Chapter 10

Performance Analysis of Classification Techniques With Feature Selection Method for Prediction of Chronic Kidney Disease

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ABSTRACT

Chronic kidney disease has become a very prevalent problem worldwide and almost 10% of the population is suffering and millions of people are dying every year because of chronic kidney disease. Numerous machine learning and data mining techniques are applied by many researchers around the world to diagnose the presence of chronic kidney disease, so that the patients of chronic kidney disease may get benefited in terms of getting proper healthcare follow-up. In this chapter, Experiment 1 is conducted by implementing different five different classifiers on the original chronic kidney disease dataset. In Experiment 2, feature selection using feature importance method is used to reduce the chronic kidney disease dataset. A subset of 15 independent features and one target feature 'class' is obtained. Again, the same steps are implemented but on the newly obtained reduced dataset. The results of both the Experiments 1 and 2 are compared, and it is observed that the accuracy of classifiers with feature selection is far better than the accuracy of classifiers without feature selection.

INTRODUCTION

Chronic kidney disease (CKD) has become a public health concern worldwide. CKD - a gradual loss of kidney function - reaches an advanced stage known as End-Stage Renal Disease (ESRD). ESRD leads to renal transplant therapy (transplant or dialysis) and death of patients who are undergoing healthcare treatment. There is a steady increase in the number of deaths of patients with kidney failure who are treated by dialysis and kidney transplantation (the last stage of CKD) (Hill et al., 2004; Murphy et al., 2016). Hypertension, diabetes mellitus, coronary artery disease, heart failure, hyperlipidemia, and anemia are some of the additional conditions that are co-occurring with CKD. It is now an established fact that CKD promotes the risk of kidney failure and heart disease and other health issues (Rosansky, 2016; Murphy et al., 2016). More than 10% of the world's population is affected by CKD and millions die each year because they are not able to afford its very expensive treatment (Rosansky, 2016). CKD shows no symptoms in the initial stage and very quietly reaches its final stage. It is mostly recognized after kidney failure, where dialysis and immediate transplant are the only options as a treatment for patients. Machine learning (ML) is an application of Artificial Intelligence (AI). ML has the ability to automatically learn and improve from experience without explicitly programmed. ML is centered around developing programs that can access data to learn from it. The ML algorithm is extensively used in all areas of life, such as transportation, education, space, agriculture, customer relationship management, health care, and more (Vijayarani & Dhayanand, 2015; Subasi, Alickovic & Kevric, 2017).

Machine learning techniques and data mining algorithms can help diagnose the disease in its early stage, so that the necessary treatments can begin on time. Several classification methods are employed by various researchers to predict CKD. In the current chapter, the classification method is used to predict patients with CKD or not, by extracting hidden information, using healthcare data. The paper aims to conduct two experiments. In first experiment, five different individual classifier algorithms are implemented with machine learning technique, and in experiment 2, feature selection using feature importance method is used to reduce the chronic kidney disease dataset. A subset of 15 independent features and 1 target feature 'class' is obtained. Again, same steps, as in experiment 1, are implemented but on the newly obtained reduced dataset. The Results of both the experiments 1 and 2 are compared and it is observed that the accuracy of classifiers with feature selection is even far better than the accuracy of classifiers without feature selection.

Incessant kidney infection, additionally called interminable kidney disappointment, depicts the continuous loss of kidney work. Your kidneys channel squanders and overabundance liquids from your blood, which are then discharged in your pee. At the point when ceaseless kidney infection arrives at a propelled stage, risky degrees

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