**Linear Regression**

Step 1 Visualization of the data

Generate the data set using the function below.



Step 2 Split the data

Training Data (70%)

Validation (15%)

Test (15%)

Step 3

Fit a linear model

We fit the line that minimizes the squared error on the training set.

Step 4

Evaluation of your model by mean square error.

**Logistic Regression**

Classification by a linear decision boundary

Step -1 Visualization of the data set

We will use a truncated version of the Iris dataset in this example

We will consider two input features

Sepal length in cms

Sepal width in cms

Two class outputs

Iris Setosa

Iris Versicolor

Step -2 Make training , validation and test splits

Training – 70%, Validation -15%, Test -15%

Step -3 Fit the logistic regression model - We fit a linear decision boundary that minimizes the classification error.

Step -4 Visualize the decision boundary

We color the areas of feature space assigned to the two different classes. Blue belongs to Class 0, and orange to class 1

Step -5 Evaluate the model

Validation and test error?

**DECISION TREE CLASSIFICATION**

Step -1

Prepare the dataset – Use the whole Iris data set

Step -2

We grow the tree until all leaves contain data of the same class

Step -3

Visualize the model

Step -4

Evaluate the model

Misclassification error in the validation set :

Misclassification error in test set :

**KNN Classifier Model**

Data set ; Iris

Three Classes – Class 1 is linearly separable from 2 and 3.

Class 2 and 3 not linearly separable.

Work with the first two features

1. Make the training and test data set

Training -75%

Test -25%

1. Make a KNN Classifier Model
2. Visualize the model

**Kmeans Clustering**

1. Load Dataset - Iris data set
2. Define and train model

Define clusters as 3 and fit the model

Max no of iterations =300

N =10, ( do the test 10 times)

1. Extract the labels and cluster centers
2. Plot the clusters - Visualize the cluster Use Guassian mixture model as visualization model
3. Vary parameters and see how the clusters are changing