Health Prediction Application: Report

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Abstract

This report describes the development of a Health Prediction Application that predicts diabetes and heart disease using machine learning models. The application integrates frontend, backend, and Python-based machine learning models to provide real-time health predictions.

1 Introduction

The project aims to build a Health Prediction Application capable of predicting health conditions such as diabetes and heart disease. The application involves three main components: the frontend (HTML and JavaScript), the backend (Node.js with Express), and machine learning models (Python). It uses a RESTful API architecture to handle requests and communicate between the frontend and backend.

2 System Architecture

The system consists of three major parts:

- **Frontend (HTML/JS)**: The frontend presents a user-friendly interface for the user to select the type of prediction (diabetes or heart disease).
- **Backend (Node.js)**: The backend is built using Node.js and Express, which handles incoming requests, invokes Python scripts for predictions, and sends back the results to the frontend.

- **Machine Learning Models (Python)**: The models for both diabetes and heart disease prediction are built using the Random Forest classifier. These models are trained using historical medical data and stored as `.pkl` files for prediction.

3 Frontend Design

The frontend consists of two HTML pages:

- `welcome.html`: This page is the entry point where the user selects between diabetes or heart disease prediction.
- `index.html`: This page dynamically generates a form based on the user's choice (either diabetes or heart disease).

4 Backend Design

The backend is built using Node.js with Express. The main functionality is provided through the `/predict` API endpoint, which accepts a POST request with the prediction type and input data. The server invokes the corresponding Python script for prediction.

5 Machine Learning Models

Two models are used for prediction:

- **Diabetes Prediction Model**: This model predicts whether a person has diabetes based on various features.
- **Heart Disease Prediction Model**: This model predicts whether a person has heart disease based on different health indicators.

6 Workflow

1. The user selects the prediction type on `welcome.html`.
2. A dynamic form is generated on `index.html`.

3. Data is collected from the user and sent to the backend.
4. The appropriate Python script is called for prediction.
5. The result is displayed on the frontend.

7 Technologies Used

- Frontend: HTML, JavaScript (Speech API), Bootstrap
- Backend: Node.js, Express.js
- Machine Learning: Python, scikit-learn, Random Forest Classifier
- Data Storage: Models saved as `.pkl` files
- API Communication: RESTful API (POST request)

8 Conclusion

The Health Prediction Application integrates machine learning with web technologies to provide accurate health predictions based on user input. This system is designed to be user-friendly, responsive, and capable of making reliable predictions.