

PREDICTION OF CHRONIC KIDNEY DISEASE STAGES AND CHRONIC KIDNEY STONES USING THE SML TECHNIQUE

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ABSTRACT

The phrase chronic kidney disease refers to kidney damage which is continuous for long time and may get worse over time. The kidney does not function properly if the harm is severe. This is mentioned as End-Stage Renal disease or Kidney failure. Patients with kidney disease may enter the chronic phase which is characterized by a gradual decline in kidney function. For determining whether kidney disease is severe or not, a variety of algorithm is used. For predicting the disease's stages, it is further taken into consideration if it is severe. Additionally, kidney stones are also diagnosed for its presence in the human body. In this project the modules are deployed to find the appropriate accuracy of the disease. Here, Supervised Machine Learning Techniques are used to predict the accuracies of the disease stages and the presence of stones.

1.INTRODUCTION

Using SML techniques, we choose the subject of knowledge set to improve detection of chronic kidney disease and kidney stone. People are all aware about CKD which is one of the most common disease among individuals nowadays. By gathering a large amount of CKD and kidney stone data, we are working hard to improve the spotting of disease in people. It usually affects the adults above the age of 30 and continues indefinitely. Males between age of thirty to thirty five have stage five CKD without a transplant, one could expect to live for fourteen years. Women of the same age affected with this disease are expected to live for thirteen years. Everybody has a four year life expectancy between the age of seventy to seventy five regardless of the gender. GFR rate is popular tool in identifying the majority of renal disorders.

2.LITERATURE SURVEY

When aberrant albumin excretion or impaired kidney function last for longer than three months, as determined by a measured or estimated glomerular filtration rate (GFR), CKD is present. According to the stage of the disease, treatments are suggested for CKD and dialysis patients. These treatments could lower these patients' morbidity and fatality rates. Although it has not been determined for sure, it is prudent to abide by FDA instructions.[1]

The originality in this study is in creating a system for diagnosing chronic renal illnesses. This study helps specialists about studying preventive methods for CKD through early diagnosis utilizing ML approaches. This paper's main ideology was to assess a dataset

made up of 400 patients and 24 attributes. The missing nominal and numerical data were replaced using the mean and mode statistical analysis methods. sRFE helps to select the most crucial characteristics. Our systems' accuracy ranged from 100% with random forest to 97.3% with SVM. These papers don't accurately depict chronic renal disease.[2]

This article inspect CKD prediction in a different manner. In this paper, seven classifier methods were used. The results have been calculated for each classifier based on the particular criterion features. The linear support vector machine provided the maximum accuracy of 98.46%. Logistic and KNN were not employed in SMOTE since they did not produce the desired results.[3]

In this article they predict the Chronic kidney disease stages and kidney stone using glomerular filtration rate. They have combined deep neural network and shallow neural network for determining the chronic kidney disease stages and kidney stone. They just capture the filtering rate to predict the output. The deep learning approach provides the maximum accuracy of 88.3% it focuses on GFR for predicting the output. In this they just capture the Filtering Rate and they don't use any machine learning algorithms. Another big drawback is they don't compare different algorithms and accuracy is reduced.[4]

In this paper they have predicted the chronic kidney disease by concentrating on several machine learning methods. Mainly they considered artificial neural network and support vector machines as classification methods for prediction. Both these model helped to produce accurate result of prediction. But artificial neural network produced better and accurate result when compared to SVM. In this paper they have used 10 fold cross validation algorithm. ANN produced for accurate result when compared to SVM. Result is not accurately predicted.[5]

In this paper, they have used heterogeneous modified artificial neural network for predicting CKD. They used digital images for prediction. First the MR and CT scan images of abdominal are segmented into left and right portion to validate and train dataset. In the images which are used for prediction there are lot of noisy and missing values to reduce that HMANN method is proposed and segmentation is helped for better identification of kidney stone produces precise prediction of kidney stone. Time taken for prediction is more.[6]

3.EXISTING SYSTEM

For the clinical diagnosis of kidney disease stages and stone formation, an accurate testing of Glomerular filtration rate (GFR) is essential. Computer learning methodologies such as deep neural networks offer a viable way for improving GFR estimation accuracy. In order to find GFR, they created a unique architecture called a deep and shallow neural network (dlGFR). We then compared its working to that of estimated GFR derived from the MDRD and CKD-EPI equations for stages and kidney stone epidemiology.

4.PROPOSED SYSTEM

The proposed ideology is to create a ML model for categorizing renal disorder stages and

kidney stones. The procedure begins with data collection, in which past information about kidney disease stages and stones is collected. With the help of attributes, we implement different algorithms and try to find the best accuracy between them. The one that produces the best accuracy is promoted to provide the output to the user.

4.1 .Scope of The Project

The goal of the research is to use ML methods for studying a dataset collected from a hospital website for determining whether a patient has CKD or not and has any kidney stones as soon as feasible.

4.2. List of Modules

1. Data pre-processing
2. Data visualization
3. Implementing Algorithms
 - a. Logistic Regression
 - b. KNN
 - c. Decision Tree Classifier
 - d. Naïve Bayes
4. Deployment

4.3.Flow Diagram

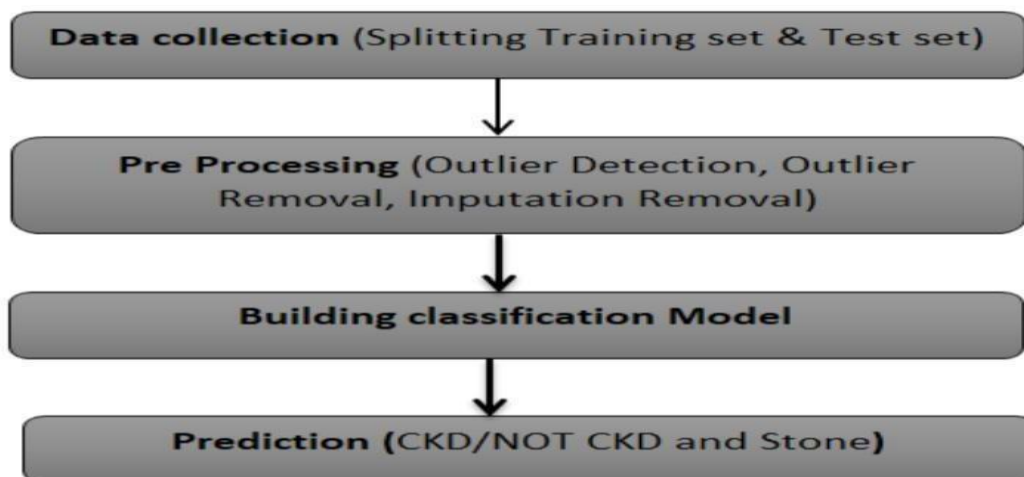


Fig 1:Flow Diagram of Proposed System

4.4 Working Model

According to the blood test report, the values for each attributes will be entered in the website which we have given. Then the User will click the "PREDICT" button. After then the process will be carried out in the backend to produce the results according to the data which the user entered. In that the first process will be "DATA PREPROCESSING". After Data Preprocessing, Data visualization will be performed for better understanding of the data. After Data visualization, We are separating the dataset into training dataset and testing dataset. The output of the training dataset will be classification of ML algorithms. So with ML algorithms, we would test the dataset for the accuracies of different algorithms. After the accuracy report of each algorithms, we consider the best accuracy algorithm to

find the stages and kidney stone according to the values entered by the user. For finding the stages and kidney stones, the average of attributes values are considered to predict the result as such like Class 0 ,Class 1, Class 2.

4.5 System Architecture

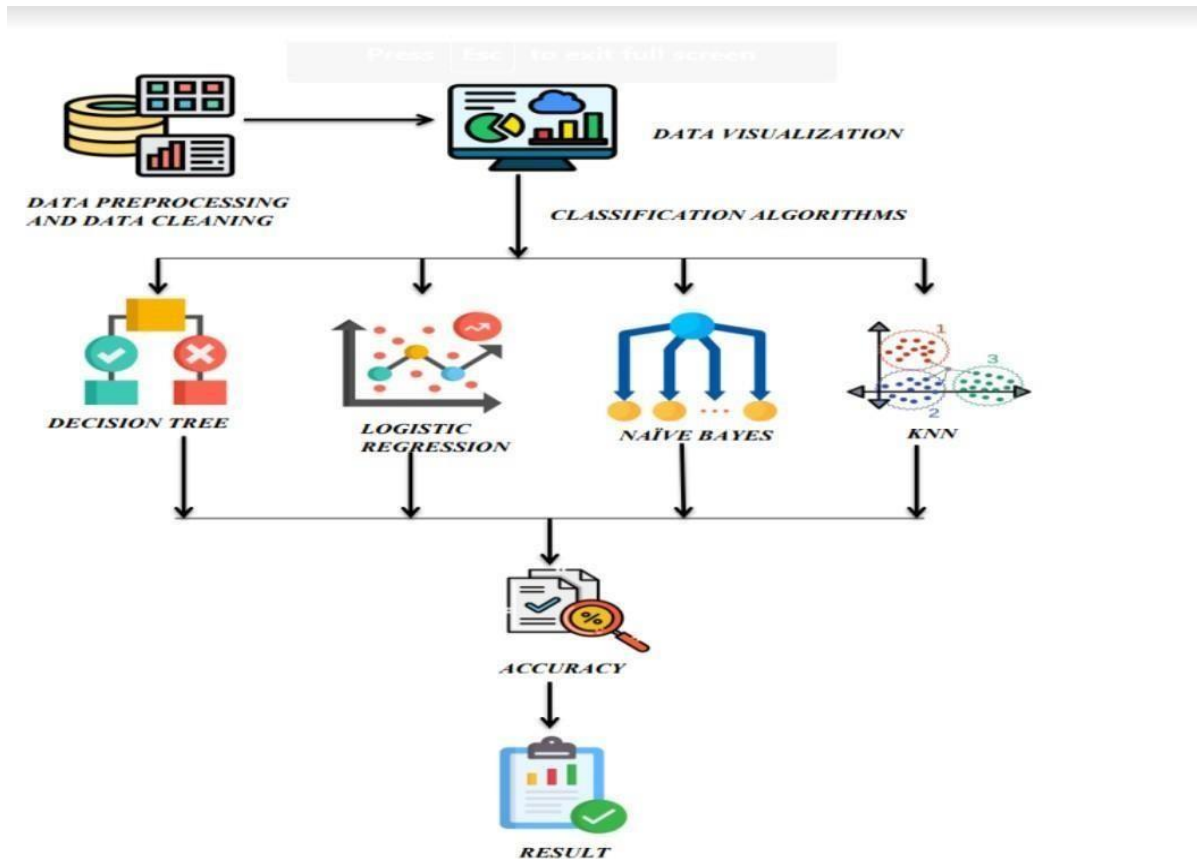


Fig 2: System Architecture

5.RESULT AND DISCUSSION

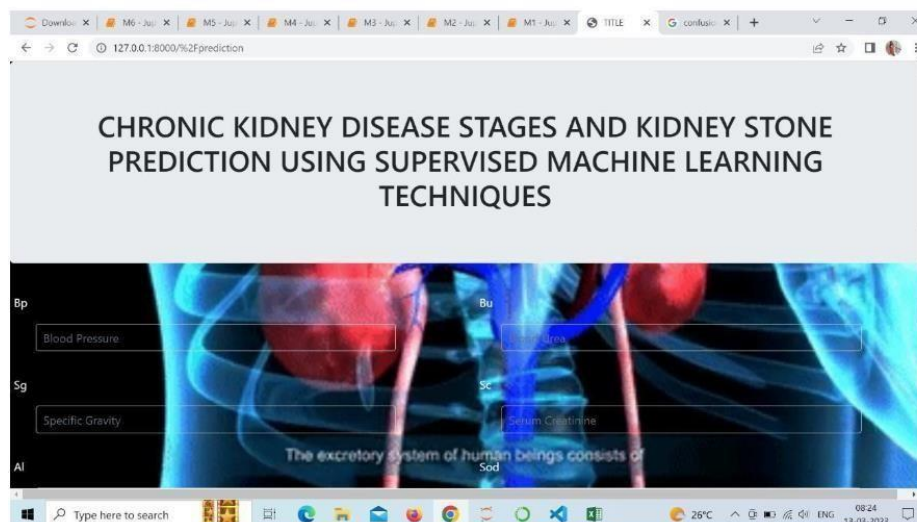


Fig 3: Prediction Page

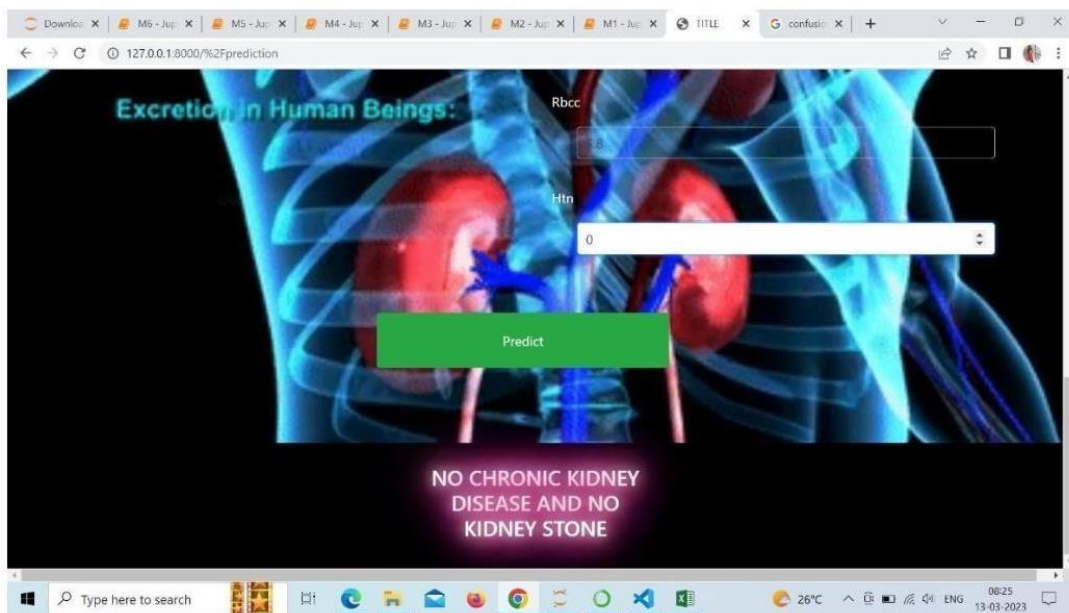


Fig 4: Stage 0

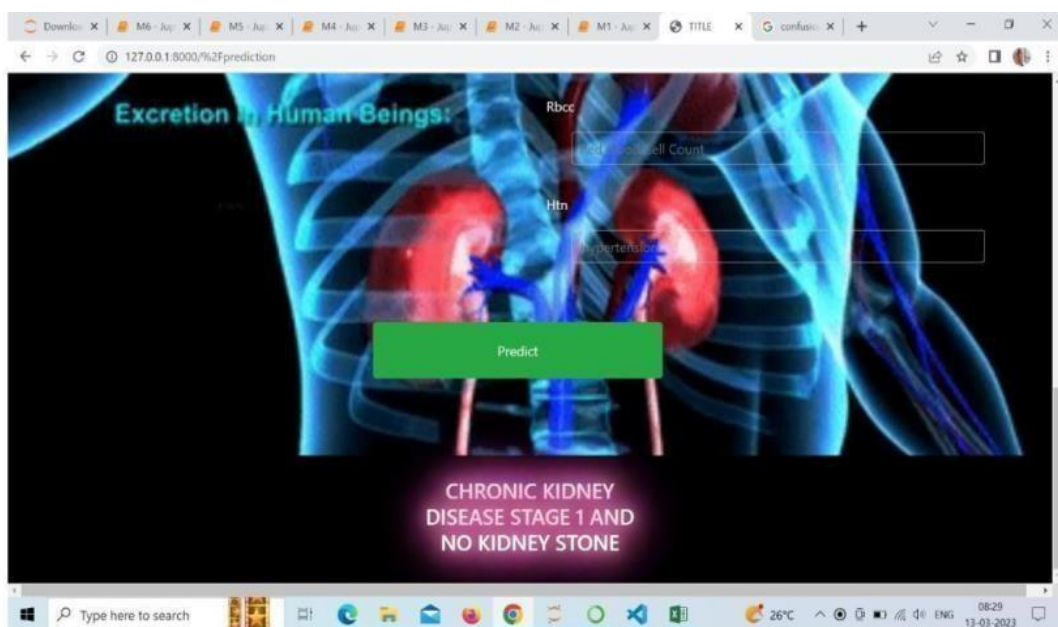


Fig 5: Stage 1

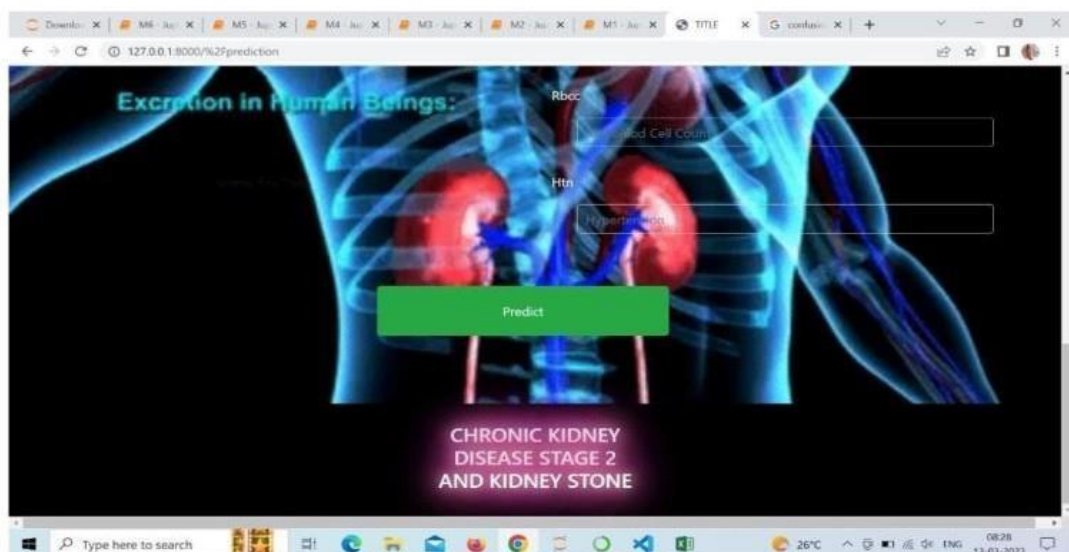


Fig 6: Stage 2

Figure 3 is the sample output for the webpage we have designed. Users will be able to interact and get their result using this webpage. Users will give their input values that is attributes like BP, Serum creatinine, potassium etc.. values according to their test results. Then after entering the attributes values the user will click the predict button which is shown in figure 4. Afterwards in the backend the code will be processed and show the result whether stage 0,1 or 2 which is shown in figure 8,9 or 10 according to the attributes values mentioned by the user.

6.CONCLUSION

In this project we tried to find the CKD disease's presence and the kidney stone presence. In this project we achieved accuracy of 97.9%.

7.FUTURE ENHANCEMENT

1. Hospitals aspire to automate (in real time) the process of excluding diseased people from eligibility.
2. To automate this process by displaying the results in websites
3. To simplify the tasks that must be completed in an AI environment.

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