What You Can Build (Winning Prototype Idea)

Project Idea

Personal Health Drift Detector (PHDD)
A system that detects **gradual negative changes in a person's health or lifestyle over time** and flags early risk.

It focuses on:

- Mood trends
- Sleep changes
- Activity decline
- Stress indicators
- BMI or self-reported health ratings

These are ideal for **weak-signal detection**.

Core Features to Implement

1. Baseline Builder

For each user:

- Calculate baseline averages from past records
- Example:
    - Average sleep hours
    - Average mood score
    - Average activity level

Then compare **current values vs personal baseline**, not population averages.

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2. Weak Signal Detection Engine

Simple but effective methods:

- Moving average change
- Z-score relative to personal history
- Trend slope detection

Example rule:

- Mood decreasing steadily for 6 months → flag risk

This satisfies the **context-aware requirement**.

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3. Risk Scoring System

Output:

- Score from **0–100**

Example:

- 0–30 = Low Risk
- 31–60 = Moderate Risk
- 61–100 = High Risk

You can calculate score using:

- Weighted feature deviations
- Logistic regression or Random Forest (lightweight)

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4. Risk Categorization

Assign category based on signals:

Example:

- Low activity + higher BMI → Metabolic
- Mood decline + stress increase → Psycho-emotional
- Blood pressure trend → Cardiovascular

Simple rule-based mapping is acceptable.

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5. Explainability Panel

Show:

- Which features changed
- How much they changed
- Why the system flagged risk

Example output:

- Sleep decreased 22%
- Mood score dropped 1.8 points
- Stress increased 15%

Judges value this highly.

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6. Empathetic Follow-Up Generator

Use templates:

Examples:

- "We noticed some recent changes in your sleep pattern. Has anything been affecting your rest lately?"

- "Your activity level has changed recently. Would you like to share if your routine has changed?"

No diagnosis, only supportive questions.

Simple Architecture (Hackathon-Friendly)

Backend

Python:

- Pandas
- Scikit-learn
- NumPy

Interface

Choose one:

- Streamlit (fastest)
- Jupyter Notebook (minimum requirement)

Streamlit is usually better for judging.

Model Choice (Best Strategy)

Use:

- Logistic Regression OR Random Forest

Why:

- Easy to explain
  Fast training
- Judges prefer simplicity

How to Maximize F2 Score

Do this:

- Lower decision threshold
- Increase recall
- Accept more false positives

This aligns exactly with judging criteria.

Creative Feature Engineering Ideas (Bonus Points)

You can create:

- Stress change rate
- Sleep variability index
- Mood volatility score
- Life-event impact factor

These impress judges more than complex deep learning.

Minimum Demo Flow (Winning Demo)

User uploads dataset →
System processes history →
Baseline built →
Weak signals detected →
Risk score generated →
Explanation shown →
Empathetic question generated

This covers **all judging requirements**.

If You Want the Strongest Hackathon Strategy

Given your **HDMS experience and anomaly detection idea**, the smartest version to build is:

Early Psycho-Emotional Risk Detector
Reason:

- Weak signals appear clearly in mood/stress data
- Easier to demonstrate trends visually
- Judges understand it quickly
- Works well with longitudinal surveys
