```
import numpy as np

import pandas as pd

import matplotlib.pyplot as plt

import seaborn as sns

from sklearn.model_selection import train_test_split

from  sklearn.ensemble import RandomForestClassifier, GradientBoostingClassifier

from sklearn.tree import DecisionTreeClassifier

from sklearn.neighbors import KNeighborsClassifier

from sklearn.metrics import f1_score

from sklearn.metrics import classification_report, confusion_matrix
```

```
import pickle

from scipy import stats

warnings.filterwarnings('ignore')

plt.style.use('fivethirtyeight')

df=pd.read_excel('/content/Data_Train.xlsx')



df.head()
```

	Airline	Date_of_Journey	Source	Destination	Route	Dep_Time	Arrival_Time	Du
0	IndiGo	24/03/2019	Banglore	New Delhi	BLR → DEL	22:20	01:10 22 Mar	
1	Air India	1/05/2019	Kolkata	Banglore	CCU → IXR → BBI → BLR	05:50	13:15	
2	Jet Airways	9/06/2019	Delhi	Cochin	DEL → LKO → BOM → COK	09:25	04:25 10 Jun	
3	IndiGo	12/05/2019	Kolkata	Banglore	CCU → NAG → BLR	18:05	23:30	
4	IndiGo	01/03/2019	Banglore	New Delhi	BLR → NAG	16:50	21:35	

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```
(10683, 11)
```

```
df.Date_of_Journey=df.Date_of_Journey.str.split('/')
```

```
df.Date_of_Journey
```

```
0        [24, 03, 2019]
1         [1, 05, 2019]
2         [9, 06, 2019]
3        [12, 05, 2019]
4        [01, 03, 2019]
              ...
10678     [9, 04, 2019]
10679    [27, 04, 2019]
10680    [27, 04, 2019]
10681    [01, 03, 2019]
10682     [9, 05, 2019]
Name: Date_of_Journey, Length: 10683, dtype: object
```

```
#Since the maximum number of stops is 4, there should be maxium 6 citles in any particular
df.Route=df.Route.str.split('->')
df.Route

    0                    [BLR → DEL]
    1        [CCU → IXR → BBI → BLR]
    2        [DEL → LKO → BOM → COK]
    3              [CCU → NAG → BLR]
    4              [BLR → NAG → DEL]
                        ...
    10678                [CCU → BLR]
    10679                [CCU → BLR]
    10680                [BLR → DEL]
    10681                [BLR → DEL]
    10682    [DEL → GOI → BOM → COK]
    Name: Route, Length: 10683, dtype: object


#In the similar manner, We split the Dep_time column, and create  separate columns for dep
df.Dep_Time.str.split(':')

    0        [22, 20]
    1        [05, 50]
    2        [09, 25]
    3        [18, 05]
    4        [16, 50]
               ...
    10678    [19, 55]
    10679    [20, 45]
    10680    [08, 20]
    10681    [11, 30]
    10682    [10, 55]
    Name: Dep_Time, Length: 10683, dtype: object
```

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```
df['Dep_Time_Hour']=df.Dep_Time.str[0]
df['Dep_Time_Hour']=df.Dep_Time.str[1]


df.Arrival_Time=df.Arrival_Time.str.split('')



df['Arrival_date'] = df.Arrival_Time.str[1]
df['Time_of_Arrival'] = df.Arrival_Time.str[0]


df['Time_of_Arrival']=df.Time_of_Arrival.str.split(':')


df['Arrival_Time_Hour']=df.Time_of_Arrival.str[0]
df['Arrival_Time_Mins']=df.Time_of_Arrival.str[1]


df.Duration=df.Duration.str.split('')


df['Travel_Hours']=df.Duration.str[0]
df['Travel_Hours']=df['Travel_Hours'].str.split('h')
df['Travel_Hours']=df['Travel_Hours'].str[0]
df.Travel_Hours=df.Travel_Hours
df['Travel_Mins']=df.Duration.str[1]
```

```
df.Travel_Mins=df.Travel_Mins.str.split('m')
df.Travel_Mins=df.Travel_Mins.str[0]
```

```
df.Total_Stops.replace('non_stop',0,inplace=True)
df.Total_Stops=df.Total_Stops.str.split('')
df.Total_Stops=df.Total_Stops.str[0]
```

```
df.Additional_Info.unique()
```

```
array(['No info', 'In-flight meal not included',
       'No check-in baggage included', '1 Short layover', 'No Info',
       '1 Long layover', 'Change airports', 'Business class',
       'Red-eye flight', '2 Long layover'], dtype=object)
```

```
df.Additional_Info.replace('NO Info','No info',inplace=True)
```

```
df.isnull().sum()
```

```
Airline                0
Date_of_Journey        0
Source                 0
Destination            0
Route                  1
Dep_Time               0
Arrival_Time           0
```

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```
Additional_Info        0
Price                  0
Dep_Time_Hour          0
Arrival_date           0
Time_of_Arrival        0
Arrival_Time_Hour      0
Arrival_Time_Mins  10683
Travel_Hours           0
Travel_Mins            0
dtype: int64
```

```
df.dropna(inplace=True)
```

```
df.isnull().sum()
```

```
Airline            0.0
Date_of_Journey    0.0
Source             0.0
Destination        0.0
Route              0.0
Dep_Time           0.0
Arrival_Time       0.0
Duration           0.0
Total_Stops        0.0
Additional_Info    0.0
```

```
Price                 0.0
Dep_Time_Hour         0.0
Arrival_date          0.0
Time_of_Arrival       0.0
Arrival_Time_Hour     0.0
Arrival_Time_Mins     0.0
Travel_Hours          0.0
Travel_Mins           0.0
dtype: float64
```

```
df.fillna('None',inplace=True)
```

```
df.fillna(df,inplace=True)
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 0 entries
Data columns (total 18 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   Airline            0 non-null      object
 1   Date_of_Journey    0 non-null      object
 2   Source             0 non-null      object
 3   Destination        0 non-null      object
 4   Route              0 non-null      object
 5   Dep_Time           0 non-null      object
 6   Arrival_Time       0 non-null      object
```

Automatic saving failed. This file was updated remotely or in another tab. Show diff

```
 10  Price              0 non-null      int64
 11  Dep_Time_Hour      0 non-null      object
 12  Arrival_date       0 non-null      object
 13  Time_of_Arrival    0 non-null      object
 14  Arrival_Time_Hour  0 non-null      object
 15  Arrival_Time_Mins  0 non-null      float64
 16  Travel_Hours       0 non-null      object
 17  Travel_Mins        0 non-null      object
dtypes: float64(1), int64(1), object(16)
memory usage: 0.0+ bytes
```

```
df.rename_axis
```

```
<bound method NDFrame.rename_axis of Empty DataFrame
Columns: [Airline, Date_of_Journey, Source, Destination, Route, Dep_Time,
Arrival_Time, Duration, Total_Stops, Additional_Info, Price, Dep_Time_Hour,
Arrival_date, Time_of_Arrival, Arrival_Time_Hour, Arrival_Time_Mins, Travel_Hours,
Travel_Mins]
Index: []>
```

```
index=index_mapper, columns=columns_mapper,axis={'index', 'columns'}
```

```
df.Travel_Hours=df.Travel_Hours.astype('int64')
```

```
egorical=['Airline','Source','Destination','Additional_Info','City1']
numerical=['Date','Montcath','Year','Dep_Time_Hour','Dep_Time_Mins','Arrival_date','Arriva
```

```
df.head()
```

```
      Airline  Date_of_Journey  Source  Destination  Route  Dep_Time  Arrival_Time  Durat
```

```
egorical=['Airline','Source','Destination','Additional_Info','City1']
numerical=['Date','Montcath','Year','Dep_Time_Hour','Dep_Time_Mins','Arrival_date','Arriva
```

```
from sklearn.preprocessing import LabelEncoder
le=LabelEncoder()
```

```
pd.set_option('display.max_columns',33)
```

```
df = pd.read_excel('/content/Data_Train.xlsx')
```

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```
encoder = LabelEncoder()
```

```
df.head()
```

	Airline	Date_of_Journey	Source	Destination	Route	Dep_Time	Arrival_Time	Du
0	IndiGo	24/03/2019	Banglore	New Delhi	BLR → DEL	22:20	01:10 22 Mar	
1	Air India	1/05/2019	Kolkata	Banglore	CCU → IXR → BBI → BLR	05:50	13:15	
					DEL →			

```
df.head()
```

	Airline	Date_of_Journey	Source	Destination	Route	Dep_Time	Arrival_Time	Du
0	IndiGo	24/03/2019	Banglore	New Delhi	BLR → DEL	22:20	01:10 22 Mar	
1	Air India	1/05/2019	Kolkata	Banglore	CCU → IXR → BBI →	05:50	13:15	
2	Jet Airways	9/06/2019	Delhi	Cochin	→ LKO → BOM → COK	09:25	04:25 10 Jun	
3	IndiGo	12/05/2019	Kolkata	Banglore	CCU → NAG → BLR	18:05	23:30	
4	IndiGo	01/03/2019	Banglore	New Delhi	BLR → NAG → DEL	16:50	21:35	

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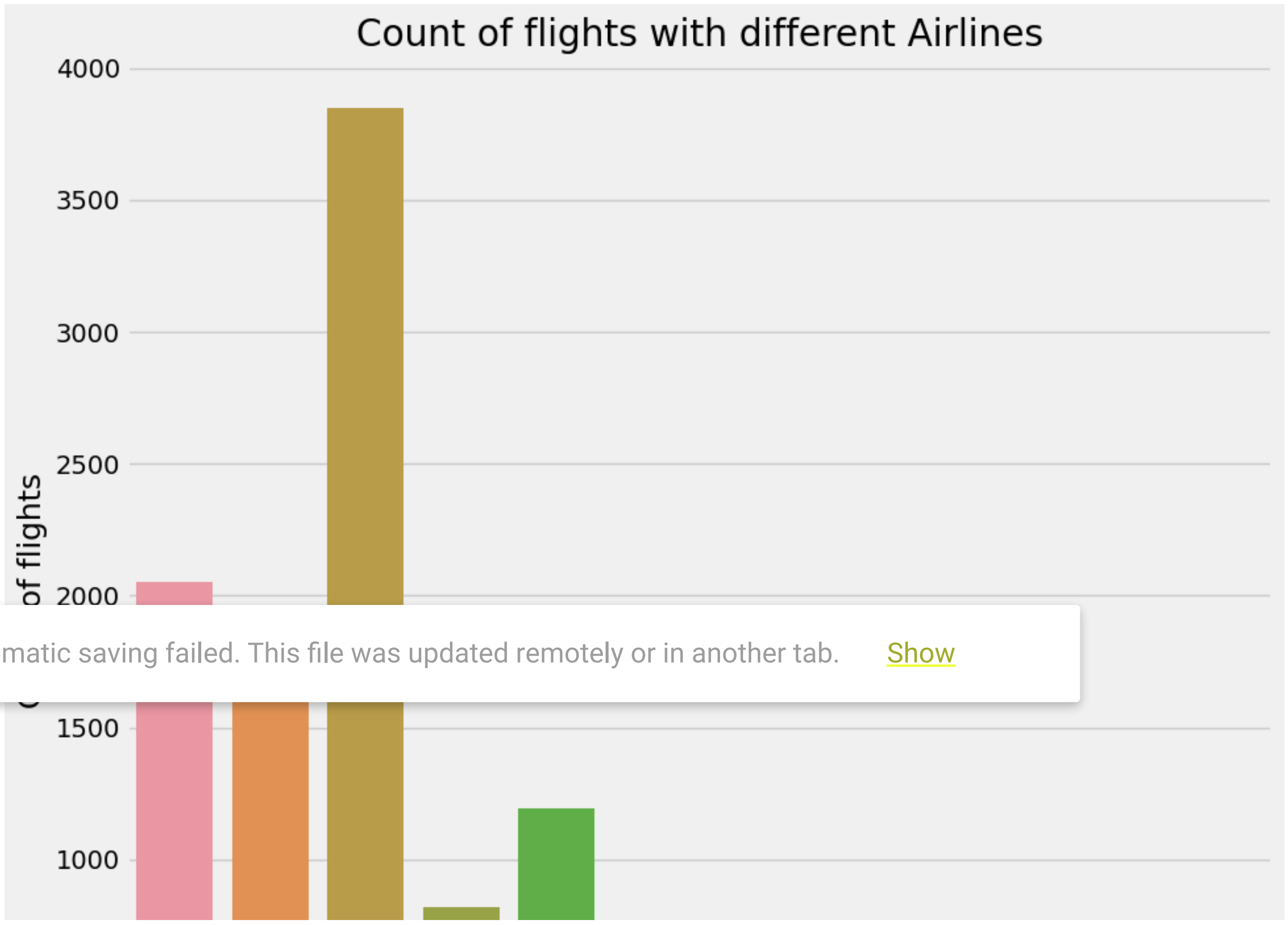
```
df.describe()
```

	Price
count	10683.000000
mean	9087.064121
std	4611.359167
min	1759.000000
25%	5277.000000
50%	8372.000000
75%	12373.000000
max	79512.000000

```
plt.figure(figsize = (10, 10))
plt.title('Count of flights with different Airlines')
sns.countplot(x = 'Airline', data = df)
plt.xlabel('Airline')
plt.ylabel('Count of flights')
plt.xticks(rotation = 90)
```

```
(array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11]),
 [Text(0, 0, 'IndiGo'),
  Text(1, 0, 'Air India'),
  Text(2, 0, 'Jet Airways'),
  Text(3, 0, 'SpiceJet'),
  Text(4, 0, 'Multiple carriers'),
  Text(5, 0, 'GoAir'),
  Text(6, 0, 'Vistara'),
  Text(7, 0, 'Air Asia'),
  Text(8, 0, 'Vistara Premium economy'),
  Text(9, 0, 'Jet Airways Business'),
  Text(10, 0, 'Multiple carriers Premium economy'),
  Text(11, 0, 'Trujet')])
```



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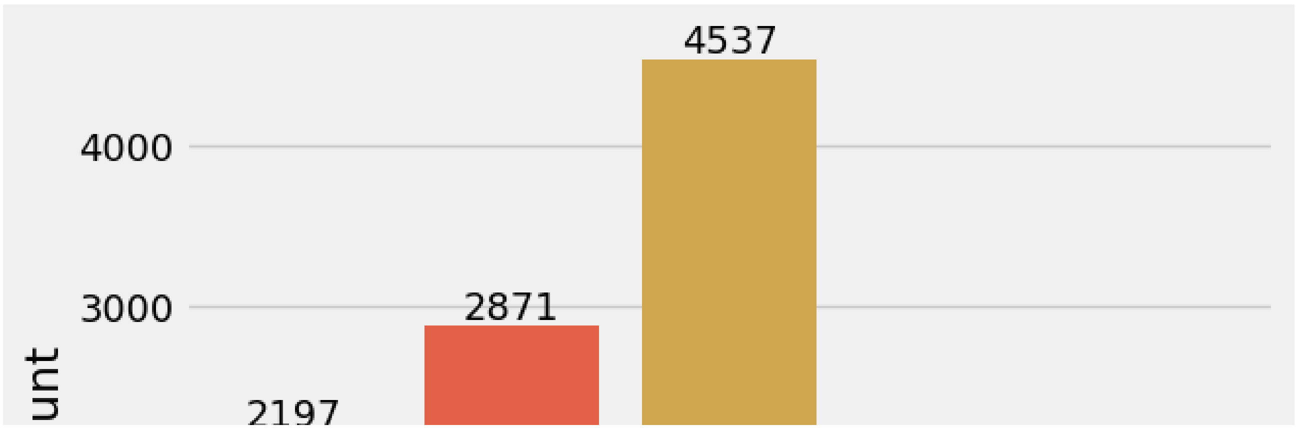
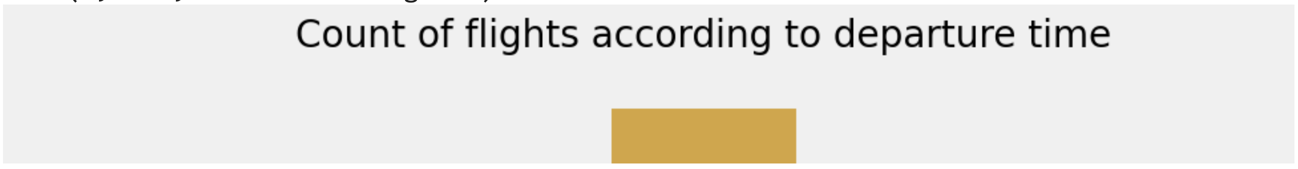
```
## Number of Flights From Each Source
ax = sns.countplot(data=df,x='Source')
ax.bar_label(ax.containers[0]);
```



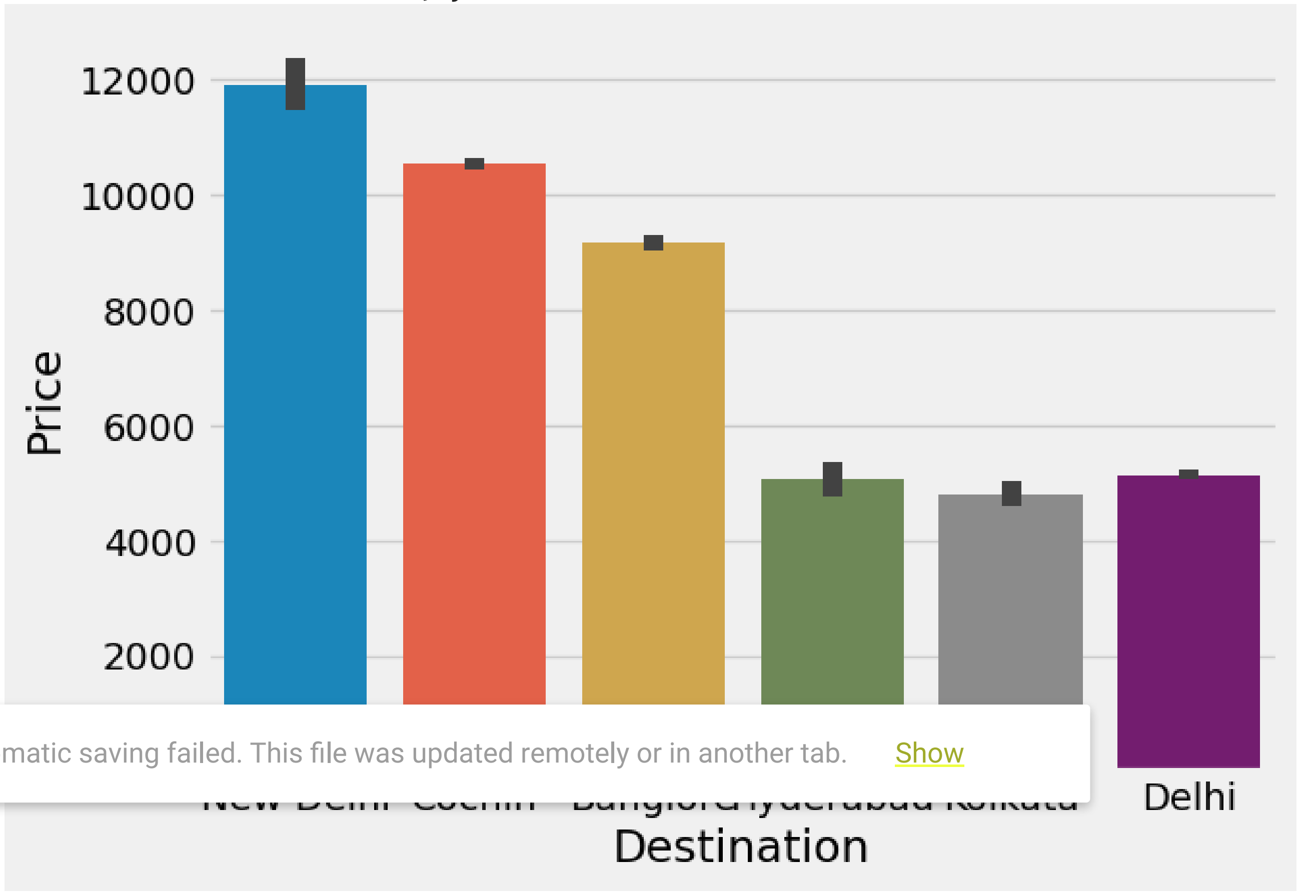
```
plt.figure(figsize = (10, 10))
plt.title('Count of flights according to departure time')
sns.countplot(x = 'Source', data = df)
plt.xlabel('Flight Time')
plt.ylabel('Count of flights')
```

```
Text(0, 0.5, 'Count of flights')
```



```
# We can make Visualization With Avg. Price for Destination
sns.barplot(x='Destination',y='Price',data=df.sort_values('Price',ascending=False))
```

```
<Axes: xlabel='Destination', ylabel='Price'>
```



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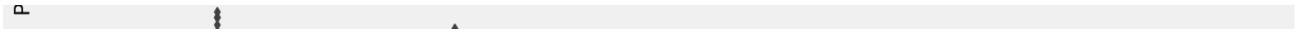
```
plt.figure(figsize=(15,8))
sns.boxplot(x='Total_Stops',y='Price',data=df.sort_values('Price',ascending=False))
```

```
<Axes: xlabel='Total_Stops', ylabel='Price'>
```

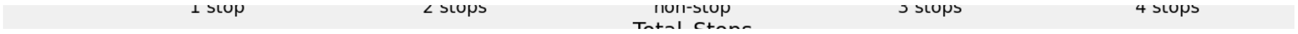
80000
70000
60000
50000

```
#plotting countplots for categorical df
```



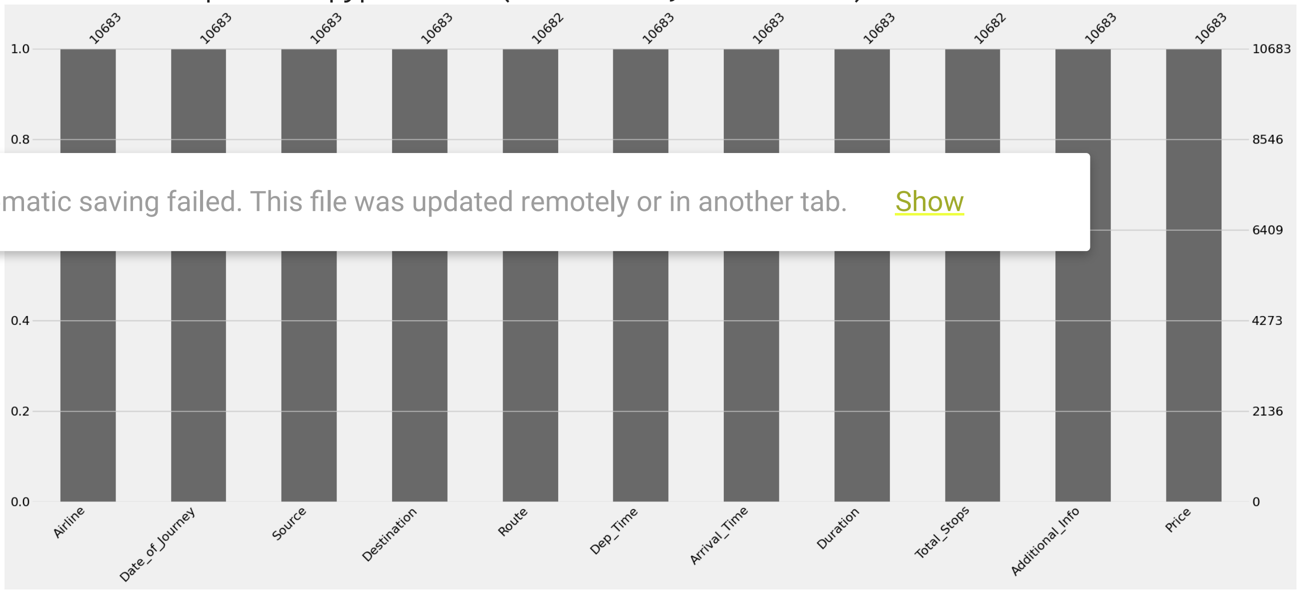
```
import seaborn as sns
c=1
plt.figure(figsize=(20,45))
```

```
<Figure size 2000x4500 with 0 Axes>
<Figure size 2000x4500 with 0 Axes>
```



```
import missingno as msno
msno.bar(df)
plt.show
```

```
<function matplotlib.pyplot.show(close=None, block=None)>
```



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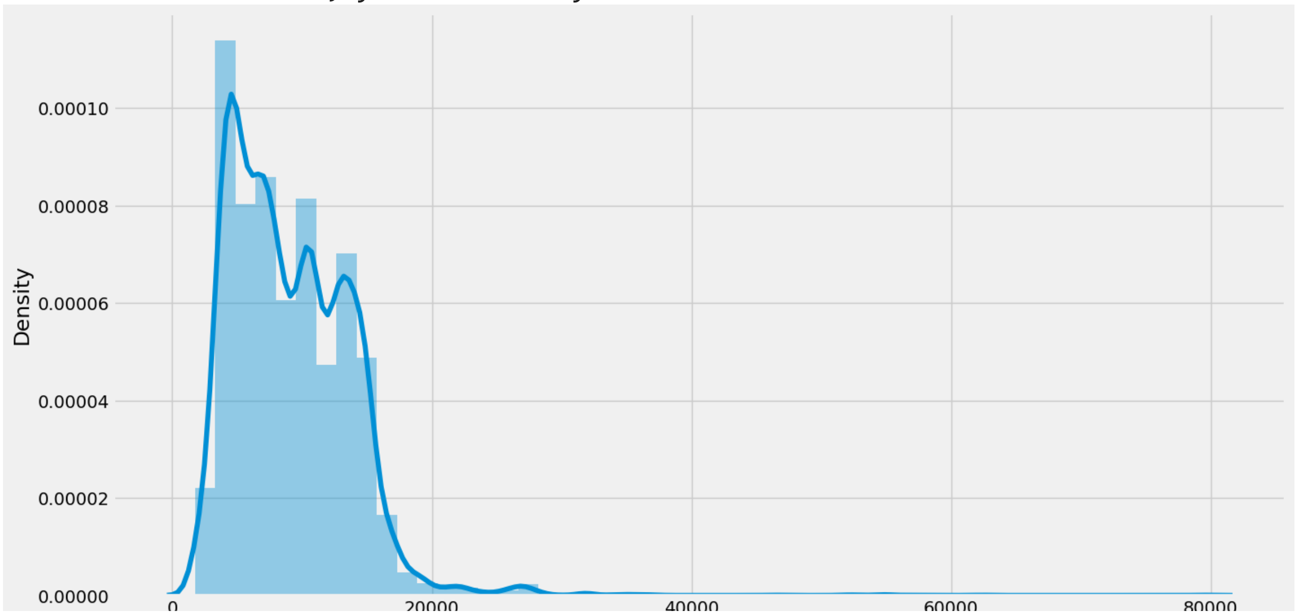
```
plt.figure(figsize=(15,8))
sns.distplot(df.Price)
```

```
<Axes: xlabel='Price', ylabel='Density'>
```



```
from sklearn import datasets
import pandas as p
import seaborn
import matplotlib. pyplot as pt
dataset = datasets. load_iris ()
dataframe = p. DataFrame (data = dataset. data, columns = dataset. feature_names)
dataframe ["relation"] = dataset. target
correlation = dataframe.corr ()
heatmap = seaborn. heatmap(correlation, annot = True)
heatmap.set (xlabel = 'IRIS values on x axis',ylabel = 'IRIS values on y axis\t', title =
pt. show ()
```

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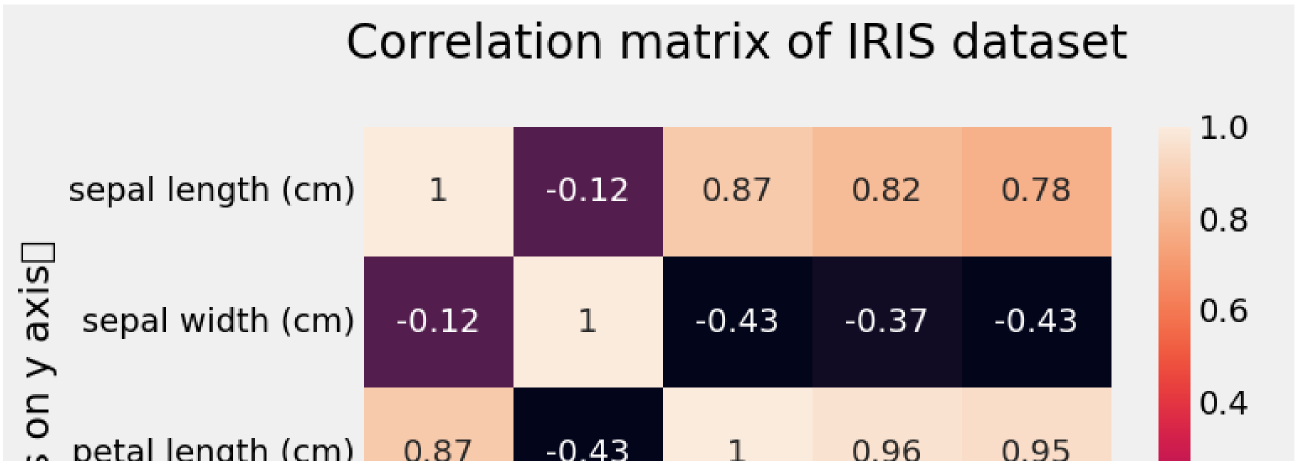
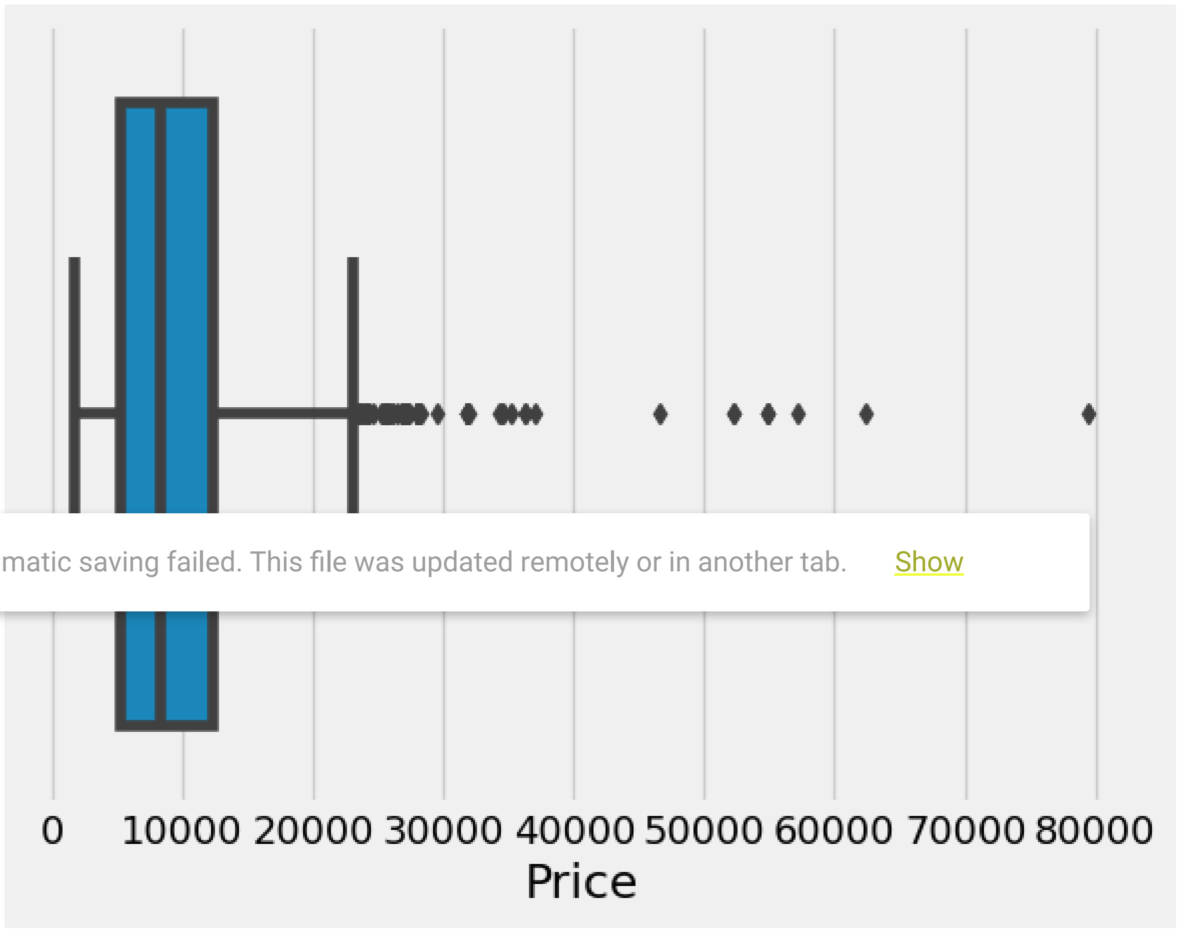


sepal length (cm)	1	-0.12	0.87	0.82	0.78
sepal width (cm)	-0.12	1	-0.43	-0.37	-0.43
petal length (cm)	0.87	-0.43	1	0.96	0.95

```
sns.boxplot(x= 'Price', data=df);
```



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```
y=df['Price']
x=df.drop(columns=['Price'],axis=1)
```

```
### Scaling the df
```

```
from sklearn.preprocessing import StandardScaler
ss=StandardScaler()
```

```
def plot(data,col):
    fig,(ax1,ax2)=plt.subplots(2,1)
    sns.distplot(data[col],ax=ax1)
    sns.boxplot(data[col],ax=ax2)


data1=pd.set_option('display.max_columns',33)
df.head()
```

	Airline	Date_of_Journey	Source	Destination	Route	Dep_Time	Arrival_Time	Du
0	IndiGo	24/03/2019	Banglore	New Delhi	BLR → DEL	22:20	01:10 22 Mar	
1	Air India	1/05/2019	Kolkata	Banglore	CCU → IXR → BBI → BLR	05:50	13:15	
2	Jet Airways	9/06/2019	Delhi	Cochin	DEL → LKO → BOM → COK	09:25	04:25 10 Jun	
3	IndiGo	12/05/2019	Kolkata	Banglore	NAG → BLR	18:05	23:30	
4	IndiGo	01/03/2019	Banglore	New Delhi	BLR → NAG → DEL	16:50	21:35	

```
def plot(data,col):
    fig,(ax1,ax2)=plt.subplots(2,1)
    sns.distplot(data[col],ax=ax1)
    sns.boxplot(data[col],ax=ax2)


import numpy as np
import pandas as pd

import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings('ignore')
```

```
train_data=pd.read_excel('/content/Data_Train.xlsx')
train_data.head()
```

	Airline	Date_of_Journey	Source	Destination	Route	Dep_Time	Arrival_Time	Du
0	IndiGo	24/03/2019	Banglore	New Delhi	BLR → DEL	22:20	01:10 22 Mar	
1	Air India	1/05/2019	Kolkata	Banglore	CCU → IXR → BBI → BLR	05:50	13:15	
2	Jet Airways	9/06/2019	Delhi	Cochin	DEL → LKO → BOM → COK	09:25	04:25 10 Jun	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CCU [illegible] → BLR	[illegible]	23:30	
4	IndiGo	01/03/2019	Banglore	New Delhi	BLR → NAG → DEL	16:50	21:35	

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```
test_data=pd.read_excel('/content/Data_Train.xlsx')
test_data.head()
```

	Airline	Date_of_Journey	Source	Destination	Route	Dep_Time	Arrival_Time	Du
0	IndiGo	24/03/2019	Banglore	New Delhi	BLR → DEL	22:20	01:10 22 Mar	
1	Air India	1/05/2019	Kolkata	Banglore	CCU → IXR → BBI → BLR	05:50	13:15	
2	Jet Airways	9/06/2019	Delhi	Cochin	DEL → LKO → BOM → COK	09:25	04:25 10 Jun	
3	IndiGo	12/05/2019	Kolkata	Banglore	CCU → NAG → BLR	18:05	23:30	
4	IndiGo	01/03/2019	Banglore	New Delhi	NAG	16:50	21:35	

```
tain_data=train_data[train_data['Total_Stops'].notnull()]
```

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```
train_data['Total_Stops']=train_data['Total_Stops'].apply(lambda x : str(x)if str(x).isdig
test_data['Total_Stops']=test_data['Total_Stops'].apply(lambda x : str(x)if str(x).isdigit
```

```
from sklearn.ensemble import RandomForestRegressor, GradientBoostingRegressor, AdaBoostReg
rfr=RandomForestRegressor()
gb=GradientBoostingRegressor()
ad=AdaBoostRegressor()
```

```
from sklearn.feature_selection import mutual_info_classif
```

```
from sklearn.metrics import r2_score,mean_absolute_error,mean_squared_error
def predict(ml_model):
    print('Model is: {}'.format(ml_model))
    model= ml_model.fit(X_train,y_train)
    print("Training score: {}".format(model.score(X_train,y_train)))
    predictions = model.predict(X_test)
    print("Predictions are: {}".format(predictions))
    print('\n')
    r2score=r2_score(y_test,predictions)
    print("r2 score is: {}".format(r2score))
    print('MAE:{}'.format(mean_absolute_error(y_test,predictions)))
    print('MSE:{}'.format(mean_squared_error(y_test,predictions)))
    print('RMSE:{}'.format(np.sqrt(mean_squared_error(y_test,predictions))))
    sns.distplot(y_test-predictions)
```

```
from sklearn.linear_model import LogisticRegression
from sklearn.neighbors import KNeighborsRegressor
from sklearn.tree import DecisionTreeRegressor
from sklearn.ensemble import GradientBoostingRegressor,RandomForestRegressor
```

```
RandomForestRegressor()
```

```
▾ RandomForestRegressor
RandomForestRegressor()
```

```
#crwating list of category columns

category=['Airline','Source','Destination','Additional-Info']
category
```

```
['Airline', 'Source', 'Destination', 'Additional-Info']
```

```
df['Date_of_Journey'].unique(),df['Date_of_Journey'].nunique()
```

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```
                                                                     019',
              24/06/2019 ,  12/03/2019 ,  27/05/2019 ,  1/06/2019 ,
             '18/04/2019', '9/05/2019', '24/04/2019', '3/03/2019', '15/04/2019',
             '12/06/2019', '6/03/2019', '21/03/2019', '3/04/2019', '6/05/2019',
             '15/05/2019', '18/06/2019', '15/06/2019', '6/04/2019',
             '18/05/2019', '27/06/2019', '21/05/2019', '06/03/2019',
             '3/06/2019', '15/03/2019', '3/05/2019', '9/03/2019', '6/06/2019',
             '24/05/2019', '09/03/2019', '1/04/2019', '21/04/2019',
             '21/06/2019', '27/03/2019', '18/03/2019', '12/04/2019',
             '9/04/2019', '1/03/2019', '03/03/2019', '27/04/2019'], dtype=object),
 44)
```

```
from sklearn.feature_selection import mutual_info_classif
```

```
# Helper funtion to plot and check parameter values
```

```
def test_params_and_plot(param_name,values):
    train_errors , val_errors = [] , []
    for value in values:
        params = {param_name: value}
        train_rmse,test_rmse = test_params(**params)
        train_errors.append(train_rmse)
        val_errors.append(test_rmse)
    plt.figure(figsize=(16,8))
    plt.title('Overfitting curve:  params')
    plt.plot(values, train_errors, 'g-*')
    plt.plot(values, val_errors, 'r-o')
    plt.xlabel(param_name)
    plt.ylabel('rmse')
    plt.legend(['Training', 'Test'])
```

```
from sklearn.feature_selection import mutual_info_classif
```

```
def get_scores(models,xtrain,ytrain):
    for name,model in models.items():
        model["model"].fit(xtrain,ytrain)

        score_r2 = score_dataset(xtrain, ytrain, model=model["model"])
        score = {'model':"Linear regression", 'score_r2':score_r2}
        print("--- "+name+" ---")
        print("Score r2: {}".format(score_r2))
        print("\n")
```

```
from sklearn.linear_model import LogisticRegression
from sklearn.neighbors import KNeighborsRegressor
from sklearn.tree import DecisionTreeRegressor
from sklearn.ensemble import GradientBoostingRegressor,RandomForestRegressor
```

```
RandomForestRegressor()
```

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```
KNeighborsRegressor()
```

```
▾ KNeighborsRegressor
KNeighborsRegressor()
```

```
from sklearn.model_selection import cross_val_score
for i in range(2,5):
    print(rfr,df.mean())
```

```
RandomForestRegressor() Price    9087.064121
dtype: float64
RandomForestRegressor() Price    9087.064121
dtype: float64
RandomForestRegressor() Price    9087.064121
dtype: float64
```

```
from sklearn.model_selection import RandomizedSearchCV
```

```
param_grid={'n_estimators':[10,30,50,70,100],'max_depth':[None,1,2,3],'max_features':['aut
rfr=RandomForestRegressor()
rf_res=RandomizedSearchCV(estimator=rfr,param_distributions=param_grid,cv=3,verbose=2,n_jc


rf_res.fit
```

```
<bound method BaseSearchCV.fit of RandomizedSearchCV(cv=3,
estimator=RandomForestRegressor(), n_jobs=-1,
                   param_distributions={'max_depth': [None, 1, 2, 3],
                                        'max_features': ['auto', 'sqrt'],
                                        'n_estimators': [10, 30, 50, 70, 100]},
                   verbose=2)>
```

```
gb=GradientBoostingRegressor()
gb_res=RandomizedSearchCV(estimator=gb,param_distributions=param_grid,cv=3,verbose=2,n_jot

gb_res.fit
```

```
<bound method BaseSearchCV.fit of RandomizedSearchCV(cv=3,
estimator=GradientBoostingRegressor(), n_jobs=-1,
                   param_distributions={'max_depth': [None, 1, 2, 3],
                                        'max_features': ['auto', 'sqrt'],
                                        'n_estimators': [10, 30, 50, 70, 100]},
                   verbose=2)>
```

```
rfr.fit
y_train_pred=rfr.predict
```

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```
print("test accuracy",r2_score)
```

```
train accuracy <function r2_score at 0x7f2bee633e50>
test accuracy <function r2_score at 0x7f2bee633e50>
```

```
knn=KNeighborsRegressor(n_neighbors=2,algorithm='auto',metric_params=None,n_jobs=-1)
knn.fit
y_train_pred=rfr.predict
y_test_pred=rfr.predict
print("train accuracy",r2_score)
print("test accuracy",r2_score)
```

```
train accuracy <function r2_score at 0x7f2bee633e50>
test accuracy <function r2_score at 0x7f2bee633e50>
```

```
rfr=RandomForestRegressor(n_estimators=10,max_features='sqrt',max_depth=None)
rfr.fit
y_train_pred=rfr.predict
y_test_pred=rfr.predict
print("train accuracy",r2_score)
print("test accuracy",r2_score)
```

```
    train accuracy <function r2_score at 0x7f2bee633e50>
    test accuracy <function r2_score at 0x7f2bee633e50>
```

```
price_list=pd.DataFrame({'Price'})
```

```
price_list
```

	0
0	Price

```
price_list
```

	0
0	Price

```
import pickle
```

```
pickle.dump(rfr,open('model1.pkl','wb'))
```

```
!pip install nbconvert
```

```
    Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/
                                                                          ist-packages (
                                                                         -packages (fro
                                                                         dist-packages
    Requirement already satisfied: pandocfilters>=1.4.1 in /usr/local/lib/python3.9/dist
    Requirement already satisfied: pygments>=2.4.1 in /usr/local/lib/python3.9/dist-pack
    Requirement already satisfied: jinja2>=3.0 in /usr/local/lib/python3.9/dist-packages
    Requirement already satisfied: nbformat>=5.1 in /usr/local/lib/python3.9/dist-packag
    Requirement already satisfied: tinycss2 in /usr/local/lib/python3.9/dist-packages (f
    Requirement already satisfied: jupyter-core>=4.7 in /usr/local/lib/python3.9/dist-pa
    Requirement already satisfied: beautifulsoup4 in /usr/local/lib/python3.9/dist-packa
    Requirement already satisfied: traitlets>=5.0 in /usr/local/lib/python3.9/dist-packa
    Requirement already satisfied: packaging in /usr/local/lib/python3.9/dist-packages (
    Requirement already satisfied: lxml in /usr/local/lib/python3.9/dist-packages (from
    Requirement already satisfied: entrypoints>=0.2.2 in /usr/local/lib/python3.9/dist-p
    Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.9/dist-pack
    Requirement already satisfied: mistune<2,>=0.8.1 in /usr/local/lib/python3.9/dist-pa
    Requirement already satisfied: nbclient>=0.5.0 in /usr/local/lib/python3.9/dist-pack
    Requirement already satisfied: jupyterlab-pygments in /usr/local/lib/python3.9/dist-
    Requirement already satisfied: platformdirs>=2.5 in /usr/local/lib/python3.9/dist-pa
    Requirement already satisfied: jupyter-client>=6.1.12 in /usr/local/lib/python3.9/di
    Requirement already satisfied: jsonschema>=2.6 in /usr/local/lib/python3.9/dist-pack
    Requirement already satisfied: fastjsonschema in /usr/local/lib/python3.9/dist-packa
    Requirement already satisfied: soupsieve>1.2 in /usr/local/lib/python3.9/dist-packag
    Requirement already satisfied: webencodings in /usr/local/lib/python3.9/dist-package
    Requirement already satisfied: six>=1.9.0 in /usr/local/lib/python3.9/dist-packages
    Requirement already satisfied: pyrsistent!=0.17.0,!=0.17.1,!=0.17.2,>=0.14.0 in /usr
    Requirement already satisfied: attrs>=17.4.0 in /usr/local/lib/python3.9/dist-packag
    Requirement already satisfied: python-dateutil>=2.1 in /usr/local/lib/python3.9/dist
```

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```
Requirement already satisfied: pyzmq>=13 in /usr/local/lib/python3.9/dist-packages (
Requirement already satisfied: tornado>=4.1 in /usr/local/lib/python3.9/dist-package
```

```
!jupyter nbconvert --to html flight.ipynb
```

```
[NbConvertApp] Converting notebook flight.ipynb to html
[NbConvertApp] Writing 1318697 bytes to flight.html
```

```
!pip install flask-ngrok
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/
Requirement already satisfied: flask-ngrok in /usr/local/lib/python3.9/dist-packages
Requirement already satisfied: requests in /usr/local/lib/python3.9/dist-packages (f
Requirement already satisfied: Flask>=0.8 in /usr/local/lib/python3.9/dist-packages
Requirement already satisfied: Jinja2>=3.0 in /usr/local/lib/python3.9/dist-packages
Requirement already satisfied: click>=8.0 in /usr/local/lib/python3.9/dist-packages
Requirement already satisfied: importlib-metadata>=3.6.0 in /usr/local/lib/python3.9
Requirement already satisfied: itsdangerous>=2.0 in /usr/local/lib/python3.9/dist-pa
Requirement already satisfied: Werkzeug>=2.2.2 in /usr/local/lib/python3.9/dist-pack
Requirement already satisfied: charset-normalizer~=2.0.0 in /usr/local/lib/python3.9
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.9/dis
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.9/dist-p
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.9/dist-package
Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.9/dist-packages (
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.9/dist-pack
```

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```
model = (open(r"model1.pkl",'rb'))
app = Flask(__name__)


@app.route("/home")
def home():
    return render_template('home.html')


@app.route("/predict")
def home1():
    return render_template('predict.html')

def predict():

    print(x)

    x = np.array(x)
    print(x.shape)

    print(x)
    pred = model.predict(x)
    print(pred)
    return render_template('submit.html', prediction_text=pred)


if __name__ == "__main__":
    app.run()
```

```
 * Serving Flask app '__main__'
 * Debug mode: off
INFO:werkzeug:WARNING: This is a development server. Do not use it in a production d
 * Running on http://127.0.0.1:5000
INFO:werkzeug:Press CTRL+C to quit
```

elect()

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