**4.1 Neural Network**

**4.1.1 Model Building**

Implemented feed forward neural network using keras library with input layer, output layer and one intermediate layer.  The parameters like activation function, loss function, epochs, optimiser were tuned to get the best training model with maximised accuracy and precision.

Used only one hidden layer with 19 neurons, input layer with 38 neuron and output layer with 1 neuron.

Used sigmoid activation function for the hidden layer and output layers.

Applied ‘binary cross entropy’ as loss function and adadelta as optimiser.

Kept epochs as low as 160 with a batch size of five per iteration.

**4.1.2 Model Evaluation**

Parameters: model = Sequential()

model.add(Dense(19,input\_shape=(38,),kernel\_initializer='uniform', bias\_initializer='zeros',activation='sigmoid'))

model.add(Dense(1, kernel\_initializer='uniform',activation='sigmoid'))

model.compile(loss='binary\_crossentropy', optimizer='adadelta', metrics=['accuracy'])

model.fit(x\_train\_numpy, y\_train\_numpy, batch\_size=5, nb\_epoch=160)

Confusion matrix

array([[ 101, 126],

[ 55, 661]], dtype=int64)

Accuracy

0.8080

Sensitivity/Specificity:

0.923/0.4449

