A Novel Hybrid Machine Learning Based Prediction of Chronic Kidney Disease

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Abstract. Chronic kidney disease, sometimes called chronic renal disease, is characterised by a typical kidney function or the incremental progression of renal failure over months or years. Due to an increasing patient population, a growing possibility of kidney disorders entering the death phase, and a poor prognosis for morbidity and mortality, chronic kidney disease (CKD) indicates a high burden on the healthcare system.Different complex conditions include developed stages in blood, anemia (low blood count), weak bones, and nerve damage. Early identification and medication prevents chronic uropathy is getting the worse situation. It is significant to have potential techniques during the initial analysis of CKD. In recent times, the Machine Learning (ML) methods had gain more attention due to its accurate and effective results. The primary objective of this task is to determine the presence of CKD. Hence in this paper A novel Hybrid Machine Learning based prediction of CKD is presented. For obtaining better and accurate results, two of the most popular ML classifiers SVM (Support Vector Machine) and Decision tree are combined as a hybrid model. This approach can give accurate and reliable outputs in form of accuracy, prediction time.

KEYWORDS: Machine Learning, Decision Tree (DT) Chronic Kidney Disease (CKD), Morbidity and mortality, Support Vector Machine (SVM).

INTRODUCTION

A serious health risk that affects people all around the world, Chronic Kidney Disease (CKD) has a significant impact on morbidity and mortality worldwide [1]. It is quickly turning into a worldwide health crisis. It is a situation; the patients living with a compromised condition of existence due to inadequate kidney work.

Japan and Taiwan are the countries in Asia with the highest prevalence of CKD in the entire world. The use of insufficient amounts of water and unhealthy eating habits are major contributing factors to this disease. The average lifespan of a person without kidneys is 18 days, and they need dialysis and a kidney transplant [2]. If left without treatment, it can affect important organs in the body, causing developed rates of cardiovascular death that can lead to sudden loss of life if not identified earlier.

Kidneys are the organs that circulate blood in the body and remove waste products from the body, also control blood pressure; producing red blood cells increases. Renal diseases are syndromes that affect kidney function and Glomerular Filtration Rate (GFR) [3]. Kidneys are two bean-structures; it is about dimension of a fist and situated on both side of the spine, under rib cage. Every day, the kidneys filter 120 to 150 quarts of blood and create 1 to 2 quarts of urine.