Diabetes Mellitus Prediction Classification Using Hybrid Machine Learning Techniques

Alagandula Kalyani[1, a)], Md Umalwara[1], Velpula Tejaswini[1], Eelandula Kumaraswamy[1], Sukhaveerji Ghate[1] and Mothe Rajesh[2]

[1]*Sumathi Reddy Institute of Technology for Women, Warangal, Telangana, India*
[2]*School of Computer Science and Artificial Intelligence, SR University, Warangal, Telangana, India.*

a)Corresponding author: kalyani22@gmail.com

Abstract: Diabetes mellitus, also called diabetes, is a class of metabolic diseases that affects hundreds of millions of mankind. It is an extra discoverer of a variety of diseases, for example: coronary failure, blindness, urinary organ diseases etc. The detection of diabetes is of great importance, concerning its severe complications. To reduce these, several investigators are functioning to forecast diabetes at a previous period utilizing many techniques. This approach presents, Classification of Diabetes Mellitus Prediction Using Hybrid Machine Learning (ML) Techniques. The goal of this examination is to implement a technique that can assume a patient's diabetic risk level with the best accuracy. The acquired dataset as the outcome of the K-means Clustering model was fed to a hybrid model with PCA and K-means clustering. Investigations are conducted on the Pima Indians Diabetes Database (PIDD) taken from the UCI ML Repository. The performance of the three algorithms (NB, SVM and Hybrid ML technique) is calculated on different aspects such as Accuracy, Precision, F-Measure and Recall. The investigations presented that Hybrid Machine Learning classifiers method implemented better than the other classifiers exclusively.

Keywords: Hybrid Machine Learning, diabetes mellitus, K-means clustering, Principal Component Analysis (PCA).

INTRODUCTION

Diabetes is a disorder that impacts the human's efficiency to produce the hormones like insulin that abnormally metabolize carbohydrates and raises blood glucose levels [1]. A diabetic person will have a rise in blood sugar. Common health indications like increased appetite, frequent urination, and high blood pressure. A kind of diabetes is not only treated orally and also needs extra treatment that is insulin treatment [2]. Diabetes can lead to several problems if in case it is not treated. A few serious issues like diabetic ketoacidosis and nonketotic hyperosmolar Coma [3]. Diabetes is diagnosed as an important severe medical problem if the amount of glucose content is raised. The few parameters that affect diabetes are the personality of an individual, hereditary factors and insulin, and the most important cause is glucose concentrations in most parameters. Timely detection is the best solution to avoid problems [4].

Type 1, Type 2, and Type 3 diabetes are the three categories into which diabetes is categorized. An autoimmune condition is T1D. If the body demolishes the cells needed to provide insulin that grasp the glucose to provide strength. This type of diabetes causes over weighted body. Body mass index (BMI) expansion above the healthy BMI range is referred to as obesity [5]. Diabetes type 1 can develop in childhood or in adulthood. Individuals experience T1D for the rest of their lives and depend on insulin injections. Diabetes people should maintain frequent exercise and fitness regimes that are advised by physicians. Type 2 diabetic people have normally affected fatness. In this kind, the body either stops noticing insulin or absence of producing insulin. Type 2 usually happens in adults/older age. The disease