Optimizing Flight Booking Decisions Through Machine

Learning Price Predictions

1.INTRODUCTION:

1.1 OVERVIEW:

In this article, we will be analyzing the flight fare prediction using Machine Learning dataset using essential exploratory data analysis techniques then will draw some predictions about the price of the flight based on some features such as what type of airline it is. what is the arrival time, what is the departure time, what is the duration of the flight, source, destination and more.

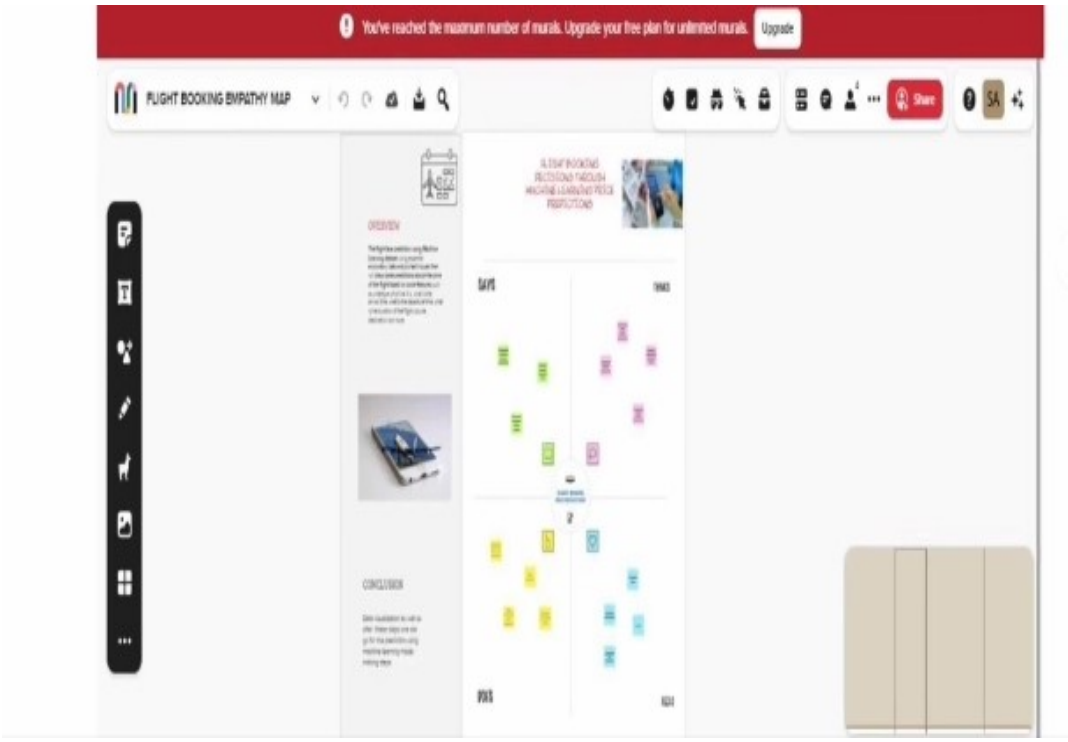
1.2 PURPOSE:

Optimizing Flight Booking Decisions through Machine Learning Price

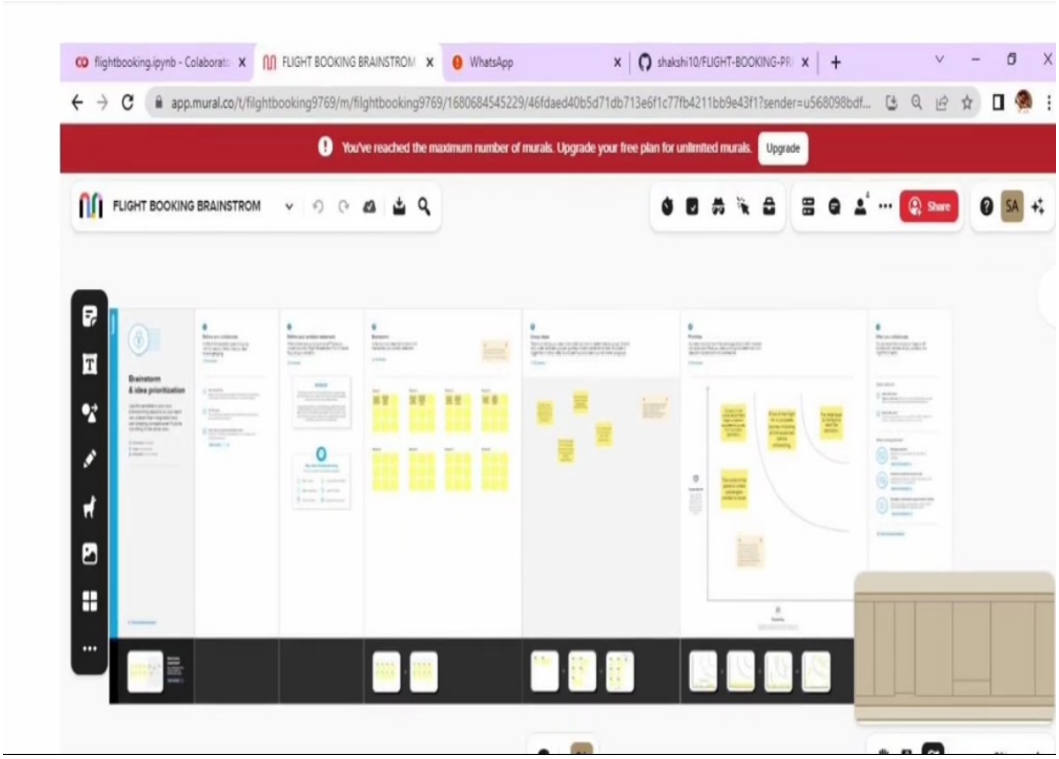
Predictions to provide convenient to passenger.

2.PROBLEM DEFINITION AND DESIGN THINKING:

2.1 EMPATHY MAP



2.2 IDEATION AND BRAINSTORMING MAP


flightbooking.ipynb - Colaborat
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WhatsApp
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You've reached the maximum number of murals. Upgrade your free plan for unlimited murals.
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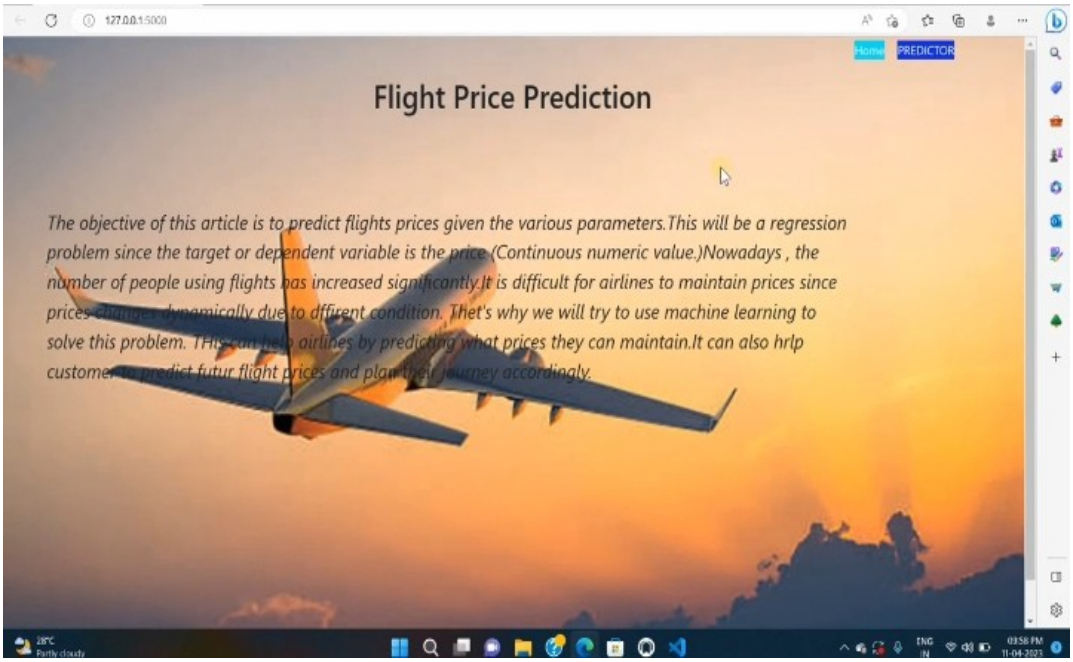
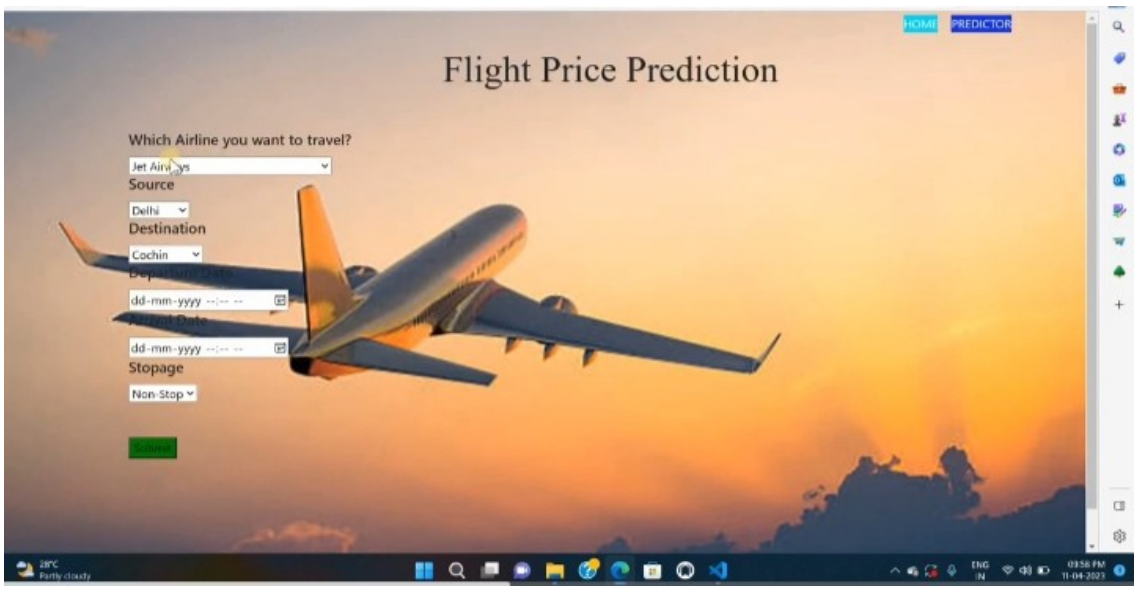
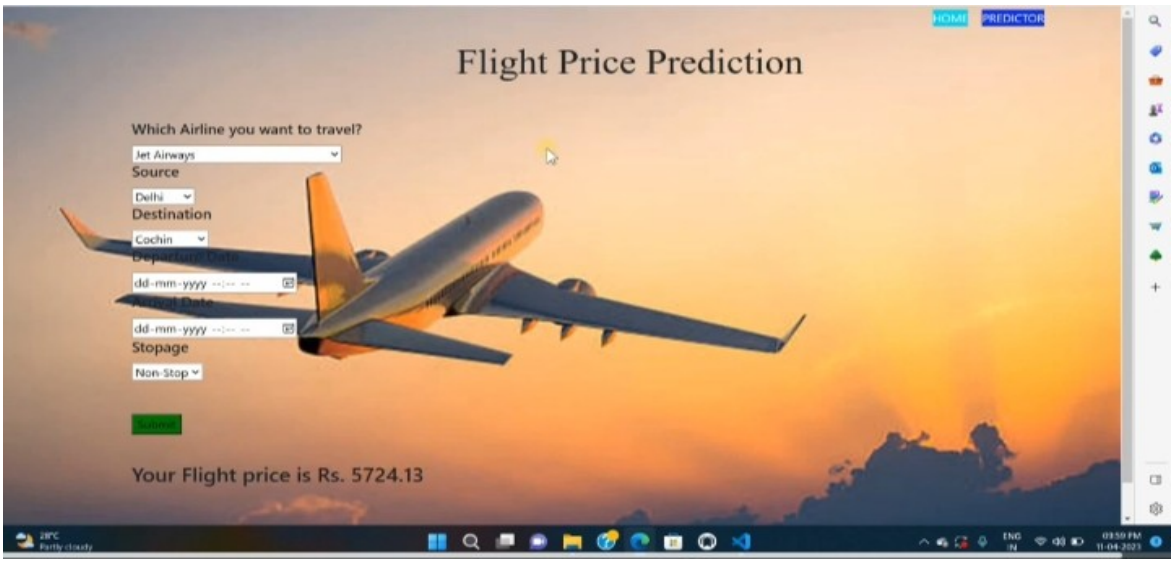
3.RESULT


127.0.0.1:5000
Home
PREDICTOR
Flight Price Prediction
The objective of this article is to predict flights prices given the various parameters.This will be a regression problem since the target or dependent variable is the price.(Continuous numeric value.)Nowadays , the number of people using flights has increased significantly.It is difficult for airlines to maintain prices since prices changes dynamically due to diffirent condition. Thet's why we will try to use machine learning to solve this problem. This can help airlines by predicting what prices they can maintain.It can also hrlp customers to predict futur flight prices and plan their journey accordingly.


HOME
PREDICTOR
Flight Price Prediction
Which Airline you want to travel?
Jet Airways
Source
Delhi
Destination
Cochin
dd-mm-yyyy --:-- --
dd-mm-yyyy --:-- --
Stopage
Non-Stop
Submit


HOME
PREDICTOR
Flight Price Prediction
Which Airline you want to travel?
Jet Airways
Source
Delhi
Destination
Cochin
dd-mm-yyyy --:-- --
dd-mm-yyyy --:-- --
Stopage
Non-Stop
Submit
Your Flight price is Rs. 5724.13

4.ADVANTAGES

=>Booking airline flights early can give passengers cheaper deals for travel because it gives them time to find and track the best price.

=>It can also allow them to begin planning their trip early.

=>While this may not appear to be a huge benefit for airports, cheaper airline
tickets can lead to increased flight travel.

DISADVANTAGES

=>You an influx of new customers

=> Not all online booking for need internet access. Reliable internet
access is required to check reservations and add bookings that are
made over the phone.

=>You need to be ready systems are created equal.

5.APPLICATION:

Flight booking applications help the airline industry automate the booking process. Users worldwide can book flights on the go using the simple apps, which include features such as quick flight search, download tickets, check and modify booking details, one-tap check-in, and many more.

6.CONCLUSION:

Data visualization as well so after these steps one cango for the prediction using machine learning model making steps.

7.FUTURE SCOPE:

Airline reservation system make the life of passengers very easy as they don't need to stand in queues for getting their seats reserved and they can easily make reservations on any airline just from a single
system.

8.APPENDIX:

```
from flask import Flask, request, render_template
from flask_cors import cross_origin
import sklearn
import pickle
import pandas as pd

app = Flask(__name__)
model = pickle.load(open("flight_rf.pkl", "rb"))



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




@app.route("/predict", methods = ["GET", "POST"])
@cross_origin()
def predict():
    if request.method == "POST":

        # Date_of_Journey
```

```
        date_dep = request.form["Dep_Time"]
        Journey_day = int(pd.to_datetime(date_dep, format="%Y-
%m-%dT%H:%M").day)
        Journey_month = int(pd.to_datetime(date_dep, format
="%Y-%m-%dT%H:%M").month)
        # print("Journey Date : ",Journey_day, Journey_month)

        # Departure
        Dep_hour = int(pd.to_datetime(date_dep, format ="%Y-
%m-%dT%H:%M").hour)
        Dep_min = int(pd.to_datetime(date_dep, format ="%Y-
%m-%dT%H:%M").minute)
        # print("Departure : ",Dep_hour, Dep_min)

        # Arrival
        date_arr = request.form["Arrival_Time"]
        Arrival_hour = int(pd.to_datetime(date_arr, format ="%Y-
%m-%dT%H:%M").hour)
        Arrival_min = int(pd.to_datetime(date_arr, format ="%Y-
%m-%dT%H:%M").minute)
        # print("Arrival : ", Arrival_hour, Arrival_min)

        # Duration
        dur_hour = abs(Arrival_hour - Dep_hour)
        dur_min = abs(Arrival_min - Dep_min)
        # print("Duration : ", dur_hour, dur_min)

        # Total Stops
        Total_stops = int(request.form["stops"])
        # print(Total_stops)

        # Airline
        # AIR ASIA = 0 (not in column)
        airline=request.form['airline']
        if(airline=='Jet Airways'):
            Jet_Airways = 1
            IndiGo = 0
            Air_India = 0
            Multiple_carriers = 0
            SpiceJet = 0
            Vistara = 0
            GoAir = 0
```

```
    Multiple_carriers_Premium_economy = 0
    Jet_Airways_Business = 0
    Vistara_Premium_economy = 0
    Trujet = 0

elif (airline=='IndiGo'):
    Jet_Airways = 0
    IndiGo = 1
    Air_India = 0
    Multiple_carriers = 0
    SpiceJet = 0
    Vistara = 0
    GoAir = 0
    Multiple_carriers_Premium_economy = 0
    Jet_Airways_Business = 0
    Vistara_Premium_economy = 0
    Trujet = 0

elif (airline=='Air India'):
    Jet_Airways = 0
    IndiGo = 0
    Air_India = 1
    Multiple_carriers = 0
    SpiceJet = 0
    Vistara = 0
    GoAir = 0
    Multiple_carriers_Premium_economy = 0
    Jet_Airways_Business = 0
    Vistara_Premium_economy = 0
    Trujet = 0

elif (airline=='Multiple carriers'):
    Jet_Airways = 0
    IndiGo = 0
    Air_India = 0
    Multiple_carriers = 1
    SpiceJet = 0
    Vistara = 0
    GoAir = 0
    Multiple_carriers_Premium_economy = 0
    Jet_Airways_Business = 0
    Vistara_Premium_economy = 0
```

```
    Trujet = 0

elif (airline=='SpiceJet'):
    Jet_Airways = 0
    IndiGo = 0
    Air_India = 0
    Multiple_carriers = 0
    SpiceJet = 1
    Vistara = 0
    GoAir = 0
    Multiple_carriers_Premium_economy = 0
    Jet_Airways_Business = 0
    Vistara_Premium_economy = 0
    Trujet = 0

elif (airline=='Vistara'):
    Jet_Airways = 0
    IndiGo = 0
    Air_India = 0
    Multiple_carriers = 0
    SpiceJet = 0
    Vistara = 1
    GoAir = 0
    Multiple_carriers_Premium_economy = 0
    Jet_Airways_Business = 0
    Vistara_Premium_economy = 0
    Trujet = 0

elif (airline=='GoAir'):
    Jet_Airways = 0
    IndiGo = 0
    Air_India = 0
    Multiple_carriers = 0
    SpiceJet = 0
    Vistara = 0
    GoAir = 1
    Multiple_carriers_Premium_economy = 0
    Jet_Airways_Business = 0
    Vistara_Premium_economy = 0
    Trujet = 0

elif (airline=='Multiple carriers Premium economy'):
    Jet_Airways = 0
```

```
    IndiGo = 0
    Air_India = 0
    Multiple_carriers = 0
    SpiceJet = 0
    Vistara = 0
    GoAir = 0
    Multiple_carriers_Premium_economy = 1
    Jet_Airways_Business = 0
    Vistara_Premium_economy = 0
    Trujet = 0

elif (airline=='Jet Airways Business'):
    Jet_Airways = 0
    IndiGo = 0
    Air_India = 0
    Multiple_carriers = 0
    SpiceJet = 0
    Vistara = 0
    GoAir = 0
    Multiple_carriers_Premium_economy = 0
    Jet_Airways_Business = 1
    Vistara_Premium_economy = 0
    Trujet = 0

elif (airline=='Vistara Premium economy'):
    Jet_Airways = 0
    IndiGo = 0
    Air_India = 0
    Multiple_carriers = 0
    SpiceJet = 0
    Vistara = 0
    GoAir = 0
    Multiple_carriers_Premium_economy = 0
    Jet_Airways_Business = 0
    Vistara_Premium_economy = 1
    Trujet = 0

elif (airline=='Trujet'):
    Jet_Airways = 0
    IndiGo = 0
    Air_India = 0
    Multiple_carriers = 0
```

```
    SpiceJet = 0
    Vistara = 0
    GoAir = 0
    Multiple_carriers_Premium_economy = 0
    Jet_Airways_Business = 0
    Vistara_Premium_economy = 0
    Trujet = 1

else:
    Jet_Airways = 0
    IndiGo = 0
    Air_India = 0
    Multiple_carriers = 0
    SpiceJet = 0
    Vistara = 0
    GoAir = 0
    Multiple_carriers_Premium_economy = 0
    Jet_Airways_Business = 0
    Vistara_Premium_economy = 0
    Trujet = 0

# print(Jet_Airways,
#     IndiGo,
#     Air_India,
#     Multiple_carriers,
#     SpiceJet,
#     Vistara,
#     GoAir,
#     Multiple_carriers_Premium_economy,
#     Jet_Airways_Business,
#     Vistara_Premium_economy,
#     Trujet)

# Source
# Banglore = 0 (not in column)
Source = request.form["Source"]
if (Source == 'Delhi'):
    s_Delhi = 1
    s_Kolkata = 0
    s_Mumbai = 0
    s_Chennai = 0
```

```
elif (Source == 'Kolkata'):
    s_Delhi = 0
    s_Kolkata = 1
    s_Mumbai = 0
    s_Chennai = 0

elif (Source == 'Mumbai'):
    s_Delhi = 0
    s_Kolkata = 0
    s_Mumbai = 1
    s_Chennai = 0

elif (Source == 'Chennai'):
    s_Delhi = 0
    s_Kolkata = 0
    s_Mumbai = 0
    s_Chennai = 1

else:
    s_Delhi = 0
    s_Kolkata = 0
    s_Mumbai = 0
    s_Chennai = 0

# print(s_Delhi,
#     s_Kolkata,
#     s_Mumbai,
#     s_Chennai)

# Destination
# Banglore = 0 (not in column)
Source = request.form["Destination"]
if (Source == 'Cochin'):
    d_Cochin = 1
    d_Delhi = 0
    d_New_Delhi = 0
    d_Hyderabad = 0
    d_Kolkata = 0

elif (Source == 'Delhi'):
    d_Cochin = 0
    d_Delhi = 1
```

```
    d_New_Delhi = 0
    d_Hyderabad = 0
    d_Kolkata = 0

elif (Source == 'New_Delhi'):
    d_Cochin = 0
    d_Delhi = 0
    d_New_Delhi = 1
    d_Hyderabad = 0
    d_Kolkata = 0

elif (Source == 'Hyderabad'):
    d_Cochin = 0
    d_Delhi = 0
    d_New_Delhi = 0
    d_Hyderabad = 1
    d_Kolkata = 0

elif (Source == 'Kolkata'):
    d_Cochin = 0
    d_Delhi = 0
    d_New_Delhi = 0
    d_Hyderabad = 0
    d_Kolkata = 1

else:
    d_Cochin = 0
    d_Delhi = 0
    d_New_Delhi = 0
    d_Hyderabad = 0
    d_Kolkata = 0

# print(
#     d_Cochin,
#     d_Delhi,
#     d_New_Delhi,
#     d_Hyderabad,
#     d_Kolkata
# )
```

```
    #     ['Total_Stops', 'Journey_day', 'Journey_month',
'Dep_hour',
    #    'Dep_min', 'Arrival_hour', 'Arrival_min', 'Duration_hours',
    #    'Duration_mins', 'Airline_Air India', 'Airline_GoAir',
'Airline_IndiGo',
    #    'Airline_Jet Airways', 'Airline_Jet Airways Business',
    #    'Airline_Multiple carriers',
    #    'Airline_Multiple carriers Premium economy',
'Airline_SpiceJet',
    #    'Airline_Trujet', 'Airline_Vistara', 'Airline_Vistara Premium
economy',
    #    'Source_Chennai', 'Source_Delhi', 'Source_Kolkata',
'Source_Mumbai',
    #    'Destination_Cochin', 'Destination_Delhi',
'Destination_Hyderabad',
    #    'Destination_Kolkata', 'Destination_New Delhi']

        prediction=model.predict([[
            Total_stops,
            Journey_day,
            Journey_month,
            Dep_hour,
            Dep_min,
            Arrival_hour,
            Arrival_min,
            dur_hour,
            dur_min,
            Air_India,
            GoAir,
            IndiGo,
            Jet_Airways,
            Jet_Airways_Business,
            Multiple_carriers,
            Multiple_carriers_Premium_economy,
            SpiceJet,
            Trujet,
            Vistara,
            Vistara_Premium_economy,
            s_Chennai,
            s_Delhi,
            s_Kolkata,
            s_Mumbai,
```

```
            d_Cochin,
            d_Delhi,
            d_Hyderabad,
            d_Kolkata,
            d_New_Delhi
        ]])

        output=round(prediction[0],2)

        return render_template('home.html',prediction_text="Your
Flight price is Rs. {}".format(output))


    return render_template("home.html")




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