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Step by Step Wellness

Project Overview

Predicting Based on Trends

This project aims to develop a predictive model for diagnosing diabetes based on medical records using machine learning techniques. The app will analyze the user's health data and predict whether they are likely to develop diabetes in the future or if they already have it. The model will use key medical metrics to acheive this.

Offering Solutions

Users will receive real-time, actionable insights about their health, fostering early detection and personalized recommendations based on their health metric.

Safety

Health Safety

Preventing and managing diabetes is crucial to long-term well being.

Preventative Care

Step by Step Wellness acts as an early warning system, and detects risk factors before onset - enhancing personal safety.

Dataset Overview

Predict Diabetes from Medical Records [link]

The objective of the dataset is to predict whether or not a patient has diabetes, based on certain diagnostic measurements:

- **Blood Glucose Concentration**
- **Blood Pressure Level**
- **Body Mass Index (BMI)**
- **Age**

This sample dataset contains patient information of females age 21 and older, with Pima Indian Heritage.

Approach and Methodology

Data Processing

- Scaled numerical features like glucose, BMI, and blood pressure to improve model performance.
- Ensured data consistency and prepared it for machine learning algorithms.

Machine Learning Model

- Chose Logistic Regression, a simple yet effective algorithm for binary classification.
- Evaluated its performance for predicting diabetes risk based on input health data.

Training Process

- Utilized scikit-learn for model implementation and evaluation.
- Split the Diabetes Dataset into 80% training and 20% testing for reliable model accuracy assessment.

Interactive UI

- Built a user-friendly interface using ipywidgets in Python Flask.
- Allowed users to input their health data and receive instant predictions and health tips.

Model Development and Training

Model Used:
Logistic Regression

Dataset split:
80% training, 20% testing

Trained on Glucose, Blood Pressure, BMI, and Age

Optimized hyperparameters for better accuracy

```
model = LogisticRegression()
model.fit(X_train, y_train)
```

Prediction Output:
1 → High Risk of Diabetes
0 → Low Risk of Diabetes

Real-Time Prediction UI
User enters values → Model predicts result

App Features

User can input key health data like:

- Glucose
- Blood Pressure
- BMI
- Age

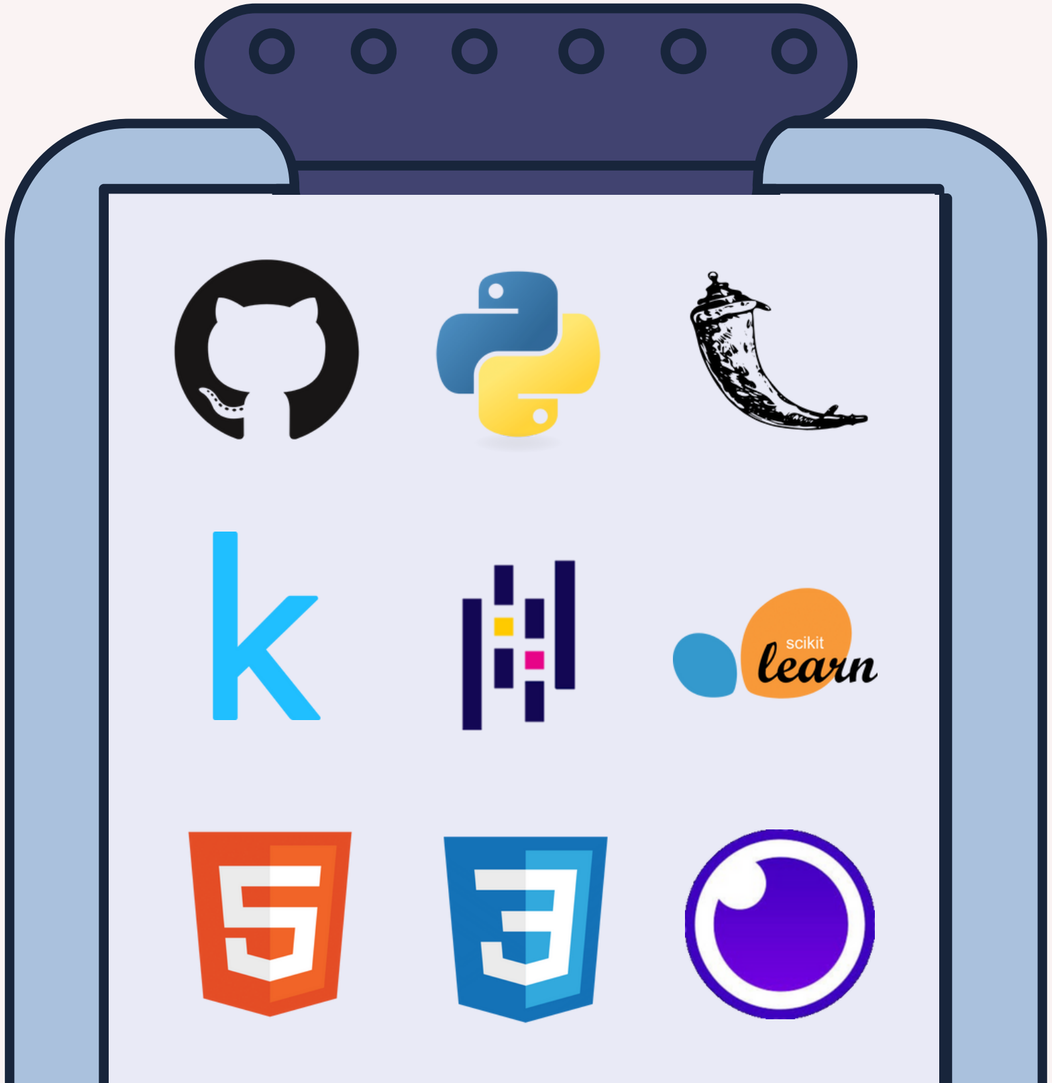
Real-Time Prediction with Explanation

- If high risk: "Consult a healthcare professional for confirmation."
- If low risk: "Continue maintaining a healthy lifestyle."

"Personalized Health Tips"

- Provides guidance on managing glucose, blood pressure, and BMI.
- Offers lifestyle and diet suggestions for better health.

Tech Stack



POST http://127.0.0.1:5000/predict Send

200 OK 29 ms 735 B 18 Minutes Ago

Params Body Auth Headers 3 Scripts Docs

Preview Headers 5 Cookies Tests 0 / 0 → Mock Conso

JSON

Preview

```
1  {"Glucose":120,"BloodPressure":80,"BMI":25,"Age":30}
```


```
{
  "advice": "- Your glucose levels are slightly high. Consider a balanced diet and regular exercise.\n- You are in the overweight range. Focusing on a balanced diet and regular physical activity can help you achieve a healthier weight. Small, consistent changes can make a big difference!\n- You have high blood pressure. Ways to combat high blood pressure is to eat a healthy diet low in sodium, maintaining a good BMI, getting regular physical activity, limiting alcohol intake, managing stress, and getting enough sleep",
  "prediction": "Your results suggest a low likelihood of diabetes. This does not guarantee you are free from risk. Maintaining a balanced diet, regular exercise, and health checkups is still recommended."
}
```

Diabetes Prediction

Glucose: 120
Blood Pressure: 80
BMI: 25
Age: 30
Predict

Result:

Your results suggest a low likelihood of diabetes. This does not guarantee you are free from risk. Maintaining a balanced diet, regular exercise, and health checkups is still recommended.

- Your glucose levels are slightly high. Consider a balanced diet and regular exercise.
- You are in the overweight range. Focusing on a balanced diet and regular physical activity can help you achieve a healthier weight. Small, consistent changes can make a big difference!
- You have high blood pressure. Ways to combat high blood pressure is to eat a healthy diet low in sodium, maintaining a good BMI, getting regular physical activity, limiting alcohol intake, managing stress, and getting enough sleep

Evaluations and Results

Our model has an accuracy of 74.05%

The reason our dataset isn't more accurate is due to the fact that it was a sample of only 768 individuals. It also only tested based on 4 metrics even though there are many more factors that contribute to predicting if someone has diabetes.

False positive rate: 20.2%
(the rate at which the model incorrectly identifies an indiviudal diabetic when they are not)

False negative rate: 36.4%
(the rate at which the model incorrectly identifies an indiviudal as non diabetic when they are not)

Future Enhancements

Dataset

- Incorporate larger and more diverse datasets from different populations.
- Include more health parameters like cholesterol, diet, and physical activity for better predictions.

Model

- Experiment with other more advanced models
- Improve prediction accuracy and handle more complex data patterns.

App Development

- Build a standalone mobile app for easier access and daily tracking.
- Integrate data visualization (graphs) to show trends in glucose levels, BMI, and blood pressure over time.

Wearable Technology

- Connect the app with smartwatches and health devices (e.g., Fitbit, Apple Watch).

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Thank You