SURVEY OF EARLY DETECTION OF CHRONIC KIDNEY DISEASE

INTRODUCTION:

Chronic kidney Disease (CKD) means your kidneys are damaged and not filtering your blood the way it should. The primary role of kidneys is to filter extra water and waste from your blood to produce urine and if the person has suffered from CKD, it means that wastes are collected in the body. This disease is chronic because of the damage gradually over a long period. It is flattering a common disease worldwide. Due to CKD may have some health troubles. There are many causes for CKD like diabetes, high blood pressure, heart disease. Along with these critical diseases, CKD also depends on age and gender. If your kidney is not working, then you may notice one or more symptoms like abdominal pain, back pain, diarrhea, fever, nosebleeds, rash, vomiting. There are two main diseases of CKD: (i) diabetes and (ii) high blood pressure. So that controlling of these two diseases is the prevention of CKD. Usually, CKD does not give any sign till kidney is damaged badly. CKD is being increased rapidly as per the studies hospitalization cases increase 6.23 per cent per year but the global mortality rate remains fixed. There are few diagnostic tests to check the condition of CKD: (i) estimated Glomerular filtration rate (ii) urine test (iii) blood pressure.

ABSTRACT:

Chronic Kidney Disease is one of the most critical illness nowadays and proper diagnosis is required as soon as possible. Machine learning technique has become reliable for medical treatment. With the help of a machine learning classifier algorithms, the doctor can detect the disease on time. For this perspective, Chronic Kidney Disease prediction has been discussed in this article. Chronic Kidney Disease dataset has been taken from the UCI repository. Seven classifier algorithms have been applied in this research such as artificial neural network, C5.0, Chi-square Automatic interaction

detector, logistic regression, linear support vector machine with penalty L1 & with penalty L2 and random tree. The important feature selection technique was also applied to the dataset. For each classifier, the results have been computed based on (i) full features, (ii) correlation-based feature selection, (iii) Wrapper method feature selection, (iv) Least absolute shrinkage and selection operator regression, (v) synthetic minority over-sampling technique with least absolute shrinkage and selection operator regression selected features, (vi) synthetic minority over-sampling technique with full features. From the results, it is marked that LSVM with penalty L2 is giving the highest accuracy of 98.86% in synthetic minority over-sampling technique with full features. Along with accuracy, precision, recall, F-measure, area under the curve and GINI coefficient have been computed and compared results of various algorithms have been shown in the graph. Least absolute shrinkage and selection operator regression selected features with synthetic minority over-sampling technique gave the best after synthetic minority over-sampling technique with full features. In the synthetic minority over-sampling technique with least absolute shrinkage and selection operator selected features, again linear support vector machine gave the highest accuracy of 98.46%

CONCLUSION:

This article objects to predict Chronic Kidney Disease based on full features and important features of CKD dataset. For feature selection three different techniques have been applied: correlation-based feature selection, Wrapper method and LASSO regression. In this perception, seven classifiers algorithm were applied viz. artificial neural network, C5.0, logistic regression, CHAID, linear support vector machine (LSVM), K-Nearest neighbors and random tree. For each classifier, the results were computed based on full features, selected features by CFS, selected features by Wrapper, selected features by LASSO regression, SMOTE with selected features by LASSO, SMOTE with full features. It was observed that LSVM achieved the highest accuracy of 98.86% in SMOTE with full features. All classifiers algorithms performed well on features selected by LASSO regression with SMOTE and without SMOTE. SMOTE with full features

gave the best result for all 5 classifiers. In this research, a total of 7 classifiers were used. However, Logistic and KNN did not give suitable results and it was why they were not used in SMOTE. As per the result, it is concluded that SMOTE is a best technique for balancing a dataset. It is noted that SMOTE gave better results with selected features by LASSO regression as compare to without SMOTE on LASSO regression model. LSVM achieved the highest accuracy in all experiments as compared to other classifiers algorithms.