Pre-Development Phase
Ideation Phase - Literature Survey

Date	30 October 2022
Team ID	PNT2022TMID49652
Project Name	Early Detection of Chronic Kidney Disease using Machine Learning
Maximum Marks	4 Marks

1. Early detection of Chronic Kidney Disease using Machine Learning

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Brac University, 2019

Chronic kidney disease (CKD) is a global prevalent ailment that causes lives in a predominant number. CKD is the 11th most deadly cause of global mortality with 1.2 million death each year and according to kidney Foundation of Bangladesh, around 40,000 CKD people experienced kidney failure annually as well as several thousand passed away in short stage of life because of CKD. Predictive analytics for healthcare using machine learning is a challenged task to help doctors decide the exact treatments for saving lives. Scientist researched collaboratively chronic kidney diseases, with the majority of their work on pure statistical models, generating numerous gaps in the development of machine-learning models. In this article we discussed the current methods and suggested improved technology based on the XGBoost (Extreme Gradient Boost), which combined significant characteristics of the F scores and evaluated four pre-processing scenarios. In addition, we provided machine training methods for anticipating chronic renal disease with clinical information. Four techniques of master teaching are explored including Support Vector Regression (SVR), logistic Regressor (LR), AdaBoost, Gradient Boosting Tree and Decision Tree Regressor. The components are made from UCI dataset of chronic kidney disease and the results of these models are compared to determine the best regression model for the prediction. From this four pre-processing cases, replacing missing values with mean values of each column and choosing important features was most logical as it allows to train with more data without dropping. However, XGBoost gave the best outcomes in all four cases where it obtained 98% accuracy in case one where null valued are dropped, 98.75% testing accuracy for both case two and three where null values were replaced with minimum and maximum values of each column and it scores 100% accuracy in case four where null values are replaced with mean values. Thus, the system can be implemented v for early stage CKD prediction in a cost efficient way which will be helpful for under developed and developing countries.

2. Identifying important attributes for early detection of chronic kidney disease

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Tharmarajah Thiruvaran

IEEE reviews in biomedical engineering 11, 208-216, 2017

Individuals with chronic kidney disease (CKD) are often not aware that the medical tests they take for other purposes may contain useful information about CKD, and that this information is sometimes not used effectively to tackle the identification of the disease. Therefore, attributes of different medical tests are investigated to identify which attributes may contain useful information about CKD. A database with several attributes of healthy subjects and subjects with CKD are analyzed using different techniques. Common spatial pattern (CSP) filters and linear discriminates analysis are first used to identify the dominant attributes that could contribute in detecting CKD. Here, the CSP filter is applied to optimize a separation between CKD and non CKD subjects. Then, classification methods are also used to identify the dominant attributes. These analyses suggest that hemoglobin, albumin, specific gravity, hypertension, and diabetes mellitus, together with serum creatinine, are the most important attributes in the early detection of CKD. Further, it suggests that in the absence of information on hypertension and diabetes mellitus, random blood glucose and blood pressure attributes may be used.

3. Intelligent systems on the cloud for the Early detection of Chronic Kidney Disease

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Renee Y Chen,

Shin-An Wang,

Sheng-Jen Jian

International Conference on Machine Learning and Cybernetics 5, 1737-1742, 2012

This paper aims to construct intelligence models by applying the technologies of artificial neural networks including back-propagation network (BPN), generalized feed forward neural networks (GRNN), and modular neural network (MNN) are developed respectively for the early detection of chronic kidney disease (CKD). The comparison of accuracy, sensitivity, and specificity among three models is subsequently performed. The model of best performance is chosen for system development. The system developed aligned with the best model is deployed to the Google cloud platform by leveraging Google Application Engine. By doing so, the result can more efficiently provide CKD physicians an alter native way to detect chronic kidney diseases in early stage of a patient. Meanwhile, it may also be used by publics for self-detecting the risk of contracting CKD