LITERATURE SURVEY

Early Prediction for Chronic Kidney Disease Detection: A Progressive Approach to Health Management

LITERATURE STUDY :

1. Poonia et al says that employed Various machine learning algorithms, including k-nearest neighbours algorithm (KNN), artificial neural networks (ANN), support vector machines (SVM), naive bayes (NB), and Logistic Regression as well as Recursive Feature Elimination (RFE) and Chi-Square test feature-selection techniques. Publicly available dataset of healthy and kidney disease patients were used to build and analyze prediction models. The study found that a logistic regression-based prediction model with optimal features chosen using the Chi-Square technique had the highest accuracy of 98.75%.

2. Vinod et al says that carried out the assessment of seven supervised machine learning algorithms namely K-Nearest Neighbour, Decision Tree, Support vector Machine, Random Forest, Neural Network, Naïve Bayes and Logistic Regression to find the most suitable model for BCD prediction based on different performance evaluation. Finally, the result showed that k-NN is the best performer on the BCD dataset with 97% accuracy

3. Almasoud et al says that aimed in their work to test the ability of machine learning algorithms for the prediction of chronic kidney disease using subset of features. They used Pearson correlation, ANOVA, and Cramer's V test to select predictive features. They have done modeling using LR, SVM, RF, and GB machine learning algorithms. Finally, they concluded that Gradient Boosting has the highest accuracy with an F-measure of 99.1.

4. Tekale et al says that worked on "Prediction of Chronic Kidney Disease Using Machine Learning Algorithm" with a dataset consists of 400 instances and 14

features. They have used decision tree and support vector machine. The dataset has been preprocessed and the number of features has been reduced from 25 to 14. SVM is stated as a better model with an accuracy of 96.75%.

5. Charleonnan et al says that did comparison of the predictive models such as K-nearest neighbors (KNN), support vector machine (SVM), logistic regression (LR), and decision tree (DT) on Indians Chronic Kidney Disease (CKD) dataset in order to select best classifier for predicting chronic kidney disease. They have identified that SVM has the highest classification accuracy of 98.3% and highest sensitivity of 0.99.

6. Alsuhibany et al says that presented ensemble of deep learning based clinical decision support systems (EDL-CDSS) for CKD diagnosis in the IoT environment. The presented technique involves Adaptive Synthetic (ADASYN) technique for outlier detection process and employed ensemble of three models, namely, deep belief network (DBN), kernel extreme learning machine (KELM), and convolutional neural network with gated recurrent unit (CNN-GRU).

7. Rady et al says that carried out the comparison of Probabilistic Neural Networks (PNN), Multilayer Perceptron (MLP), Support Vector Machine (SVM), and Radial Basis Function (RBF) algorithms to predict kidney disease stages. The researchers conducted their research on a small size dataset and few numbers of features. The result of this paper shows that the Probabilistic Neural Networks algorithm gives the highest overall classification accuracy percentage of 96.7%.

8. Yashfi et al says that proposed to predict the risk of CKD using machine learning algorithms by analyzing the data of CKD patients. Random Forest and Artificial Neural Network have been used. They have extracted 20 out of 25 features and applied RF and ANN. RF has been identified with the highest accuracy of 97.12%

9. Priyanka et al says that carried out chronic kidney disease prediction through naive bayes. They have tested using other algorithms such as KNN (K-Nearest Neighbor Algorithm), SVM (Support Vector Machines), Decision tree, and ANN (Artificial Neural Network) and they have got Naïve Bayes with better accuracy of 94.6% when compared to other algorithms.

10. Xiao et al says that proposed prediction of chronic kidney disease progression using logistic regression, Elastic Net, lasso regression, ridge regression, support vector machine, random forest, XGBoost, neural network and k-nearest neighbor and compared the models based on their performance. They have used 551 patients' history data with proteinuria with 18 features and classified the outcome as mild, moderate, severe. They have concluded that Logistic regression performed better with AUC of 0.873, sensitivity and specificity of 0.83 and 0.82, respectively.

11. Salekin et al says that did evaluation of classifiers such as K-NN, RF and ANN on a dataset of 400. In this study, Random Forest (RF), Support Vector Machine (SVM) and Decision Tree (DT) have been used to detect CKD. Most of previous researches focused on two classes, which make treatment recommendations difficult because the type of treatment to be given is based on the severity of CKD.Wrapper feature selection were implemented and five features were selected for model construction in the study. The highest classification accuracy is 98% by RF and a RMSE

12. Agrawal et al says that in this study, Random Forest (RF), Support Vector Machine (SVM) and Decision Tree (DT) have been used to detect CKD. Most of previous researches focused on two classes, which make treatment recommendations difficult because the type of treatment to be given is based on the severity of CKD.

13. Molla MD et al says that predictive analysis using machine learning techniques can be helpful through an early detection of CKD for efficient and timely interventions

14. Ethiopia et al says that national kidney foundation classifies stages of CKD into five based on the abnormal kidney function and reduced Glomerular Filtration Rate (GFR), which measures a level of kidney function. The mildest stage (stage 1 and stage 2) is known with only a few symptoms and stage 5 is considered as end-stage or kidney failure. The Renal Replacement Therapy (RRT) cost for total kidney failure is very expensive. The treatment is not also available in most developing countries like Ethiopia. As a result, the management of kidney failure and its complications is very difficult in developing countries due to shortage of facilities, physicians, and the high cost to get the treatment

15. George et al says that kidney disease is serious public health problem in Ethiopia affecting hundreds of thousands of people irrespective of age, sex [4]. The lack of safe water, appropriate diet, and physical activities is believed have contributed. Additionally, communities living in rural area have limited knowledge about the CKD. According to WHO report of 2017, the number of deaths in Ethiopia due to kidney disease was 4,875. It is 0.77% of total deaths that has ranked the country 138th in the world. The age-adjusted death rate is 8.46 per 100,000 of the population and the death rate increased to 12.70 per 100,000 that has ranked the country 109 in 2018

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