

Title: An Interpretable Framework for Predicting Type 2 Diabetes using ML and Explainable AI(Conference Paper)

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Abstract

Diabetes Mellitus is an incurable disease and stands as a major universe cause of destruction. With the universal prevalence of diabetes increasing rapidly, accurate detection and identification of the disease have become crucial. In this paper, we present an explainable AI-based diabetes indicative methodology that is carefully constructed, effective, and, most importantly, interpretable. Using two real-world diabetes datasets, the three most well-known machine learning classifiers in the literature - Random Forest (RF), Decision Tree (DT), and XGBoost - were subjected with quantitative assessments. After training and assessment of all classification models, the suggested method achieved the best results in the XGBoost classifier for the Sylhet dataset with 99.4% accuracy and the Pima Indian dataset with 92.59% accuracy. The datasets were normalized across observations to provide standardized values for improved analytical applicability and comparability. Explainable AI has been implemented for the XGBoost machine learning model by generating both global and local explanations using Shapley additive explanations (SHAP) and Local interpretable model-agnostic explanations (LIME). The elements

that contribute to diabetes are explained and shown in graphs to help medical professionals make decisions about clinical diagnosis and treatment options. © 2023 IEEE.

Author keywords

Decision Tree (DT)Diabetesdiabetes diagnosisexplainable AinterpretableLIMEPima Indian datasetRandom Forest (RF)SHAPSylhet datasetXGBoost

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