**Renal risk: Revolutionary Renal Health Risk Assessment Using Gradient Boosting Techniques**

**Abstract**

Chronic kidney disease (CKD) is a growing global health concern, which requires effective strategies for early detection and risk reduction. This project presents an advanced health risk assessment model utilizing Gradient Boosting techniques to predict CKD onset and progression. By utilizing a broad dataset encompassing demographic, clinical trials, laboratory variables and external factors such as blood glucose and blood pressure, we will develop a predictive model that significantly surpasses traditional methods such as Logistic Regression, K-Nearest Neighbour classifier in identifying CKD individuals. Gradient Boosting, a powerful machine learning algorithm, excels in capturing complex, non-linear interactions within the data, thereby increasing predictive accuracy. Our model will be trained and validated using a large, diverse parameters, ensuring robust performance across various population subgroups. Key performance metrics, including accuracy and precision indicate a significant improvements over regular CKD assessment tool. The Renal Risk model will try to capture each and every detail allowing healthcare providers to identify high-risk patients with greater confidence and initiate timely medical care. This approach can significantly slow down CKD progression, improve patient outcomes, and reduce the overall burden on healthcare systems. By utilizing advanced machine learning techniques, this project offers a transformative solution for CKD assessment, indicating a new era in predictive healthcare and personalized medicine. This project will highlight the potential of Gradient Boosting in revolutionizing clinical decision-making and underscores the need for identifying chronic kidney disease.

**Keywords**

Chronic kidney disease (CKD), Machine Learning, Logistic Regression, KNN classifier, Gradient Boasting Techniques.