Human Centered Data Science SS 2025

# Remedi

## An Alzheimer's Risk Assessment Tool

*Saad Waseem*
*Yasemin Mutlugil*
*Nino Sabella*
*Orkun Akyol*
*Jingren Dai*

# About the project

Diagnosing Alzheimer's is complex and we wanted to create an AI tool that can help with this process by:

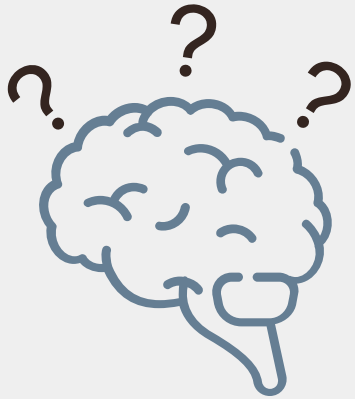
- Predicting the risk
- Explaining the prediction
- Being transparent throughout the process

## Intended Audience

Our tool supports Physicians in making a more informed decision in diagnosing Alzheimer's.

# Key Questions Addressed

- Is the model confident in making diagnosis?
- Why does the model think a patient might have Alzheimer's?
- Is the prediction fair and unbiased?
- What would happen if this patient's condition changed?
- Is the decision justifiable to the patient?



# About the dataset

## Dataset

Alzheimer's Disease Dataset shared by Rabie El Kharoua on Kaggle

## Data

2149 Patient Records, 32 features per patient, binary target variable

## Key Features

Demographics, lifestyle habits, cognitive scores, medical history

## Type

Synthetic data for educational purposes and enables testing without privacy concerns.

# Models We Built

### Logistic Regression

Simple and highly interpretable

### Random Forest

Robust and accurate

### Neural Network

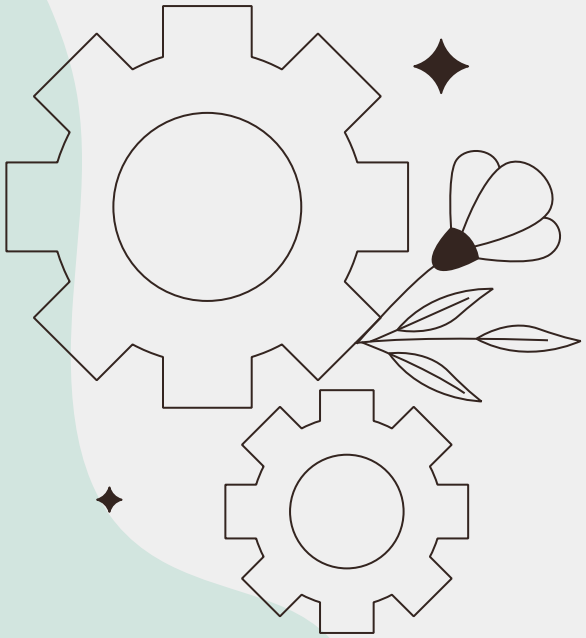
Captures complex patterns but less interpretable

## Why three models?

Each model offers a different balance between accuracy and explainability, giving physicians options.

| Model | Accuracy | Precision | Recall | F1 Score | AUC |
|---|---|---|---|---|---|
| Logistic Regression | 0.8278 | 0.72 | 0.83 | 0.7711 | 0.902 |
| Random Forest | 0.9884 | 0.99 | 0.98 | 0.985 | 0.9949 |
| Neural Network | 0.7762 | 0.63 | 0.9 | 0.7412 | 0.9034 |

# Key Design Choices



### Rapid Prototyping

Streamlit allowed fast iterations and integration of interactive components

### Explainable

Used SHAP and PDP for model transparency

### Preprocessing

Tested the effects of standardization and PCA on traceability, used oversampling to avoid bias

### Confidence-Driven Results

Confidence scores with human-in-the-loop decisions.

# Improvement from User Feedback

**Reworked Input Design**: Medical jargon replaced with plain language

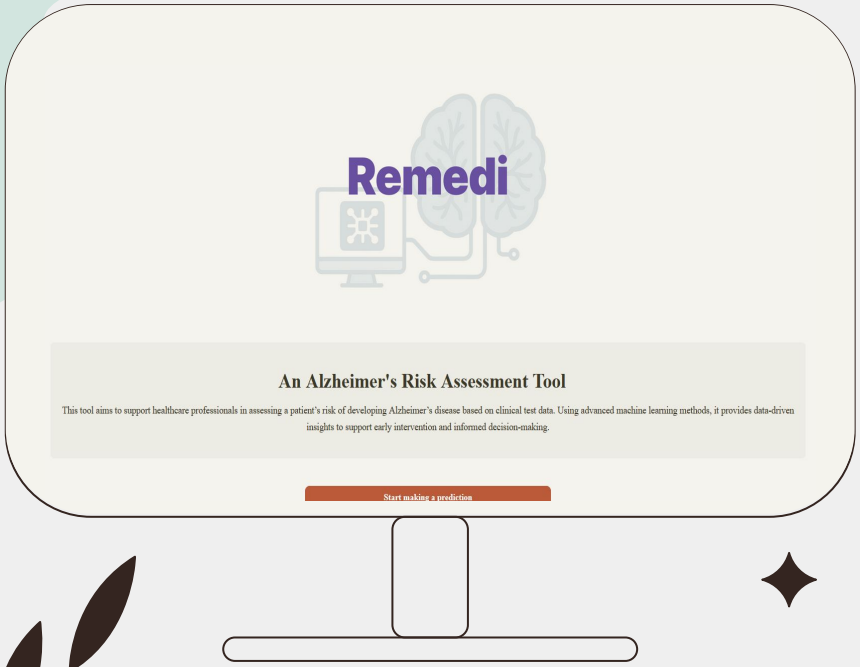
**Improved Navigation Flow**: Added navigation buttons inside pages

**Visual Risk Indicators**: Introduced clear, color-coded risk levels to guide interpretation.

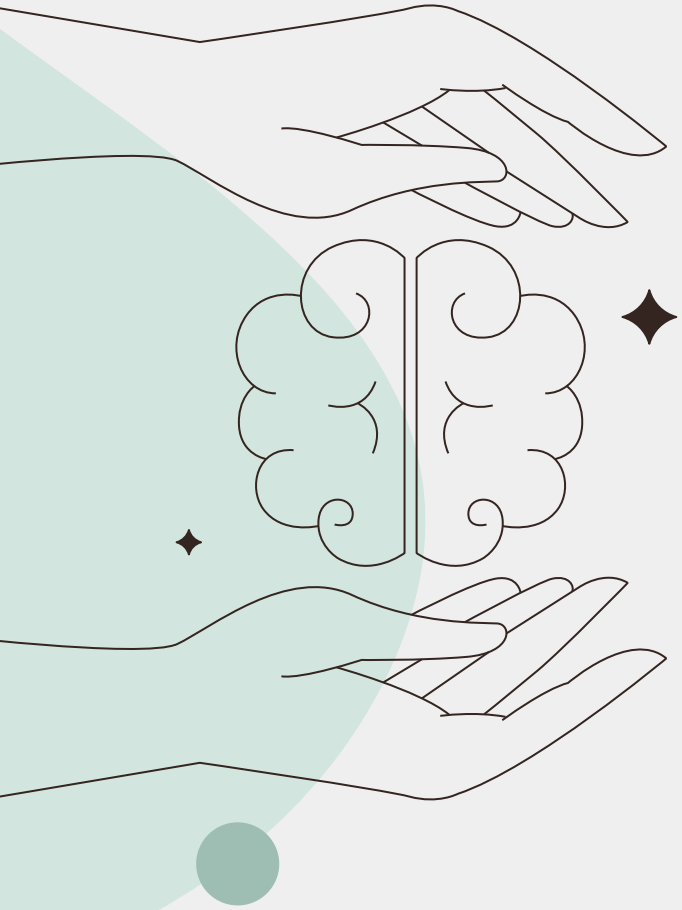
**Actionable Insights Panel**: Included suggestions for next steps.

**Reordered UI**: Presented easily interpretable information first before details.

**Model Info Made Accessible**: Added brief explanations of each model and trade-offs between accuracy and interpretability.


Remedi
An Alzheimer's Risk Assessment Tool
This tool aims to support healthcare professionals in assessing a patient's risk of developing Alzheimer's disease based on clinical test data. Using advanced machine learning methods, it provides data-driven insights to support early intervention and informed decision-making.
Start making a prediction

# Live Demo!



# Thanks!

**Do you have any questions?**