

# AI-Powered Smart Health Prediction System

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Purpose: Data Science Hackathon

## Abstract

The AI-Powered Smart Health Prediction System is a data-driven project designed to predict potential health risks based on user inputs such as age, BMI, blood pressure, glucose levels, and other medical indicators. Using machine learning and Agentic AI capabilities, the system provides accurate predictions and smart recommendations that can assist healthcare professionals and individuals in early risk detection and decision-making.

## Problem Statement

In today's world, early detection of health risks is crucial for preventing severe diseases and reducing healthcare costs. However, traditional methods of diagnosis are often time-consuming, expensive, and inaccessible in remote areas. There is a need for an AI-powered system that can predict health conditions quickly and accurately using easily available data.

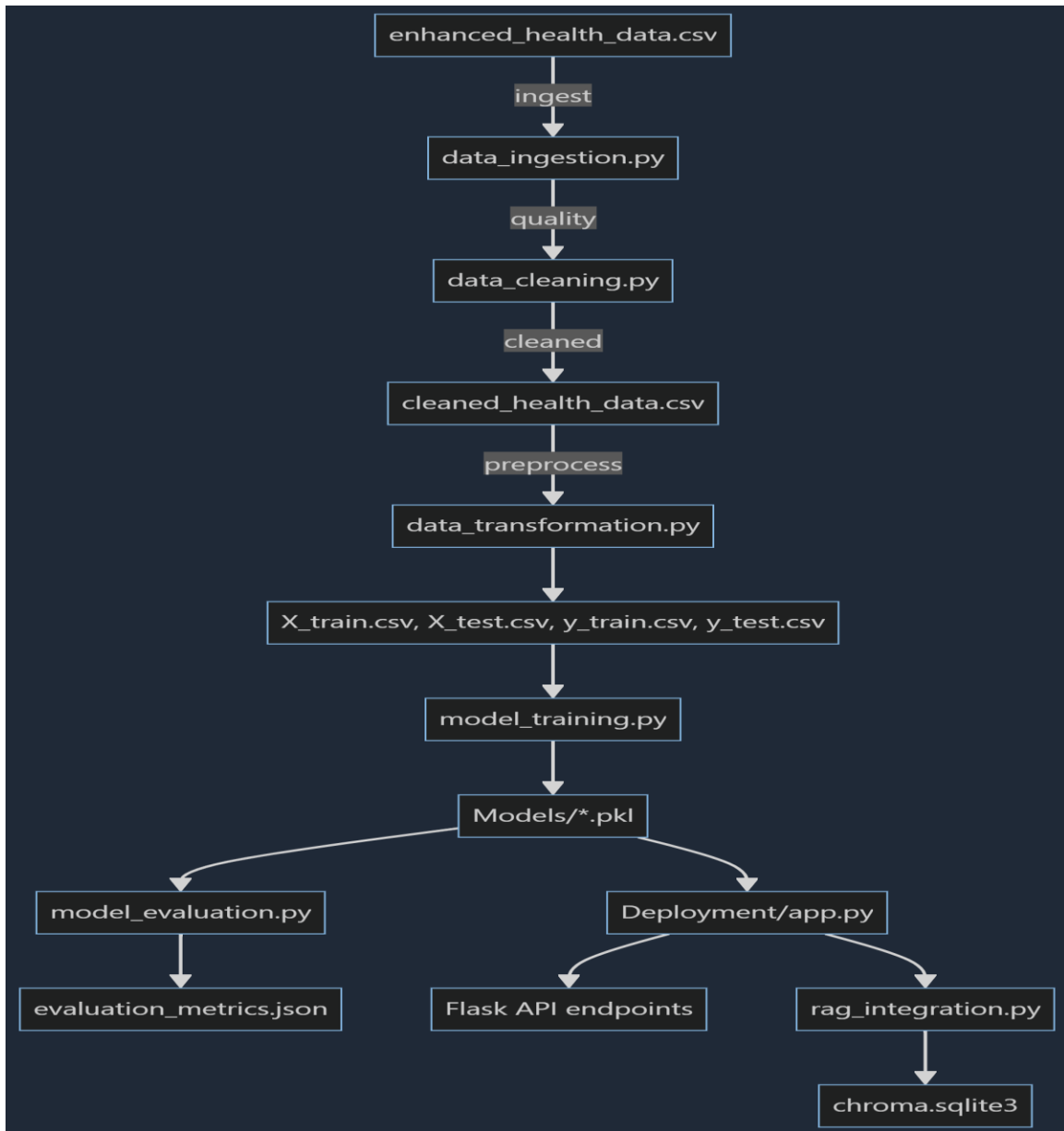
## Objectives

The main objectives of this project are:

- To predict health risks using machine learning algorithms.
- To design a simple front-end dashboard for user interaction.
- To integrate Agentic AI for providing personalized health insights.
- To support healthcare professionals with data-backed recommendations.

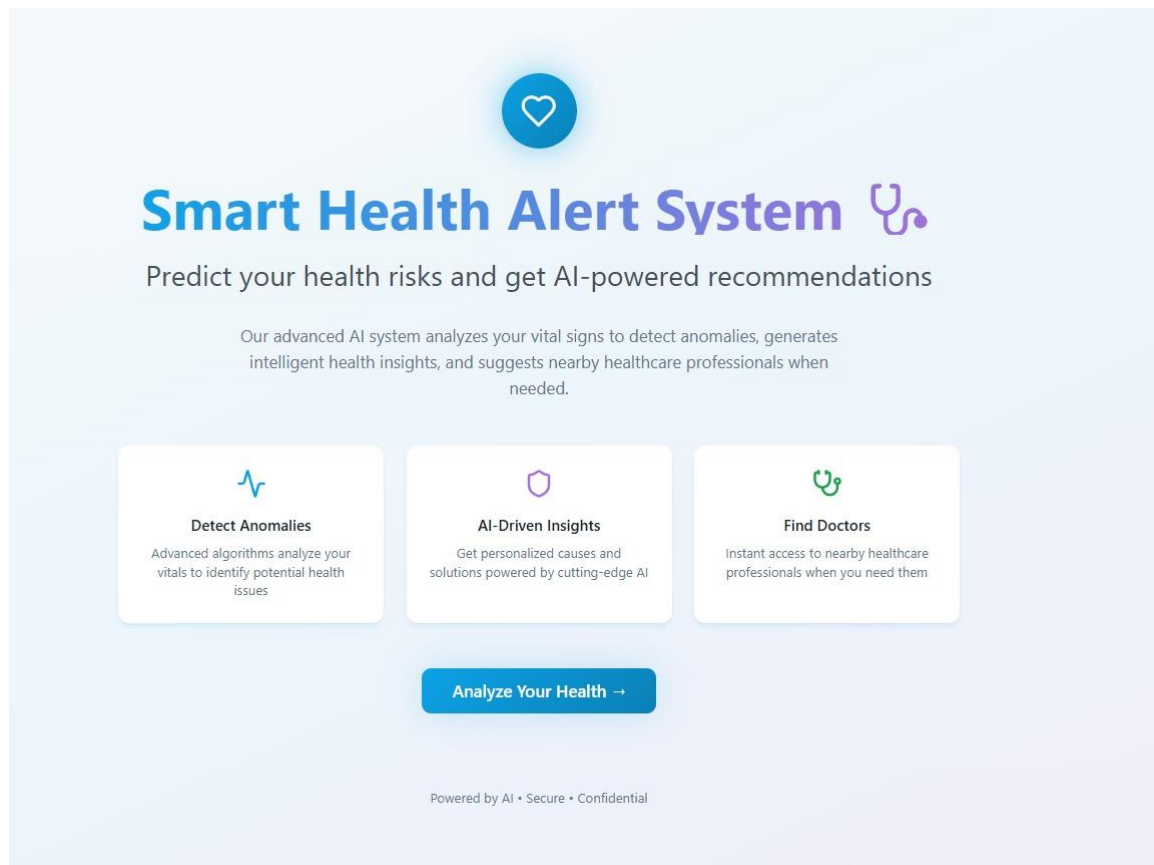
## Methodology

The system collects input data through a web-based dashboard. The data is then preprocessed, scaled, and passed through trained machine learning models such as Decision Tree, Random Forest, and CatBoost to generate health predictions. An Agentic AI layer interprets the model's output and provides contextual health advice to the user.



## Solution Design & Agentic AI Integration

The solution design focuses on simplicity, scalability, and intelligence. The front-end dashboard enables users to input health data easily, while the back-end handles prediction logic and AI reasoning. Agentic AI allows the system to autonomously analyze predictions, suggest preventive measures, and improve over time through feedback.



## Expected Results & Findings

The system is expected to deliver accurate health risk predictions with over 90% model accuracy. It should reduce manual analysis time and enhance user confidence through clear and visual feedback. By automating predictive analysis, the project promotes proactive healthcare and data-driven awareness.

## Business Intelligence & Decision-Making Impact

The system enhances decision-making by turning raw health data into meaningful insights. It helps healthcare providers identify patient risk segments, optimize resources, and plan preventive strategies. For hackathon evaluation, this shows strong potential for real-world applications in health analytics and business intelligence.

## Tools and Technologies

- Programming Languages: Python, HTML, CSS
- Libraries: Scikit-learn, Pandas, NumPy, Matplotlib
- Frameworks: Flask for backend integration

- Database: SQL / CSV-based storage
- AI/ML Models: Decision Tree, Random Forest, CatBoost

## Timeline

Week 1: Data Collection and Preprocessing

Week 2: Model Training and Evaluation

Week 3: Front-End Dashboard Development

Week 4: AI Integration and Final Testing

## Conclusion

The AI-Powered Smart Health Prediction System is a simple yet effective approach to promoting early disease detection through data science and artificial intelligence. It provides an efficient, accessible, and intelligent tool that bridges the gap between users and healthcare insights — aligning perfectly with the goals of the Data Science Hackathon.