

LITERATURE SURVEY

Date	15 October 2022
Team Id	PNT2022TMID50020
Project Name	Early Detection Of Chronic Kidney disease Using Machine Learning
Maximum Marks	2 Marks

Introduction:

Chronic Kidney Disease refers to the kidneys inability to fulfill their normal blood filtration role and other functions (CKD). The term "chronic" refers to the progressive deterioration of kidney cells over time. This is a severe renal failure in which the kidney no longer filters blood and there is a significant fluid accumulation in the body. This causes an abnormally high level of potassium and calcium salts in the body. High quantities of these salts in the body cause a variety of additional problems. The primary function of the kidneys is to filter excess water and wastes from the blood. This mechanism must work properly to balance the salts and minerals in our bodies. The proper salt balance is required to manage blood pressure, activate hormones, and create red blood cells, among other things. A high calcium concentration causes bone problems and cystic ovaries in women. CKD can also cause a sudden sickness or an allergy to specific medications. Acute is the medical term for this condition.

Literature Review:

Title 1: Early Detection of Chronic Kidney Disease Using Advanced Machine Learning Models

Author: A.Vaishnovi Anushya, Ayyala Ganesh, Amitha, Dr.Dhanajaya.

Description: The kidneys are positioned in the abdominal cavity, on each side of the spine. They generally weigh around 5 times their body weight yet receives only 20% of the blood flow from the heart. The urine generated by each kidney drains into the urinary bladder, which is positioned in the pelvic area, via a distinct urethra. The kidney is the most essential organ in the human body because it manages fluid levels, electrolyte balance, and other elements that maintain the body's internal environment stable and comfortable. Kidney diseases are conditions that impact the kidney's functioning. Renal disorders can lead to kidney failure in its advanced stages. Kidney diseases are conditions that impact the kidney's functioning. Kidneys can be injured, which means they can't accomplish what they should. This is known as chronic kidney disease (CKD). Anyone can get chronic kidney disease. In medical research, nephrologists primarily employ two primary tests to identify CKD. A blood test to determine glomerular filtration rate (GFR) and a urine test to determine albumin. Genetics, hypertension, diabetes, obesity, age, and other factors can all have an impact on CKD.

Title 2: Chronic Kidney Disease Prediction using Machine Learning

Author: Reshma , Salma Shaji, S R Ajina, Vishnu Priya , Janisha

Description: proposed a system that uses various data mining techniques like Random Forest algorithm and Back propagation neural Network. Here they compare both of the proposed a system that uses various data mining techniques like Random Forest algorithm and Back propagation neural Network. Here they compare both of

the CKD prediction system using machine learning techniques such as K-Nearest Neighbor, Logistic Regression, Decision Tree, Random Forest, Naïve Bayes, Support Vector Machine and Multi-Layer Perceptron Algorithm. These are applied and their performance are compared to the accuracy, precision, and recall results. Finally, Random forest is chosen to implement this system.

Title 3: Detection of Chronic Kidney Disease Using Machine Learning Algorithms with Least Number of Predictors

Author: Marwa Almasoud, Tomas E Ward

Description: classification or diagnosis of chronic kidney disease. In 2013, T. Di Noia et al, presented a software tool that used the artificial neural network ANN to classify patient status, which is likely to lead to end-stage renal disease (ESRD). The classifiers were trained using the data collected at the University of Bari over a 38-year period, and the evaluation was done based on precision, recall, and F-measure. The presented software tool has been made available as both an Android mobile application and online web application. Using data from Electronic Health Records (EHR) in 2014, H. S. Chase et al. [6] identified two groups of patients in stage progressor patients (eGFR declined $>3 \text{ ml/min/1.73m}^2 \text{ /year}$) and 364 non-progressor patients (eGFR declined $<1 \text{ ml/min/1.73m}^2$). Where GFR is a glomerular filtration rate that commonly used to detect CKD. Based on initial lab data recorded, the authors used Naïve Bayes and Logistic Regression classifiers to develop a predictive model for progression from stage 3 to stage 4. They compared the metabolic complications between the two groups and found that phosphate values were significantly higher, but bicarbonate, hemoglobin, calcium, and albumin values were significantly lower in progressors compared to non-progressors, even if initial eGFR values were similar. Finally, they found that the

probability of progression in patients classified as progressors was 81% (73% – 86%) and non-progressors was 17% (13% – 23%).

Existing Solution:

Non communicable illnesses are the leading cause of early death, and CKD is the leading non communicable disease. Chronic Kidney Disease is a major concern for the global health care system. People with CKD must focus on implementing proven, cost-effective therapies to as many people as possible while taking into consideration restricted needs, human and financial resources. Chronic kidney disease (CKD) is now wreaking havoc on society and is spreading at an alarming rate. Various efforts have been undertaken to advance early therapy to prevent the condition from progressing to chronic disease. Recent research suggests that some of the negative outcomes can be avoided with early identification and treatment.

<https://www.kidney.org/phi/form?version=health>

The Approach to the Project:

Every year, an increasing number of patients are diagnosed with late stages of renal disease. Chronic Kidney Disease, also known as Chronic Kidney 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 kidney failure. Machine Learning 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 machine learning methodologies investigated (DT). The components are built using chronic kidney disease datasets.

Conclusion:

This study developed an algorithm for predicting CKD at an early stage. The dataset contains input parameters obtained from CKD patients, and the models are trained and validated using the valid parameters. To diagnose CKD, decision tree, random forest, and support vector machine learning models are built. As an extension of this research, the comparison may also be done depending on the duration of execution and feature set selection.

Reference:

- 1. Title:** Prediction of Chronic Kidney disease using adaptive hybridized deep convolutional neural network on the internet of medical things platform

Source: IEEE access

Author: G. chenetal

Date: October 2020

- 2. Title:** Clinical practice guideline for diabetes management in chronic kidney disease

Source: Kidney Int

Author: P.T. Coatesetal

Date: October 2020

3. Title: Overview of clinical prediction models

Source: Ann Transt.Med

Author: L.Chen

Date: November 2019

4. Title: Prediction of chronic kidney diseases using deep artificial neural network technique

Source: Springer International Publishing

Author: H. kriplani

Date: June 2019

5. Title: Three types of Machine Learning Algorithms List of Common Machine Learning Algorithms

Source: IEEE Access

Author: Abdi

Date: November 2016

6. Title: Risk Prediction of Chronic Kidney Disease Using Machine Learning Algorithms

Source: ICCCNT

Author: N. A. Almansourteal

Date: October 2018

7. Title: Computer-Aided Diagnosis of Chronic Kidney Disease in Developing Countries

Source: IEEE Access

Author: M. Eliete Pinheiro

Date: October 2020

8. Title: Neural network and support vector machine for the prediction of chronic kidney disease

Source: Computer Bio Medical

Author: N. A. Almansouretal

Date: October 2018

9. Title: Prediction of chronic kidney disease (CKD) using Data Science

Source: Conf. Intelligent Computer Control System

Author: N. V. Ganapathi Raju **Date:**

November 2019

10. Title: Prediction of chronic kidney disease using machine learning

Source: Advanced Science Technology

Author: M. V. Maheshwar reddy

Date: December 2019