IBM LITERATURE SURVEY

EARLY DETECTION OF CHRONIC KIDNEY DISEASE USING MACHINE LEARNING

1. **Paper Name:** Prediction of Kidney Disease – A Machine Learning Perspective
   Author: Pankaj Chittora, Sandeep Chaurasia, Prasun Chakrabarti
   Year of Publication: 2021
   Journal/Conference: IEEE Access
   Description: The paper explains the use of Machine Learning to act as a tool to detect diseases on time.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 dataset used here consists of 400 instances and 24 attributes. The attributes are labelled in two classes as CKD (Chronic Kidney Disease) and non-CKD. Out of all classifiers used, SVM was found to generate consistent results with higher accuracy.

2. **Paper Name:** XGBoost Model for Chronic Kidney Disease Detection
   Author: Adeola Ogunleye, Qing-Guo Wang
   Year of Publication: 2019
   Journal/Conference: IEEE/ACM Transactions on Computational Biology and Bioinformatics
   Description: The paper explains the use of XGBoost Algorithm for detecting Chronic Kidney Disease. XGBoost is an extendible and cutting-edge application of gradient boosting machines and it has proven to push the limits of computing power for boosted trees algorithms. In this algorithm, decision trees are created in sequential form. It was developed for the sole purpose of model performance and computational speed. The model was found to starkly identify CKD apart from other disease with the attributes in the data set. The proposed model was applied and found to have achieved an accuracy, sensitivity and specificity of 1.000, 1.000 and 1.000, respectively.

3. **Paper Name:** Early Detection of Kidney Disease Using Advanced Machine Learning Models

   Author: A.Vaishnovi Anuhya, Ayyala Ganesh, Nallabathini Poojitha, Amandeep Singh , Amitha S K, Dr. Dhananjaya. V

   Year of Publication: 2022

   Journal/Conference: International Research Journal of Engineering and Technology (IRJET) 2022

   Description: Every year, an increasing number of patients are diagnosed with late stages of renal disease. Chronic Kidney Disease, also known as Chronic Renal Disease, is characterized by abnormal kidney function or a breakdown of renal function that progresses over months or years. Chronic kidney disease is often found during screening of persons who are known to be at risk for kidney issues, such as those with high blood pressure or diabetes, and those with a blood family who has chronic kidney disease (CKD). As a result, early prognosis is critical in battling the disease and providing effective therapy. Only early identification and continuous monitoring can avoid serious kidney damage or renal failure. Machine Learning (ML) plays a significant part in the healthcare system, and it may efficiently aid and help with decision support in medical institutions. The primary goals of this research are to design and suggest a machine learning method for predicting CKD. Support Vector Machine (SVR), Random Forest (LR), Artificial Neural Network (ANN), and Decision Tree are four master teaching methodologies investigated (DT). The components are built using chronic kidney disease datasets, and the outcomes of these models are compared to select the optimal model for prediction.

4. **Paper Name:** Machine learning algorithm for early detection of end-stage renal disease

   Author: Zvi Segal, Dan Kalifa, Kira Radinsky, Bar Ehrenberg, Guy Elad, Gal Maor, Maor Lewis, Muhammad Tibi, Liat Korn & Gideon Koren

   Year of Publication: 2017

   Journal/Conference: BMC

   Description: End stage renal disease (ESRD) describes the most severe stage of chronic kidney disease (CKD), when patients need dialysis or renal transplant. There is often a delay in recognizing, diagnosing, and treating the various etiologies of CKD. The objective of the present study was to employ machine learning algorithms to develop a prediction model for progression to ESRD based on a large-scale multidimensional database.

5. **Paper Name:** Chronic kidney disease prediction using machine learning techniques
   Author: G. Nandhini, J Aravinth
   Year of Publication: 2021
   Journal/Conference: International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT)
   Description: Early diagnosis and characterization are the important components in determining the treatment of chronic kidney disease (CKD). CKD is an ailment which tends to damage the kidney and affect their effective functioning of excreting waste and balancing body fluids. Some of the complications included are hypertension, anemia (low blood count), mineral bone disorder, poor nutritional health, acid base abnormalities, and neurological complications. Early and error-free detection of CKD can be helpful in averting further deterioration of patient's health. These chronic diseases are prognosticated using various types of data mining classification approaches and machine learning (ML) algorithms. This Prediction is performed using Random Forest (RF) Classifier, Logistic Regression (LR) and K-Nearest Neighbor (K-NN) algorithm and Support Vector Machine (SVM). The data used is collected from the UCI Repository with 400 data sets with 25 attributes. This data has been fed into Classification algorithms. The experimental results show that K-NN, LR, SVM hands out an accuracy of 94%, 98% and 93.75% respectively. The RF classifier gives out a maximum accuracy of 100%

6. **Paper Name**: Detection of Chronic Kidney Disease using Machine Learning Algorithms with Least Number of Predictors
   Author: Marwa Almasoud, Tomas E Ward
   Year of Publication: 2018
   Journal/Conference: International Journal of Advanced Computer Science and Applications

   Description: Chronic kidney disease (CKD) is one of the most critical health problems due to its increasing prevalence. In this paper, we aim to test the ability of machine learning algorithms for the prediction of chronic kidney disease using the smallest subset of features. Several statistical tests have been done to remove redundant features such as the ANOVA test, the Pearson's correlation, and the Cramer's V test. Logistic regression, support vector machines, random forest, and gradient boosting algorithms have been trained and tested using 10-fold cross-validation. We achieve an accuracy of 99.1 according to F1- measure from Gradient Boosting classifier. Also, we found that hemoglobin has higher importance for both random forest and Gradient boosting in detecting CKD. Finally, our results are among the highest compared to previous studies but with a smaller number of features reached so far.

7. **Paper Name:** Early Prediction of Chronic Kidney Disease by using Machine Learning Techniques

   Author: Bidri Deepika*, Vasudeva Rao KR, Dharmaj N Rampure, Prajwal P and Devanand Gowda G

   Year of Publication: 2020

   Journal/Conference: American Journal of Computer Science and Engineering Survey.

   Description: There are many people who are suffering from chronic kidney diseases worldwide. Due to the several risk factors like food, environment and living standards many people get diseases suddenly. 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, particularly in developing countries, 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. The goal is to build a real time application by using the machine learning techniques (Naive Bayes and KNN algorithms), to detect the CKD at an early stage.