**IBM-EPBL/IBM-Project-54113-1661597336**

# LITERATURE REVIEW: Early Detection of Chronic Kidney Disease Using Machine Learning

**TEAM MEMBERS :**

**510819104004 - DHANA LAKSHMI.R**

**510819104003 - ARTHI.S**

**510819104005 - DILIP.G**

**510819104301 - SIVA SURIYAN.M.S**

## ABSTRACT

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. The components are built using chronic kidney disease datasets, and the outcomes of these models are compared to select the optimal model for prediction.

## LITERATURE SURVEY

**Survey 1 :**

**AUTHORS: Himanshu Kriplani, Bhumi Patel and Sudipta Roy**

**TITLE : Prediction of Chronic Kidney Diseases Using Deep Artificial Neural Network Technique**

**METHODS :** This project presents a method to detect the chronic kidney disease and methodologies to diagnose chronic kidney disease is a challenging problem which can reduce the cost of treatment. We studied 224 records of chronic kidney disease available on the UCI machine learning repository named chronic kidney diseases dating back to 2015. Our proposed method is based on deep neural network which predicts the presence or absence of chronic kidney disease with an accuracy of 97%. Compared to other available algorithms, the model we built shows better results which is implemented using the cross-validation technique to keep the model safe from overfitting. This automatic chronic kidney disease treatment helps reduce the kidney damage progression, but for this chronic kidney disease detection at initial stage is necessary.

**Survey 2 :**

**AUTHORS : Hongquan Peng , Haibin Zhu , Chi Wa Ao Ieong , Tao Tao , Tsung Yang Tsai , Zhi Liu**

**TITLE : A two-stage neural network prediction of chronic kidney disease**

**METHODS :** This paper presents a method to detect chronic kidney disease (CKD) plays a pivotal role in early diagnosis and treatment. Measured glomerular filtration rate (mGFR) is considered the benchmark indicator in measuring the kidney function. However, due to the high resource cost of measuring mGFR, it is usually approximated by the estimated glomerular filtration rate, underscoring an urgent need for more precise and stable approaches. With the introduction of novel machine learning methodologies, prediction performance is shown to be significantly improved across all available data, but the performance is still limited because of the lack of models in dealing with ultra-high dimensional datasets. This study aims to provide a two-stage neural network approach for prediction of GFR and to suggest some other useful biomarkers obtained from the blood metabolites in measuring GFR. It is a composite of feature shrinkage and neural network when the number of features is much larger than the number of training samples. The results show that the proposed method outperforms the existing ones, such as convolution neural network and direct deep neural network.

**Survey 3 :**

**AUTHORS : Deepak K N , Adhwaidh P S , Akshay P D , Athira K S , Jisna Jayan**

**TITLE : CHRONIC KIDNEY DISEASE PREDICTION SYSTEM USING MACHINE LEARNING**

**METHODS :** This paper reviews and analyzes the Chronic kidney disease (CKD) is a global health issue that causes a high rate of morbidity and mortality, as well as the onset of additional diseases. Because there are no clear symptoms in the early stages of CKD, people frequently miss it. Early identification of CKD allows patients to obtain timely treatment to slow the disease's progression. Due to their rapid and precise recognition capabilities, machine learning models can successfully assist doctors in achieving this goal. We propose a machine learning framework for diagnosing CKD in this paper. The CKD data set was taken from kaggle, which has a substantial number of missing values. We employ multiple machine learning methods such as DT, SVM, and DNN to analyze data from CKD patients with 21 characteristics and 400 records. The dataset is preprocessed by filling in missing data and normalizing it. To increase accuracy and save training time, the most relevant features from the dataset are chosen. Image processing and letter recognition are used to automatically input the attributes.