```
# Aditya Desai
# Roll no : A-16
# BE-A
import numpy as np
import pandas as pd
data = pd.read_csv("/home/kj-comp/ML/Email dataset/emails.csv")
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[5172 rows x 3002 columns]
data.columns
Index(['Email No.', 'the', 'to', 'ect', 'and', 'for', 'of', 'a',
'you', 'hou',
      'connevey', 'jay', 'valued', 'lay', 'infrastructure',
'military',
      'allowing', 'ff', 'dry', 'Prediction'],
     dtype='object', length=3002)
data.info()
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5172 entries, 0 to 5171
Columns: 3002 entries, Email No. to Prediction
dtypes: int64(3001), object(1)
memory usage: 118.5+ MB
data.isnull()
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[5 rows x 3001 columns]
data.isnull().any().value counts()
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dtype: int64
#Separating Features & Labels
x = data.iloc[:, :data.shape[1] -1]
y = data.iloc[:, -1]
x.shape, y.shape
((5172, 3000), (5172,))
# Splitting into Train and Test Dataset
from sklearn.model selection import train test split
x train, x test, y train, y test = train test split(x, y,
test size=0.15)
# Machine Learning Models
from sklearn.linear model import LogisticRegression
from sklearn.svm import SVC, LinearSVC
from sklearn.neural network import MLPClassifier
from sklearn.neighbors import KNeighborsClassifier #KNN
models = {"Logistic Regression": LogisticRegression(solver='lbfgs',
\max iter = 2000),
          "Linear SVM": LinearSVC(max iter = 3000),
          "Polynomial SVM": SVC(kernel = "poly", degree = 2),
          "RBF SVM": SVC(kernel = "rbf"),
          "Sigmoid SVM": SVC(kernel = "sigmoid"),
          "Multi-layer Perception Classification":
MLPClassifier(hidden layer sizes = [20,20]),
          "K-Nearest Neighbors": KNeighborsClassifier(n_neighbors =
20)
         }
# Predict Accuracy Score for Each Model
from sklearn.metrics import accuracy score
for model name, model in models.items():
    y pred = model.fit(x train, y train).predict(x test)
    print(f"Accuracy for {model_name} model is :
{accuracy score(y test, y pred)}")
Accuracy for Logistic Regression model is: 0.9716494845360825
```

```
/home/kj-comp/anaconda3/lib/python3.7/site-packages/sklearn/svm/
base.py:947: ConvergenceWarning: Liblinear failed to converge,
increase the number of iterations.
  "the number of iterations.", ConvergenceWarning)
Accuracy for Linear SVM model is: 0.9536082474226805
Accuracy for Polynomial SVM model is: 0.7525773195876289
Accuracy for RBF SVM model is : 0.8054123711340206
Accuracy for Sigmoid SVM model is: 0.6082474226804123
Accuracy for Multi-layer Perception Classification model is :
0.9884020618556701
Accuracy for K-Nearest Neighbors model is: 0.8698453608247423
# Accuracy in percentage is:-
# Logistic Regression model: 97%
# Linear SVM model: 95%
# Polynomial SVM model: 75%
# RBF SVM model: 80%
# Sigmoid SVM model: 61%
# Multi-layer Perception Classification model: 98%
# K-Nearest Neighbors model: 86%
```