

ABSTRACT

Chronic Kidney Disease (CKD), also known as chronic renal disease, involves conditions that impair kidney function, reducing their ability to keep you healthy. This disease can lead to various complications, including nerve damage, weak bones, anemia (a decrease in blood cells), low blood pressure, and nutritional deficiencies. The use of various machine learning techniques plays a crucial role in the early detection of chronic diseases. In recent years, the prevalence and severity of Chronic Kidney Disease (CKD) have increased globally. Without treatment, CKD may advance to end-stage renal disease (ESRD), a critical condition. With advancements in machine learning (ML) techniques and the availability of extensive medical datasets, automated CKD detection has emerged as a promising approach. This paper provides a comprehensive review of recent studies focusing on ML-based CKD detection methods. We explore various ML algorithms employed, such as support vector machines, random forests and ensemble methods, along with the features used for CKD prediction. different machine learning classifiers—Support Vector Machine (SVM), K-Nearest Neighbor (KNN), Random Forest, and decision Tree in identifying CKD at early stages, based on metrics such as accuracy, precision, recall, and F1-score. Experimental results demonstrate that the Random forest model surpasses other algorithms, achieving an accuracy of 97.5 %, a recall rate of 94.1%, Precision of 100% and an F1-score of 96.9%.