Abstract

Chronic Kidney Disease (CKD) are a universal issue for the well-being of people as they result in morbidities and deaths with the onset of additional diseases. Because there are no clear early symptoms of CKD, people frequently miss them. Timely identification of CKD allows individuals to acquire proper medications to prevent the development of the diseases. Machine learning technique (MLT) can strongly assist doctors in achieving this aim due to their rapid and precise determination capabilities. Many MLT encounter inappropriate features in most databases that might lower the classifier's performance. Missing values are filled using K-Nearest Neighbor (KNN). Adaptive Weight Dynamic Butterfly Optimization Algorithm (AWDBOA) are nature-inspired feature selection (FS) techniques with good explorations, exploitations, convergences, and do not get trapped in local optimums. Operators used in Local Search Algorithm-Based Mutation (LSAM) and Butterfly Optimization Algorithm (BOA) which use diversity and generations of adaptive weights to features for enhancing FS are modified in this work.

Simultaneously, an adaptive weight value is added for FS from the database. Following the identification of features, six MLT are used in classification tasks namely Logistic Regressions (LOG), Random Forest (RF), Support Vector Machine (SVM), KNNs, Naive Baye (NB), and Feed Forward Neural Network (FFNN). The CKD databases were retrieved from MLT repository of UCI (University of California, Irvine). Precision, Recall, F1-Score, Sensitivity, Specificity, and accuracy are compared to assess this work's classification framework with existing approaches.

Keywords: Chronic kidney disease (CKD) ▪ machine learning (ML) ▪ K-nearest neighbor (KNN) imputation ▪ feature selection (FS) ▪ adaptive weight dynamic butterfly optimization algorithm (AWDBOA) ▪ integrated model