

1. At first I have divided the initial dataset into two parts as Target variable and Predictor variables after calling the pre-processed dataset.
2. Applied scaling method for both target and predictor variables using StandardScaler function. (**Z-score method**)

Subtract the mean of each feature from each data point and divided by the standard deviation.

$$z = (\text{value} - \text{mean}) / \text{standard deviation}$$

- - z is the normalized value
 - x is the original value
 - μ is the mean of the feature
 - σ is the standard deviation of the feature

3. split the dataset as training and test

training (4019, 17)

testing(1723, 17)

4. model building

Defined a sequential model with 3 hidden layers of 5 neurons each, activated by Relu and Tanh

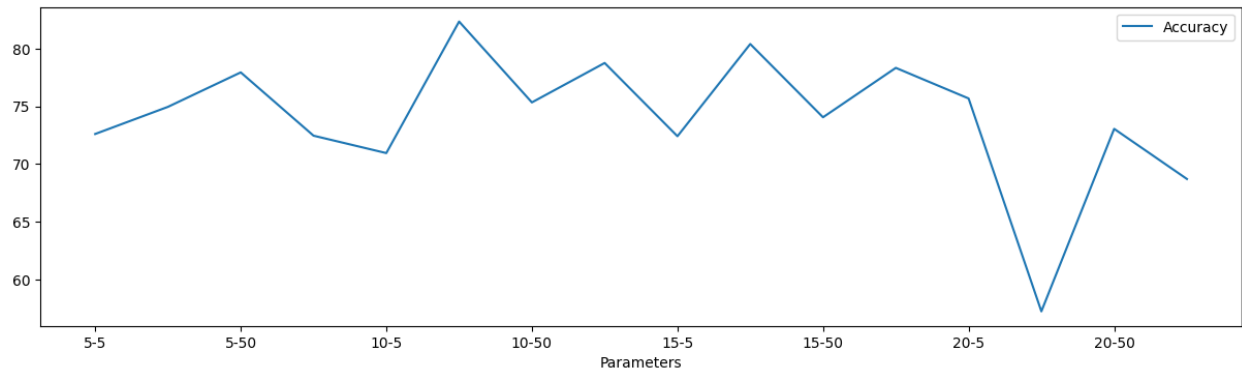
Defined output layer with single neuron for the regression output

Compile the model with mean squared error, loss.

Used **Adam** optimizer to improve the performance.

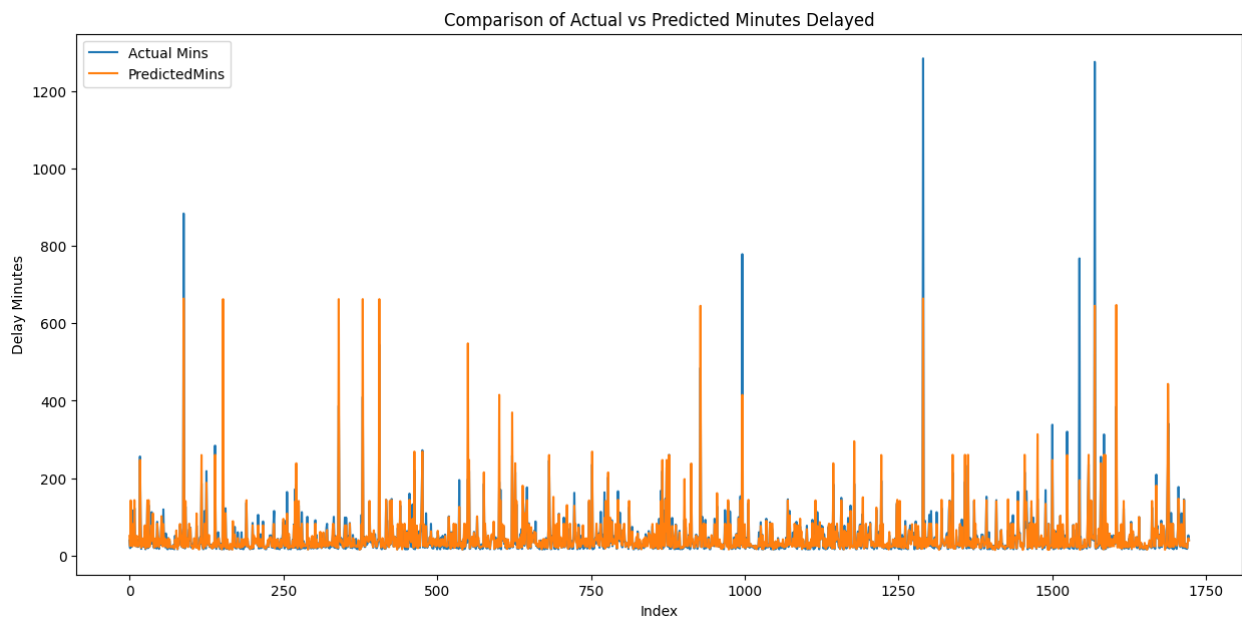
5. Train the model with specified batch sizes and epochs

Defined a function to perform manual grid search to find best hyperparameters based on Mean Absolute Percentage Error (MAPE) on the testset.



Trained the model with tuned parameters.

Generate predictions on testset and evaluate the results with the trainset.



6. Predict unseen(new) data

Defined a function to predict unseen data. The function has the ability to pre-process data and scale new data insert from the user's end.

We'll provide a user friendly interface for the users to insert new data and get the predictions in a smooth way as a future improvement of our research project.