**Prediction of diabetes based on diagnostic measurements**

**Objective**

The objective of the dataset is to predict whether or not a patient has diabetes, based on certain diagnostic measurements. The dataset is taken from Kaggle.com.

**Dataset**

The dataset has total 768 observations and 8 predictors. We have one target variable (binary variable) which tells us if the patient has diabetes or not.

**Procedure**

I have designed a fully connected neural network. Input layer has 8 neurons as there are 8 inputs. The first layer has 8 neurons and third layer which is a output layer has 1 neuron. We have used ‘Relu’ as an activation function for the first layer and ‘sigmoid’ as an activation function for the output layer as we have to classify data into 2 classes.

**PARAMETERS CALCULATION:**  
**number of input \* no. of neurons + biases (1 per each neuron)**  
For the 1st layer: 8\*8+8=72  
For 2nd layer 8\*8+8=72

For 3nd layer 8\*1+1=9  
Total =153

I tried designing a neural network with 2 layers and it is not giving good results, I have added 3 layers to improve the accuracy. Epoch is set to 150. Optimizer is adam. Also, I have standardized the data before feeding it to neural network.

**Conclusion**

Following are the results after building 2 layer neural network

The training accuracy is 75%

And evaluation accuracy is 62%

Which shows us that there is a overfitting.

Following are the results after building 3 layer neural network

The training accuracy is 81%

And evaluation accuracy is 76%

Which shows us that the accuracy is close to each other and no need to further redesign the neural network.