

## DS Lab Session 7: Assignment

<https://www.kaggle.com/datasets/mukeshmanral/graduates-admission-prediction?resource=download>

### 1. (Admission predict Dataset)

Using the supplied predictive variables (GRE score, TOEFL score, University Rating, etc.) in the given dataset and predict the admission chance of a new candidate using Linear Regression.

1. Divide the data into the train-test split of 80:20.
2. Implement the Linear Regression Model to Predict the chances of admission.
3. Implement the Gradient Descent with SSE to Optimize the model for up to 100 iterations and predict the test set.
4. Print the Coefficients of the Optimized model.
5. Print the SSE, MSE, and R2 scores for the Train and Test Sets.

2.

Step-1:

Define input array X with angles from 60 deg to 360 deg converted in radians.

Step-2: Compute Y as  $Y = [\sin(X) + \cos(X)] + K^2$

where K is a random number generated from normal distribution with 0.5 mean and 0.15 std dev.

Step-3: Create Linear Regression model with SSE as error, and different Non-Linear Regression models of 3, 13th and 15th degree polynomials on data created in step-1 and step-2. (You may optimize the model for max. of 100 iterations using Gradient Descent or you may change max. iterations as needed to get better result).

Step-4: Plot the created models for the power of 1, 3, 13, 15, and print the SSE, Coefficients for the plotted models, and print the prediction of test set on 15th Deg. Polynomial model.

Step-5: Add the L2 regularization to the nonlinear regression model with 15th degree polynomial created in Step 3. (Optimize for Max. of 50 Iterations and lambda values [1e-10 and 1e-5])

Step-6: Plot the Ridge (L2) regression models for lambda values [1e-10 and 1e-5] and print the SSE, Coefficients for the plotted models, and print the prediction of test set on 15th Deg. Polynomial model.

Note: Use use Sckit\_learn Library