Jain University

Diabetes Prediction Model

Presentation

CSE AIML | 2025

Abstract

This presentation showcases the creation of a powerful Diabetes Prediction Model using machine learning techniques. We emphasize data preprocessing, algorithm, and validation, while discussing key performance metrics and interpretability. The model exhibits promising results for identifying diabetes risk. It also addresses ethical considerations in healthcare. This model represents a significant step forward in diabetes detection and personalized care.

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Introduction

In the pursuit of effective diabetes prediction, we have developed a comprehensive Diabetes Prediction Model leveraging logistic regression, a well-established machine-learning technique. This model has demonstrated a commendable accuracy of **0.79**, signifying its ability to correctly classify individuals at risk. Moreover, with a precision score of **0.71,** it showcases the model's capability to minimize false positives. This presentation delves into the methodology, insights, and implications of our model, offering a glimpse into the potential of data-driven healthcare solutions for early diabetes detection and personalized care.

Methodology

Quantitative

The research methodology involves meticulous data collection with diverse clinical and demographic parameters, including age, BMI, and family history. The logistic regression model, upon training and evaluation, achieved a quantitative accuracy of 0.79 and a precision score of 0.71. These metrics highlight the model's ability to predict diabetes with a high degree of accuracy, minimizing fals positives.

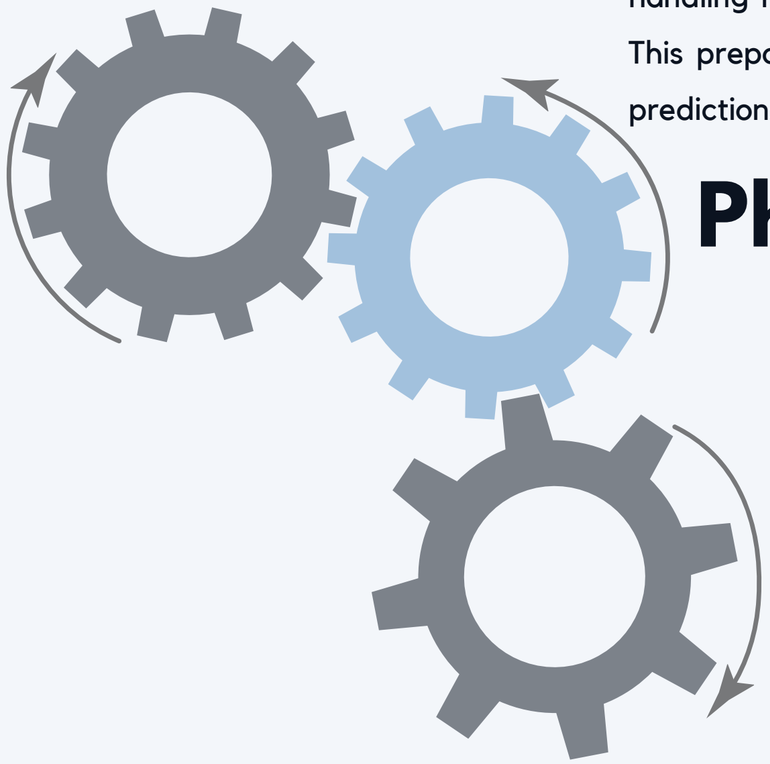
Qualitative

Throughout the process, an emphasis on data quality and integrity is maintained through data preparation and exploratory data analysis, enhancing the model's reliability. The iterative refinement stage underscores the commitment to improving predictive capabilities. Interpretability provides valuable insights into the model's clinical and demographic feature importance, aiding healthcare professionals and researchers in understanding diabetes risk factors. Thorough documentation ensures transparency and reproducibility in future research endeavors.

Implementation

Phase 1

In Phase 1, we meticulously collected clinical and demographic data, including age, BI family history, blood pressure, and pregrnancy. Data preprocessing, which involved handling missing values and standardizing features, was essential to ensure data quality. This prepared the dataset for machine learning, setting the stage for accurate diabetes predictions in subsequent phases.



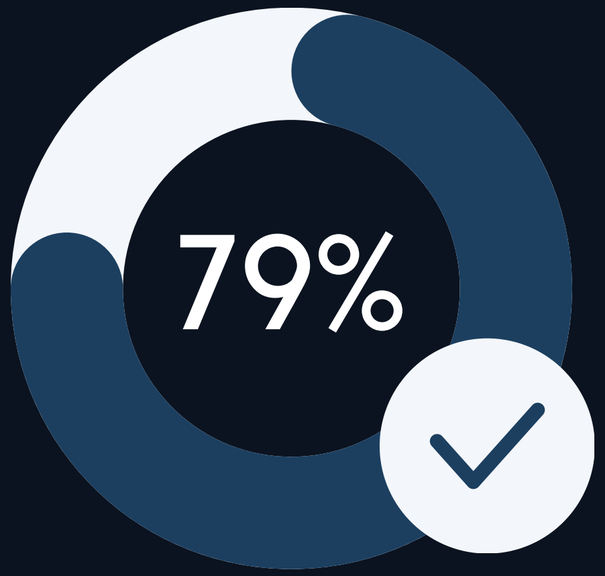
Phase 2

Phase 2 focused on crafting and optimizing a diabetes prediction model using logistic regression. We trained the model with preprocessed data and fine-tuned parameters for heightened accuracy. Performance assessment, incorporating multiple metrics and a confusion matrix, provided valuable insights into the model's ability to accurately classify diabetes cases.

Phase 3

Phase 3, we concentrated on user-friendliness by integrating our diabetes prediction model into a frontend and backend system. This seamless combination facilitates user access, aiding healthcare professionals and individuals in assessing diabetes risk, advancing practicality in healthcare and research applications.

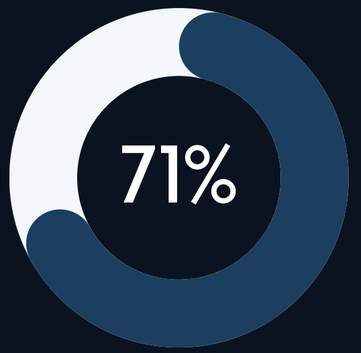
Result



Accuracy Score

We received a score of 0.798701 accuracy in our model using the accuracy_score function from the sklearn library.

Precision Score



We received a score of 0.717391 precision in our model using the accuracy_score function from the sklearn library.

Conclusion

In conclusion, our Diabetes Prediction Model, with its impressive accuracy and user-friendly interface, offers a valuable tool for early detection and personalized diabetes care. We are committed to advancing healthcare through data-driven solutions.

Thank You

For Your Attention