Prediction of protein interaction in Chronic Kidney Disease.

1. Dibaba Adeba Debal et,al., Prosposed "Chronic kidney disease prediction using machine learning techniques" .The data source is taken from St.Paulo's Hospital. It is the second largest public hospital in Ethiopia which treats the large number of patients with CKD .The dataset contains 1718 instances and 19 features where 7 features are nominal and 12 are numeric. The prediction model is using the machine learning algorithms such as random forest, support vector machine, decision tree. Analysis of variance and recursive feature elimination using cross validation have been applied for feature selection. Applying the predicted models on the original dataset, we have got the highest accuracy with RF, SVM, and The accuracy was 99.8% for the binary class and 82.56% for fve-class.

2. Lee et.al., Proposed "Clustering-based spatial analysis (CluSA) framework through graph neural network for chronic kidney disease prediction using histopathology images". The dataset is collected from George O'Brien Kidney Center at the University of Michigan. K-Means Clustering is used to classification the dataset, then they constructed histogram based on the nearest-centroid group labels, and these clustering are done based on the spatial analysis through neural network model called the DGCNN model, which reads the graph, Random forest method is used to combine the multiple result to delivers a more accurate result. In this study, they found the relationship between clustering and the spatial analysis. Objective computational CluSA framework will be helpful for discriminating levels of kidney function and other disease in digital histopathology image analysis.

3. Iliyas et.al., Discussed "Prediction of Chronic Kidney Disease Using Deep Neural Network". The dataset is taken from General Hospital in Gashua Local Government Area of Yobe state. It contains only 400 samples and 11 attributes or features. In this methodology used are Data Pre-processing to clean the raw data, Target variable method to select the key and necessary variables

for identification of the disease, DNN machine learning model and it is a subset of ANN, which is used for predicting the disease based on the input and weight, Evaluation of the model uses the confusion matrix.In this research use the DNN model for prediction of CKD to high degree of accuracy. Drawback is less number of samples and it needs other models to compare the techniques which may provide a better performance.

4. Antony et.al., proposed "A Comprehensive Unsupervised Framework for Chronic Kidney Disease Prediction". The dataset is taken from University of California Irvin(UCI) and it contains 400 samples and 24 features or attributes. To train the model they used Unsupervised Machine Learning Algorithms. K-Means Clustering is used to classification the dataset, DB-Scan is density based clustering algorithm, it separates the samples dense regions from low density, Autoencoder is a deep learning technique that consist the two components

encoder and decoder and these are used to discrepancy between the original data and its reconstruction and can be used for classify the CKD and Non-CKD, Isolation Forest is used to identifying the anomaly by isolating the outliers, Cluster validation method to evaluate the cluster generated by each algorithm.This model is helps to prediction and detection of CKD using K-means, DB-scan, Autoencoder and Isolation forest. Considering the all the 24 features resulted 99.3% accuracy is K-means, 94% for DB-Scan, 97.5% for Autoencoder and 91% for Isolation Forest.

5. Chittora & Chaurasia et.al., Proposed "Prediction of Chronic Kidney Disease – A Machine Learning Perspective" .The dataset is taken from UC Irvine Machine Learning Repository and dataset consist of 400 instances and 25 attributes or features. Artificial Neural Network, C5.0 it creates the decision tree from input, Logistic Regression is used to predict the outcome based on the binary values, CHAID(Chi-square automatic interaction detection) is a decision tree, and it helps to predict relationship between

variables, Linear Support Vector Machine(LSVM) is classifier helps to solve the all linear problems, K-Nearest Neighors(KNN) is a supervised machine learning algorithm, used for both classification and regression problems, Random Tree, Validation Method of Classifiers is uses training dataset for checking build model is working good or not.

6. Dritsas and Trigka et.al., proposed "Machine Learning Techniques for Chronic Kidney Disease Risk Prediction".The dataset consist of 400 samples and 14 attributes or features. Methodology involved are Naïve Bayes classifier, Bayesian network is probabilistic graph model, which follows structure of DAG, Support Vector Machine, Logistic Regression it predicts a binary outcome or dependent data, based on the one or more independent variables, Artificial Neural Network, K-Nearest Neighbors classfier it helps to measure the distance between an unlabeled instance and training instance, J48 is called as divide-and-conquer, and helps to choose the feature at each stage, Logistic Model tree, Random Forest, Random tree, Reduced Error Pruning Tree, Rotation Forest, AdaBoostM1, Stochastic Gradient Descent, Ensemble Learning.In this work, based on the supervised machine learning methodology, which helps to create a model for predicting the risk of CKD occurrence. Drawback is less number of samples.

7. Halle Marie Patrice et.al., proposed "Markers and risk factors for chronic kidney disease in sub-Saharan Africans: baseline levels and 12-month trajectories in newly referred patients in Cameroon" .the 420 patients were refered to chronic kidney disorder in general hospitals of the cameroon the patients were estimated the GFR by modification of diet in renal disease.schwart formula used the linear regressions for analyzing the data.The study found that there are 37% of the patients are at 3rd stage and 30% are of 4th stage and are of 5th stage and

8. Pronab Ghosh et.al., proposed "Optimization of Prediction Method of Chronic Kidney Disease Using Machine

Learning Algorithm" .The dataset is taken from the UCI ML repository and to predict this chronic kidney disease four methods of machine learning are used such as SVM(super vector machine) ,AB(AdaBoost),GB(Gradient Boosting) ,LDA(Linear Discriminant Analysis) In all the approaches they have done the most accurate mas Gradient Boosting which is accurate of 99% and then comes Linear Discriminant Analysis which is accurate of 97%

9. Bilal Khan et.al., proposed "An Empirical Evaluation of Machine Learning Techniques for chronic kidney disease prophecy" .the author used several approaches of the machine learning algorithms such as Naïve bayes,Logistic regeression(LR), support vector machine(SVM),Nbtree,J48,composite hypercube on iterated random projection(CHIRP) among all of these the distinct approach was accurate that is CHIRP the accuracy was of 99% the accuracy for the SVM was for 98.25% and for Nbtree it is 98.75%

10.Alvaro Sobrinho et.al., proposed Computer-Aided Diagnosis of chronic kidney disease in developing countries: A comparative analysis of Machine Learning Techniques.The various machine learnig algorithm is used to predict the used to predict the disease in the patient J48 decision tree,k-nearest neighbour ,support vector machine, Multilayer perception, naïve bayes,random forest among all these the accuracy rate of J48 decision tree was more which is of 95% and SVM(76.6%),KNN(71.67%),MP(75%),randomforest(93.3%),naïve bayes(88.33%)

11.Shawn Pei Feng Tan et.al., proposed "In Development of 4-Pyridoxic Acid PBPK Model to Support Biomarker-Informed Evaluation of OAT1/3 Inhibition and Effect of Chronic Kidney Disease" .The used methods are PDA DDI clinical data in this Data from four clinical studies were gathered which were used for model verification in healthy populations. Next they did PBPK

model development and verification and probenecid were developed using the Simcyp Simulator and The distribution of PDA was predicted using the full PBPK distribution model and coupled with the Rodgers and Rowland method and then they created Chronic kidney disease model application To predict the changes in PDA pharmacokinetics in mild, moderate, and severe CKD. The fourth method was Prediction of probenecid-PDA OAT1/3 interaction. after verification of both PDA and probenecid PBPK model individually, the DDI between PDA and probenecid was replicated and PopPK modeling of PDA data22 was used in the probenecid model.

12.Zbigniew Leonowicz et.al., from Poland with other authors proposed "Prediction of Chronic Kidney Disease - A Machine Learning Perspective". In this Seven classifier algorithms are used like 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 was found in UC Irvine Machine Learning Repository. The dataset consist of 400 instances and 24 attributes with 1 target attribute. Wrapper, Filter and Embedded were the feature selecting algorithms. The highest accuracy was achieved by linear support vector machine i.e 98.86.All classifications performed well on features selected by Least Absolute Shrinkage and Selection Operator and Synthetic Minority Oversampling Technique. But Logistic and KNN did not give suitable results.

13.Gouzhen chen et.al.,proposed "Prediction of chronic kidney disease using adaptive hybridized deep convolutional neural networks on the internet of medical things platform". The author used the AHDCNN (Adaptive hybridised deep convolutional neural networks) algorithm of the deep learning and two SVM classifiers are used one on binary patterns and other on raw medical images to build a model that should detect the kidney disease in the earlier stages.where they achieved true positive of 93% and false

positives 52% based on the simulated result.

14. Mousa Ghelichi-Ghojogh et.al., In "Chronic kidney disease and its health-related factors: a case-control study". The data was collected by interview questionnaire and the data size was n 700 participants (350 cases and 350 controls) the patient's age was above or equal to 20 and had a definitive diagnosis of CKD by nephrologists. Here Logistic regression was applied to measure the association between the selected factors and CKD and to measure the unadjusted associations between categorical variables they used Te Chi-square test. This research looked at many things that could either cause problems or help prevent them. The findings showed that it's really important for people with certain health issues to work together with their doctors to keep an eye on how well their kidneys are working.

15. Jing et.al., proposed "Detection and diagnosis of chronic kidney disease using deep learning-based heterogeneous modified artificial neural network" .In this paper they have used Artificial neural networks (ANN) method for classifying the images and they have used Heterogeneous Modified Artificial Neural Network(HMANN) method. Then HMANN method is divided into three architectures viz., SVM(Support Vector Machine), Multilayer Perception, Back Propagation algorithms. SVM helps to pattern detection and data analysis. MP is helps to blend the several perception on a single layer. This paper concludes that reduce excess fitness and to identifying the most significant predictive attributes for CKD.

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