Code Methodology

1. The model is trained using the principles of Supervised Machine Learning where for given value of X i.e., input values (x1, x2, x3, …, xn) there is a corresponding Y value i.e., target or output value.

Diagram

Description automatically generated

1. As shown in figure, the data is fed into the model where X comprises various features such as blood features such as blood pressure, age, sugar, etc. and Y is the target class that consists of binaries values i.e., affected by CKD or not.
2. The model uses batch learning or offline learning mechanism [10] for training, in which the training data is provided to the ANN model in batches, and then validated and tested.
3. The dataset used in the proposed model is collected from Apollo Hospitals in Managiri and Karaikudi, Tamil Nadu, India. It contains some 25 attributes and a site, which is a branch of Google LLC, and this site is an Online machine learning community experts and data scientists, allowing users to publish and find data sets of various problems called Kaggle. Below describes the broad phases that were followed during the construction of the ANN model for CKD diagnosis.

Diagram

Description automatically generated

1. The character and binary values were mapped to numeric values for example, last attribute 'Class' was mapped as 0 for not having chronic kidney disease and I for having the same.
2. The model itself is a fully connected Deep Neural Network. It is constructed using the ANN provided by PyTorch library supported by Python programming language. After constructing the model, the pre-processed data was divided into two parts randomly where 75% of the data was used for training and the other 25% was consumed in testing the model. The training data was then fed to the model using the batch learning approach or offline learning mechanism. The model was trained for 250 epochs and then tested on unseen data.
3. The trained model was then tested on 25% of the unseen data to analyze its performance. Based on the testing results, the model’s hyperparameters are tuned to achieve maximum testing accuracy.

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| **Hyperparameters** | **Configuration** |
| Number of Hidden Layers | 4 |
| Number of Nodes per Layers | {64, 64, 64, 64} |
| Activation Function | Rectified Linear Unit (ReLU) |
| Learning Rate | 0.001 |
| Optimizer | Adam |
| Criterion | Categorical Cross-Entropy |
| Batch Size | 16 |
| Number of Training Epochs | 250 |

Model Hyper-parameters table