1. INTRODUCTION

Chronic Kidney Disease (CKD) being one of the deadliest and a prolonging painful disease has affected 10% of our current population. It marks not only the start of kidney malfunction but also triggers other diseases in the course of the patient’s lifetime if treatment is not given or taken at the right time and rose to the 18th deadliest disease in 2010 [1]. This disease proves to be more fatal due to the fact that it cannot be detected at an early curable stage and shows its symptoms or effects only when an irreversible damage has been done to the kidney. By the time a patient discovers the disease, it becomes a tedious and long procedure to get him checked, diagnose the result which may be inaccurate, deliver drugs as per the CKD stage the patient might be in and all care needs to be given to sustain their life. One of the problems of CKD comes in monitoring drug doses to the patients and in the paper proposed by S. R. Raghavan, V. Ladik and K. B. Meyer [2], they developed DARWIN, an intelligent software decision support system that helped look after the amount of erythropoietin doses to be given to the CKD patients which eases the task of doctors in determining the same for thousands of patients within a month.

The factor that causes chronic kidney disease to become one of the deadliest diseases is that there is no common, powerful and individual factor that can be used as a decisive factor to distinguish between diseased individuals and healthy individuals. This further hinders the rapid and accurate diagnosis of this disease by medical researchers and doctors resulting in incorrect prediction of the disease [3]. Using the concept of supervised machine learning, the model can learn various data patterns and perform classification, as shown in [4]. However, in order to improve test accuracy, a robust classification model that is not affected by fluctuating environments is required. This can be achieved by building a deep neural network that can surpass traditional machine learning classifiers such as SVM, KNN, and Naïve Bayes Etc., as described in [5], by adjusting hyperparameters and sufficient input data, the trained artificial neural network can achieve significant test accuracy in distinguishing CKD patients from other the rest. Even in the study proposed by A. E. Gaweda et al. [6], we can see that ANN has been proposed as one of the approaches for drug dosing in patients with chronic renal failure which suggested that neural networks can definitely be used to deliver drug doses to patients intelligently. The advancement of Neural Network architecture over the years and their capability for classification, prediction, associating (remembering patterns), etc. makes it a plausible choice for the task of diagnosing CKD.

The main contribution of this research is the proposed Deep Neural Network model for diagnosing chronic kidney disease with an accuracy of 98.87% outclassing the conventional Machine Learning models like SVM and Naïve Bayes Classifier. This paper provides readers with in-depth knowledge of the multi-layer perceptron classifier, which uses the deep neural network provided by the PyTorch library as its core. Another argument that this paper states is that Neural Models can be a better choice of adaption technique for classifying chronic kidney disorder due to the fact that can handle non-linearity in the data, can compute on complex heaps of data fetched from the datasets and adapts and learns by itself on the essential information using its layers of neurons present within the structure.