LITERATURE SURVEY

Topic: Early Detection of Chronic Kidney Disease

ABSTRACT:

The purpose of this survey is to determine various machine learning algorithms used for early detection of Chronic Kidney Disease(CKD). There are many people who are suffering from chronic kidney diseases worldwide. Diagnosing of chronic kidney diseases is generally invasive, costly, time-consuming and often risky. That is why many patients reach late stages of it without treatment, especially in those countries where the resources are limited. Therefore, the early detection strategy of the disease remains important. Finding a solution for the above-mentioned problems and riding out from disadvantages became a strong motive to conduct this study. Chronic Kidney Disease is one of the types of kidney disease, which results in a gradual loss of kidney function. This phenomenon can be observed over a period of months or years due to several living conditions of patients.

INTRODUCTION:

Diagnosing of chronic kidney diseases is generally invasive, costly, time consuming and often risky. That is why many patients reach latest age so fit without treatment, especially in those countries where their sources are limited. Therefore, the early detection strategy of the disease remains important, particularly in developing countries like India, where the diseases are generally diagnosed in later stages. Finding a solution for the above-mentioned problems and riding out from disadvantages became a strong motive to conduct this study. Chronic Kidney Disease (CKD) is one of the types of kidney disease, which results in a gradual loss of kidney function. This phenomenon can be observed over a period of months or years due to several living conditions of patients. Kidney disease is broadly classified into acute kidney injury and chronic kidney disease. Acute kidney injury is sudden damage to the kidneys. In many cases it will be short term but, in some people, it may lead to long-term chronic kidney disease. Chronic kidney disease means the kidneys are damaged and can't filter blood the way they should. The disease is called "chronic" because the damage to your kidneys happens slowly over a long period of time. The main causes are damaged blood vessels of the kidneys due to High Blood Pressure and Diabetes. Machine learning is a growing technology which enables computers to learn automatically from past data. Machine learning enables a machine to automatically learn from data, improve performance from experiences, and predict things without being explicitly programmed. At a broad level, machine learning can be classified into three types: Supervised learning, Unsupervised learning and Reinforcement learning.

LITERATURE SURVEY:

Kunwar, et al. entitled "Chronic Kidney Disease Analysis is Using Data Mining Classification Techniques" published in 2016. The objective of the paper is to predict Chronic Kidney Disease (CKD) using classification techniques like Naive Bayes and Artificial Neural Network (ANN). The experimental results implemented in Rapid Miner tool show that Naive Bayes produce more accurate results than Artificial Neural Network [1]. Amirgaliyev, et al. entitled "Analysis of Chronic Kidney Disease Dataset by Applying Machine Learning Methods" published in 2015. In this research study, the effects of using clinical features to classify patients with chronic kidney disease by using support vector machines algorithm is investigated. The chronic kidney disease data set is based on clinical history, physical examinations, and laboratory tests [2]. Devika, et al. entitled "Comparative Study of Classifier for Chronic Kidney Disease Prediction Using Naive Bayes, KNN and Random Forest" published in 2019. This paper examines the performance of Naive Bayes, K-Nearest Neighbor (KNN) and Random Forest classifier on the basis of its accuracy, preciseness and execution time for CKD prediction. Finally, the outcome after conducted research is that the performance of Random Forest classifier is finest than Naive Bayes and KN [3]. Avci E et al. entitled "Performance Comparison of Some Classifiers on Chronic Kidney Disease Data" published in 2018. In this study, dataset named "chronic kidney disease" obtained from UCI database is used. The dataset consists of 400 individual's information and contains 25 features dataset was classified according to whether it is chronic kidney disease using Naive Bayes (NB), K-Star, Support Vector Machines (SVM) and J48 classifiers used in data mining [4].

CONCLUSION:

This survey delivers the concept of various techniques that has been used for detecting the early symptoms of chronic kidney disease (CKD). The use of machine learning algorithms can provide promising results to bring the most effective accuracy in analysing the prediction model.

REFERENCES:

1. **Kunwar V, Chandel K, Sai Sabitha A, Bansal A** (2016) Chronic Kidney Disease Analysis Using Data Mining Classification Techniques. 2016 6th International Conference-Cloud System and Big Data Engineering.

   Review:

   Data mining has been a current trend for attaining diagnostic results. Huge amount of unmined data is collected by the healthcare industry in order to discover hidden information for effective diagnosis and decision making. Data mining is the process of extracting hidden information from massive dataset, categorizing valid and unique patterns in data. There are many data mining techniques like clustering, classification, association analysis, regression etc. The objective of our paper is to predict Chronic Kidney Disease (CKD) using classification techniques like Naive Bayes and Artificial Neural Network (ANN). The experimental results

implemented in RapidMiner tool show that Naive Bayes produce more accurate results than Artificial Neural Network.

2. **Amirgaliyev Y, Shamiluulu S, Serek A** (2018) Analysis of Chronic Kidney Disease Dataset by Applying Machine Learning Methods. 2018 IEEE 12th International Conference on Application of Information and Communication Technologies (AICT).

   Review:

   ML techniques for the prediction and diagnosis of chronic kidney disease. The findings obtained from our predictive analysis combined with the expertise of healthcare professionals can help in making an accurate prognosis. Various feature selection techniques have been used to optimize the number of features affecting chronic kidney disease. accuracy, sensitivity is compared. Multiple Machine learning algorithms have been explored such as Logistic Regression, Naïve Bayes, KNN, SVM, Decision Trees, Random Forest Classifier, and Extra Trees Classifier. It was concluded that Decision Trees using information gain gave six optimal features and the Extra Trees Classifier model gives the best accuracy of 99.36 % with Extra Trees Classifier having one of the least execution times.

3. **Devika R, Sai Vaishnavi A, Subramaniyaswamy V** (2019) Comparative Study of Classifier for Chronic Kidney Disease Prediction Using Naive Bayes, KNN and Random Forest. 2019 3rd International Conference on Computing Methodologies and Communication (ICCMC).

   Review:

   The task of knowledge mining is to generate regular patterns from historical data and emphasize future conclusions, follows from the convergence of many recent trends: the decreased value of huge knowledge storage devices and therefore the tremendous ease of aggregation knowledge over networks; the development of robust and economical machine learning algorithms to method this data; and therefore the decrease value of machine power, enabling use of computationally intensive strategies for knowledge analysis. varied knowledge mining classification approaches and machine learning algorithms are applied for prediction of chronic diseases. Therefore, this paper examines the performance of Naive Bayes, K-Nearest Neighbour (KNN) and Random Forest classifier on the basis of its accuracy, preciseness and execution time for CKD prediction. Finally, the outcome after conducted research is that the performance of Random Forest classifier is finest than Naive Bayes and KNN.

4. **Avci E, Karakus S, Ozmen O, Avci D** (2018) Performance Comparison of Some Classifiers on Chronic Kidney Disease Data. 2018 6th International Symposium on Digital Forensic and Security (ISDFS)