

UDBHAV'25

**THE CARDIO PREDICTOR: HEART HEALTH EARLY
WARNING**

PROJECT ID: UDBHAV_015

**T-13
HT100-ML-006**

IDEA

THE CHALLENGE: TITLE: THE CARDIO PREDICTOR: HEART HEALTH EARLY WARNING

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MISSION:

HEART ATTACKS OFTEN STRIKE WITHOUT WARNING. THIS TOOL HELPS DOCTORS IDENTIFY AT-RISK PATIENTS YEARS IN ADVANCE BY ANALYZING MEDICAL HISTORY TO CALCULATE PERSONALIZED RISK SCORES.

MVP REQUIREMENTS:

- RISK SCORING: OUTPUT PROBABILITY SCORE FOR HEART RISK
- DATA HANDLING: WORK ACCURATELY EVEN WITH MISSING PATIENT DATA
- DOCTOR DASHBOARD: PRESENT RISK FACTORS CLEARLY

TECH STACK:

- RANDOM FOREST
- LOGISTIC REGRESSION
- UCI HEART DISEASE DATASET

ES NON-LINEAR PATTERNS --> OUTPUTS A PRECISE RISK PROBABILITY SCORE (0-100%).



TECHNICAL DETAILS

CORE AI ENGINE:

MODEL: RANDOM FOREST CLASSIFIER (ENSEMBLE LEARNING).

WHY: CHOSEN FOR ITS ABILITY TO HANDLE NON-LINEAR RELATIONSHIPS IN MEDICAL DATA AND HIGH RESISTANCE TO OVERFITTING COMPARED TO SINGLE DECISION TREES.

DATA PIPELINE:

SOURCE: UCI HEART DISEASE DATASET (CLEVELAND).

RESILIENCE: IMPLEMENTS STATISTICAL IMPUTATION (MEAN STRATEGY) TO AUTOMATICALLY RESOLVE MISSING PATIENT VALUES WITHOUT CRASHING.

LATENCY: MODEL SERIALIZATION VIA JOBLIB ALLOWS FOR INSTANT (<50MS) INFERENCE WITHOUT RETRAINING.

TECH STACK:

BACKEND: PYTHON, SCIKIT-LEARN, NUMPY, PANDAS.

FRONTEND: STREAMLIT FOR RAPID, INTERACTIVE UI.

VISUALIZATION: PLOTLY FOR DYNAMIC RISK GAUGES.

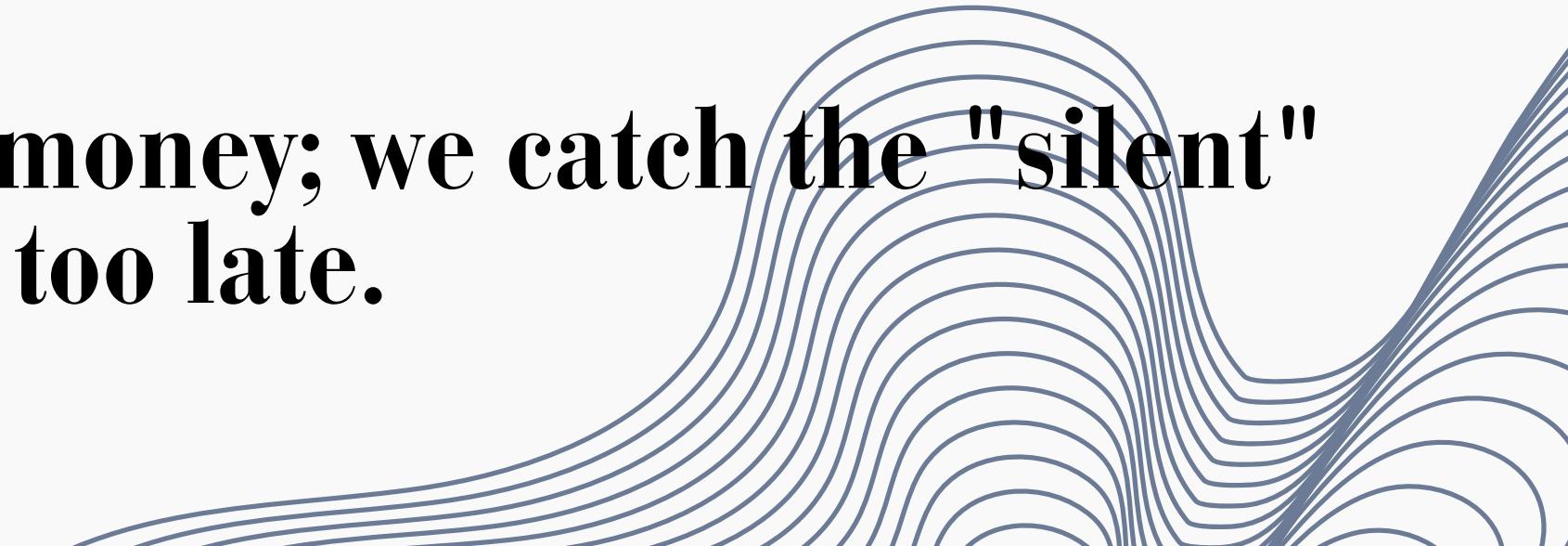
BUSINESS SCOPE AND IMPACT

Zero Hardware Cost: Since it's 100% software, we can deploy this to hospitals and clinics instantly—no expensive machines needed.

Prevention Pays: It is far cheaper for insurers to treat a patient before a heart attack than to pay for emergency surgery later.

Access for All: The lightweight code runs on basic laptops, bringing expert-level diagnostics to rural clinics that lack specialists.

The Bottom Line: We don't just save money; we catch the "silent" cases before it's too late.



CHALLENGES AND FUTURE SCOPE

Current Challenges:

Small Data: Our prototype relies on a limited public dataset. Real-world use requires training on millions of diverse records to ensure accuracy for everyone.

Integration: Connecting modern AI into old hospital systems (EHRs) is technically complex.

Future Roadmap:

Smartwatch Sync: Connect with Apple Watches or Fitbits to monitor patient heart health 24/7, not just during clinic visits.

Generative AI Reports: Integrate an LLM (like GPT) to write a plain-English explanation of the risk score for the patient.

Lifestyle Prescriptions: Automatically generate personalized diet and exercise plans based on the specific risk factors detected.

THANK YOU

