

**Development and Validation of a Prognostic Model for the
Prediction of the Probability of Chronic Kidney Disease
using Machine Learning in Sri Lanka – DiagnoCare**

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A dissertation submitted in partial fulfilment of the requirement for
Bachelor of Science (Honours) degree in Business Information Systems

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Informatics Institute of Technology, Sri Lanka
in collaboration with
University of Westminster, UK**

2021

Abstract

Chronic Kidney Disease is a high mortality Non-communicable disease included in the Global Burden of Disease study conducted by WHO. GBD comprises a rigorous scientific study to quantify the immensity of health loss from all major diseases. The ranking of CKD in this GBD study is worryingly in the rise. Globally more than 700 million people have been diagnosed with CKD, which constitutes to approximately 10% of the total global population. The impact of CKD leads to kidney failure, inflicting insurmountable suffering for patients and their families. CKD has not spared Sri Lanka either. The leading causes of CKD are the type 02 diabetes, hypertension and chronic glomerulonephritis. Recently, a new form of CKD has arisen wherein the etiology is unknown. Sri Lanka being an agricultural oriented economy is severely affected by this disease as the farmers of the northern central province have become a major target. Kidney diseases are highly complexed in nature. Risk evaluation models are becoming increasingly important in clinical decision making. The selected novel Biomarkers KIM1 & NGAL along with the traditional Biomarkers such as Serum Creatinine and eGFR are increasingly gaining significance. Therefore, a technology that could utilize these two concepts towards prediction of CKDu will be invaluable. Use of artificial intelligence could bridge the gap. The research centered in analyzing and utilizing the validated prediction factors for prevalence of CKD/CKDu among the Sri Lankan community by designing a customizable mobile application based on a validated machine learning model. This was successfully achieved by designing a mobile based solution called DiagnoCare with the help of Machine Learning, utilizing novel Biomarkers towards the affective prediction of CKD. The mobile application is expected to be a boon to the Sri Lankan community, especially the farmers who are in the rural region with restricted access to modern healthcare facilities. The customizable application is designed, such that it will be able to accommodate the regional as well as global needs in the future.

Keywords: Chronic Kidney Disease, Chronic Kidney Disease of Unknow etiology, Biomarkers, Disease prediction, Machine Learning, Mobile application, Healthcare, Predictive analytics.