias), or significant limitations** if deployed?

Q5: Challenges & Growth

Describe a specific moment during this assignment where you faced a challenge (e.g., data generation, model choice). How did you overcome it? How did this project deepen your understanding of ML or your own interests?

Submission Format

- **Single Jupyter Notebook (.ipynb file).**
- **Clear Q&A structure** using Markdown headers (e.g., ## Phase 1, ### Q1).
- **Code cells with explanatory comments.**
- **Visualizations and results embedded directly.**
- **File Naming: ml_wellness_project_[your_name].ipynb**