

How do you prevent AI from Hallucinating?

*An Engineering approach to Personal Health Analytics
Inspired by Prof. Oren Freifeld's 'Intro to Deep Learning' (BGU)*

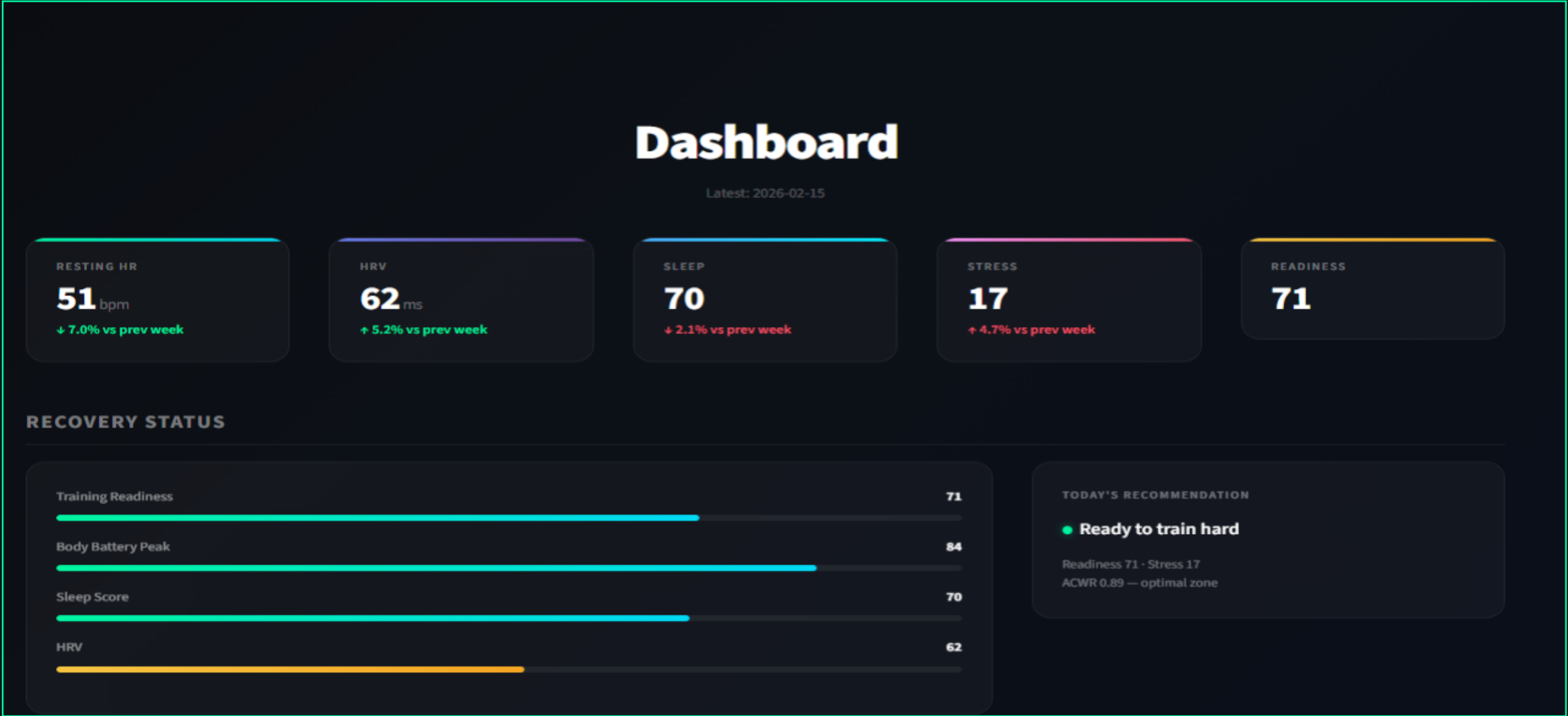
Python • PostgreSQL • CrewAI • Streamlit • Scipy • Heroku

DETERMINISM BEFORE SEMANTICS

- Problem: LLMs fed raw data will invent correlations.
- Solution: Constrain the AI to look through a 'Pipe'.
- The Pipe = Validated Statistical Results Only.
- The AI can't see raw data, only what the math proves.

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[ Raw Garmin Data ]  
⌵  
[ DETERMINISTIC MATH LAYER ] (The Guardrail)  
• Pearson Correlations (Linear)  
• Markov Chains (State Transitions)  
• AR(1) Models (Persistence)  
⌵  
[ SEMANTIC LAYER ] (The AI)  
• 5 Specialized Agents (Read-Only)  
• "Here is the math. Explain it."  
⌵  
[ True Insight ]
```

THE RESULT: N-OF-1 INSIGHTS



Live Dashboard running on Heroku

YOU CAN'T FAKE MATH

We validate relationships mathematically before the AI sees them.

Pearson Correlation :
$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

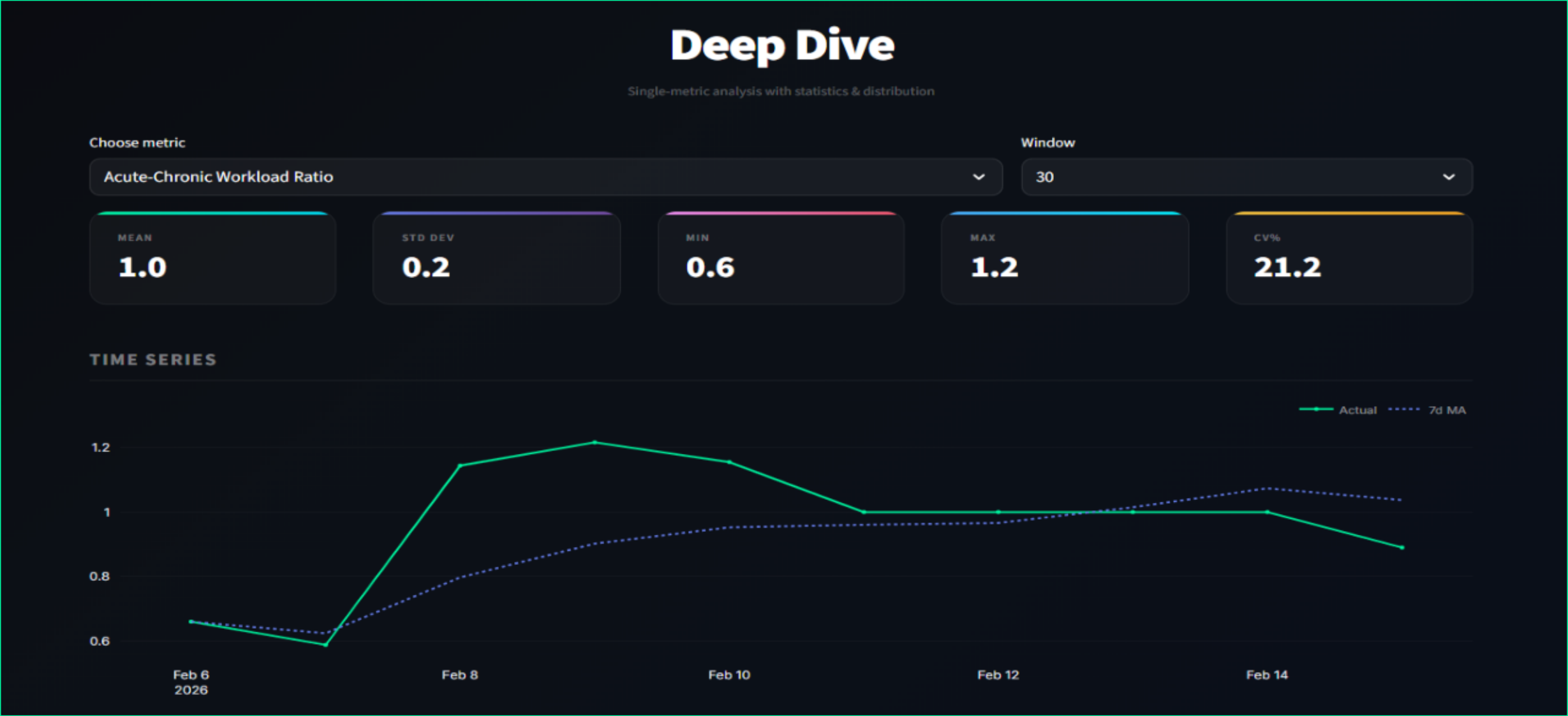
Markov Transition :
$$P_{ij} = P(S_{t+1} = j \mid S_t = i)$$

AR(1) Model :
$$X_t = c + \phi X_{t-1} + \varepsilon_t$$



Computed Correlation Matrix

DEEP DIVE ANALYSIS



THE AGENT TEAM

- 5 Specialists (not 1 generic prompt).
- Read-Only Access via SQL tools.
- Long-term memory tracks previous advice.
- Built with CrewAI + Gemini 2.5 Flash.

