Project 2: AI Based Diabetes Prediction System

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Problem Statement: Develop an AI-powered diabetes prediction system that leverages machine learning algorithms to analyze medical data and predict the likelihood of an individual developing diabetes, providing early risk assessment and personalized preventive measures.

Dataset Link: https://www.kaggle.com/datasets/mathchi/diabetes-data-set

Project Steps

Phase 1: Problem Definition and Design Thinking

In this phase, we'll define the problem of developing an AI-powered diabetes prediction system, understand the requirements, and plan the design of the system.

Problem Definition: The problem is to build an AI-powered diabetes prediction system that uses machine learning algorithms to analyze medical data and predict the likelihood of an individual developing diabetes. The system aims to provide early risk assessment and personalized preventive measures, allowing individuals to take proactive actions to manage their health.

Design Thinking:

Data Collection: We need a dataset containing medical features such as glucose levels, blood pressure, BMI, etc., along with information about whether the individual has diabetes or not.

Data Preprocessing: The medical data needs to be cleaned, normalized, and prepared for training machine learning models.

Feature Selection: We will select relevant features that can impact diabetes risk prediction.

Model Selection: We can experiment with various machine learning algorithms like Logistic Regression, Random Forest, and Gradient Boosting.

Evaluation: We will evaluate the model's performance using metrics like accuracy, precision, recall, F1-score, and ROC-AUC.

Iterative Improvement: We will fine-tune the model parameters and explore techniques like feature engineering to enhance prediction accuracy.

Phase 2: Innovation

In this phase, we can explore innovative techniques such as ensemble methods and deep learning architectures to improve the prediction system's accuracy and robustness.

Phase 3: Development Part 1

In this phase, we'll begin developing the diabetes prediction system by preparing the data and selecting relevant features.

Phase 4: Development Part 2

In this phase, we'll continue building the diabetes prediction system by selecting a machine learning algorithm, training the model, and evaluating its performance.

Phase 5: Project Documentation & Submission

In this phase, we'll document the entire diabetes prediction system and prepare it for submission.

Documentation

Clearly outline the problem statement, design thinking process, and the phases of development.

Describe the dataset used, data preprocessing steps, and feature selection techniques.

Explain the choice of machine learning algorithm, model training, and evaluation metrics.

Document any innovative techniques or approaches used during the development.

Submission

Compile all the code files, including the data preprocessing, model training, and evaluation steps.

Provide a well-structured README file that explains how to run the code and any dependencies.

Include the dataset source and a brief description.

Share the submission on platforms like GitHub or personal portfolio for others to access and review.