

# PROJECT REPORT

**PROJECT TITLE : DEVELOPING A FLIGHT DELAY PREDICTION MODEL USING MACHINE LEARNING.**

**TEAM ID : PNT2022TMID14481.**

**TEAM MEMBERS : VIDHYAPATHI N (TEAMLEAD)**

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## 1. INTRODUCTION

### 1.1 Project overview

In the past two decades, air travel has become increasingly popular and has become increasingly accessible to people all over the world. Aviation has evolved to become one of the most important forms of transportation, with its efficiency and reliability making it the preferred choice for long-distance travel. However, flight delays are a major problem in the aviation industry, and they are becoming more and more common. In the United States, the average delay has increased by 30% since 2000, and the cost of delays has risen to \$32 billion per year. There are many factors that can contribute to flight delays, such as weather, air traffic control, and maintenance. However, the most common cause of delays is simply that the plane is not ready to take off on time. This is usually due to the fact that the plane is not fully loaded with passengers, baggage, and fuel. It can also be due to technical problems with the plane itself. The goal of this project is to develop a machine learning model that can predict flight delays. The model will be trained on a dataset of historical flight data, and it will be used to predict the delay of a flight before it even takes off.

### 1.2 Purpose

The purpose of this project is to develop a machine learning model that can predict flight delays. The model will be trained on a dataset of flight information, and will be used to predict the arrival delay of flights. The project is divided into two parts:

1. Data pre-processing and feature engineering
2. Model training and testing

In the first part, the data will be pre-processed and features will be engineered. This part will be focused on cleaning the data and making sure that the

features are suitable for training the machine learning model. In the second part, the machine learning model will be trained and tested. This part will focus on tuning the model to get the best performance possible.

## **2. LITERATURE SURVEY**

### **2.1 Existing problem**

Airlines, airports, and passengers would all benefit from a more accurate flight delay prediction model. Currently, models used by airlines to predict flight delays are based on historical data and do not take into account real-time data such as weather conditions. This can lead to delays and cancellations, as well as increased costs for airlines.

### **2.2 References**

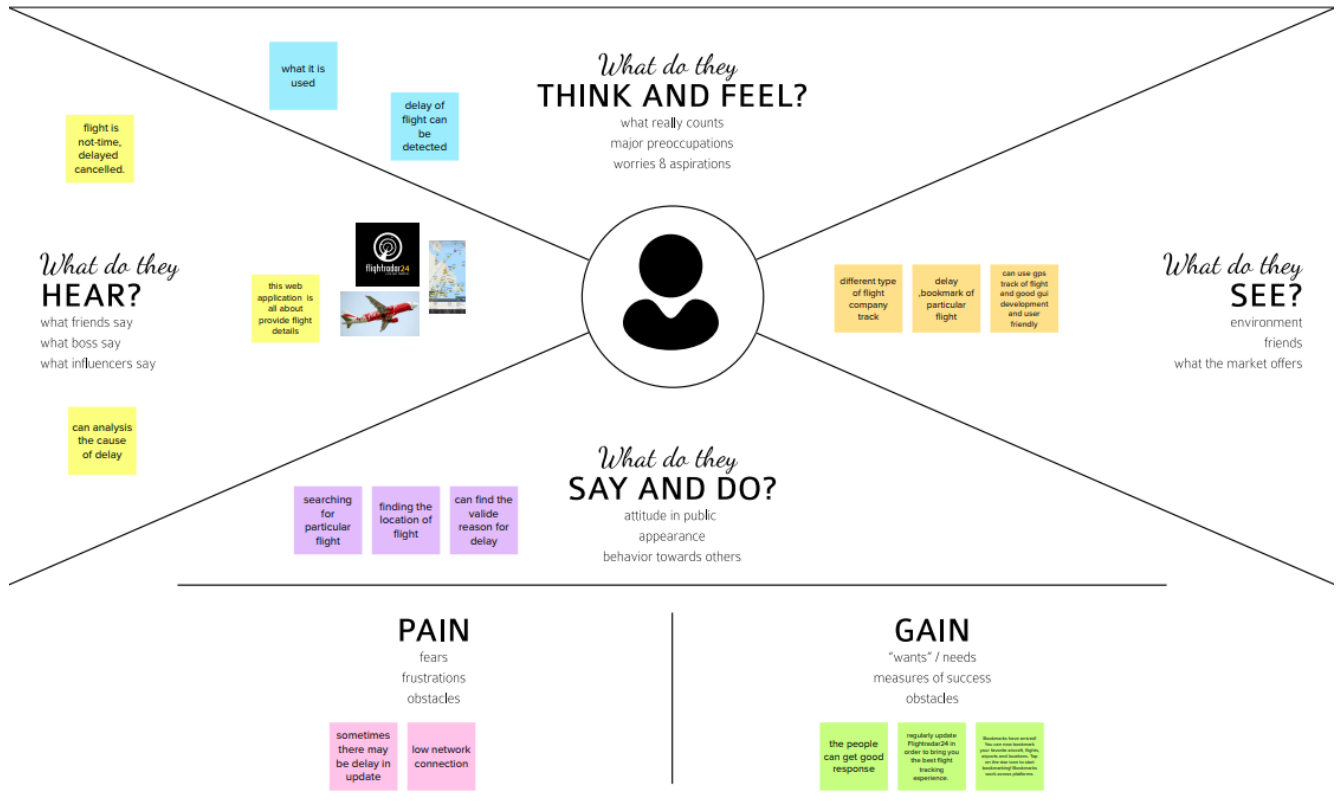
- [1] Khaksar, H., & Sheikholeslami, A. (2017). Airline delay prediction by machine learning algorithms. *Scientia*
- [2] Esmailzadeh, E., & Mokhtarimousavi, S. (2020). Machine learning approach for flight departure delay prediction and analysis. *Transportation Research Record: Journal of the Transportation Research Board*, 2674(8), 145–159.
- [3] M. Al-Tabbakh, S., M. Mohamed, H., & H. El, Z. (2018). Machine learning techniques for analysis of Egyptian flight delay. *International Journal of Data Mining & Knowledge Management Process*, 8(3), 01–14’
- [4] Ye, B., Liu, B., Tian, Y., & Wan, L. (2020). A methodology for predicting aggregate flight departure delays in airports based on supervised learning. *Sustainability*, 12(7), 2749.
- [5] ATLIOĞLU, M. C., BOLAT, M., ŞAHİN, M., TUNALI, V., & KILINÇ, D. (2020). Supervised learning approaches to flight delay prediction. *Sakarya University Journal of Science*.
- [6] Yu, B., Guo, Z., Asian, S., Wang, H., & Chen, G. (2019). Flight delay prediction for commercial air transport: A deep learning approach. *Transportation Research Part E: Logistics and Transportation Review*, 125, 203–221.

## 2.3 Problem Statement Definition

The main objective of the model is to predict flight delays accurately in order to optimize flight operations and minimize delays. These delays are responsible for large economic and environmental losses.

## 3. IDEATION AND PROPOSED SOLUTION

### 3.1 Empathy Map Canvas



# 3.2 Ideation and Brainstroming

4

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

Tip

You can select a sticky note and hit the pencil icon to start drawing!

Gladys Kirubhavathy

Problem Statement

How can we make a better use of the space in the office?

Problem Statement

How can we make a better use of the space in the office?

Problem Statement

How can we make a better use of the space in the office?

Hari Gokul

Problem Statement

How can we make a better use of the space in the office?

Problem Statement

How can we make a better use of the space in the office?

Problem Statement

How can we make a better use of the space in the office?

Jai

Problem Statement

How can we make a better use of the space in the office?

Problem Statement

How can we make a better use of the space in the office?

Problem Statement

How can we make a better use of the space in the office?

Kishore

Problem Statement

How can we make a better use of the space in the office?

Problem Statement

How can we make a better use of the space in the office?

Problem Statement

How can we make a better use of the space in the office?





## Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

20 minutes

### Weather

Choose different routes when the weather conditions are bad



#### TIP

Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mind.

### Facilities and resources in airport

Construct large runways

Construct bigger airports to support large number of flights

Arrange alternate flights

Construct many check-in counters to avoid queues

### Customer

Use apps to find out how often flight is typically delayed

Avoid travelling during peak season

Schedule flights for the middle of the week to avoid traffic

Always book a back up flight

Choose right airlines

### Airlines

Inform the range of timing beforehand

Check the flight conditions before take off

Avoid many flights in the runway

Flights should be checked for any mechanical issues

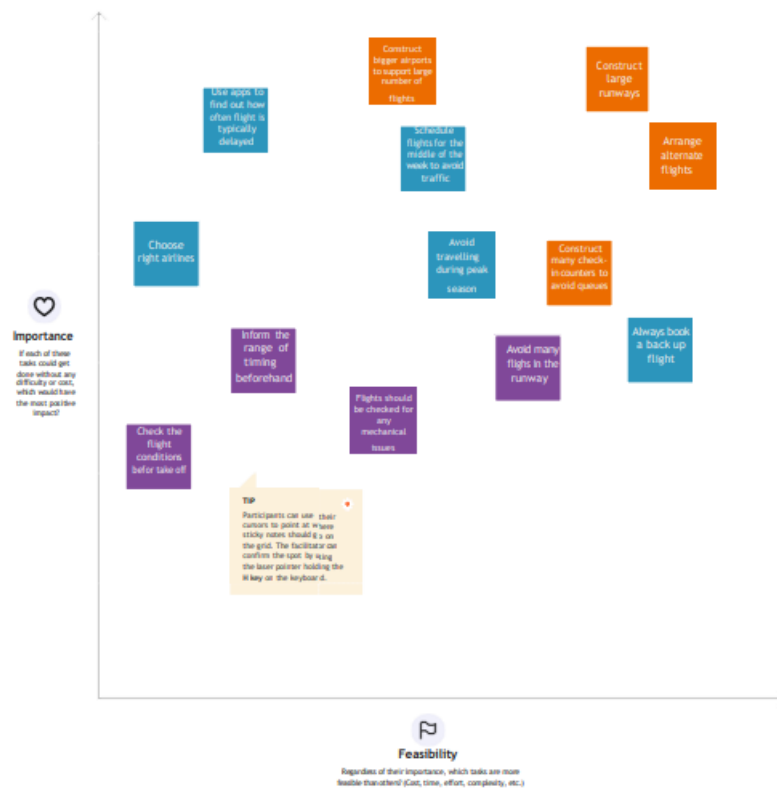




## Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes



## After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

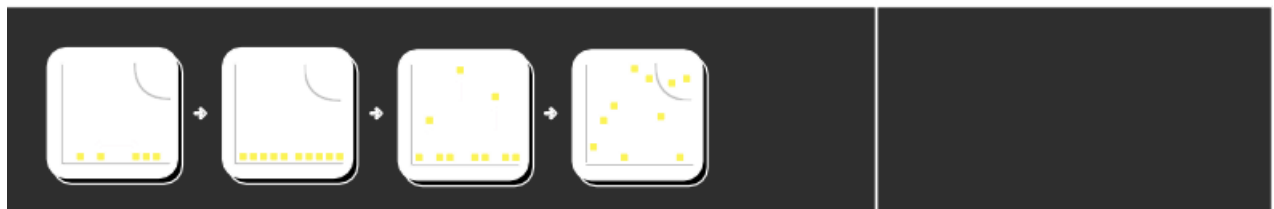
### Quick add-ons

- Share the mural**  
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.
- Export the mural**  
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

### Keep moving forward

- Strategy blueprint**  
Define the components of a new idea or strategy.  
[Open the template](#)
- Customer experience journey map**  
Understand customer needs, motivations, and obstacles for an experience.  
[Open the template](#)
- Strengths, weaknesses, opportunities & threats**  
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.  
[Open the template](#)

[Share template feedback](#)



### 3.3 Proposed Solution

S.No	Parameter	Description
1.	Problem Statement	The main objective of the model is to predict flight delays accurately in order to optimize flight operations and minimize delays. These delays are responsible for large economic and environmental losses.
2.	Idea/Solution description	Using a machine learning model, we can predict flight arrival delays. A flight is considered to be delayed when the difference between scheduled and actual arrival times is greater than 15 minutes.
3.	Novelty/Uniqueness	A user friendly app that provides accurate predictions of the delay time which can be easily accessible.
4.	Social Impact/Customer Satisfaction	Predicting flight delays can improve airline operations and passenger satisfaction, which will result in a positive impact on the economy.
5.	Business Model (Revenue Model)	Make revenue from commercial advertisements and sell the model to airline companies.
6.	Scalability of the solution	This model can handle any number of inputs and provide the respective outputs.

## 3.4 Problem Solution Fit

Define CS, fit into CC	<b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span> <ul style="list-style-type: none"> <li>- Normal flight users</li> <li>- Business professionals having meetings</li> <li>- People boarding a lay-over flight</li> <li>- Logistics incharge at airport</li> <li>- Airport catering manager</li> </ul>	<b>6. CUSTOMER CONSTRAINTS</b> <span>CC</span> <ul style="list-style-type: none"> <li>- Refund/Partial Refund</li> <li>- Not knowing the exact time of delay</li> <li>- Unavailability of alternate flights or accommodation</li> </ul>	<b>5. AVAILABLE SOLUTIONS</b> <span>AS</span> <ul style="list-style-type: none"> <li>- May take alternate flights</li> <li>- Ask for an alternate flight/schedule</li> <li>- Wait for the delayed schedule</li> <li>- Enjoy airline benefits</li> <li>- Report airline</li> <li>- Cancel the flight</li> <li>- Search for specific reasons for delay</li> </ul>	Explore AS, differentiate
	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <span>J&amp;P</span> <ul style="list-style-type: none"> <li>- To know if a flight is delayed</li> <li>- To make alternate arrangements to reach the destination in case the flight is delayed</li> <li>- To know other things that can be done when the flight is delayed</li> </ul>	<b>9. PROBLEM ROOT CAUSE</b> <span>RC</span> <ul style="list-style-type: none"> <li>- Unavailability of means to estimate delays occurring in airplanes</li> <li>- Large scale economic loss for both airlines and the customers</li> <li>- Degradation in airline's reputation when many flights are delayed</li> </ul>	<b>7. BEHAVIOUR</b> <span>BE</span> <ul style="list-style-type: none"> <li>- Use the app deployed to know the approximate delay</li> <li>- Find alternate travel options</li> <li>- Find hotel accommodations for overnight delays</li> <li>- Fill ratings and feedbacks to help other users</li> </ul>	

Identify strong TR & EM	<b>3. TRIGGERS</b> <span>TR</span> <ul style="list-style-type: none"> <li>- Cancellation of flights</li> <li>- Extreme boredom</li> <li>- Guilt of wasting time</li> <li>- Thought of missing important meetings</li> <li>- Missing layover flight</li> <li>- Uncertainty in deciding if the flight is <u>delayed</u> when they start late for the airport</li> </ul>	<b>10. OUR SOLUTION</b> <span>SL</span> <ul style="list-style-type: none"> <li>- The aim is to develop an application predicts flight delays using a super machine learning model (a decision classifier) with the data of flights and d so far and estimate the time of delay t spatial dependencies of flights into acc</li> </ul>	<b>8. CHANNELS OF BEHAVIOUR</b> <span>CH</span> <p>8.1 ONLINE</p> <ul style="list-style-type: none"> <li>- Check if a particular flight will be delayed and the estimated time of arrival</li> <li>- Giving ratings and feedbacks for <u>various flights</u> so as to improve the app's performance in predicting further delays</li> <li>- Check for other specific reasons for delay</li> </ul>	Identify strong TR & EM

Identify strong TR & EM	<b>4. BEFORE / AFTER</b> <span>EM</span> <p>Before:</p> <ul style="list-style-type: none"> <li>- Worried</li> <li>- About missing important events</li> <li>- About missing layover flights</li> <li>- If the flight is <del>gonna</del> be canceled</li> <li>- Frustrated</li> <li>- About the unexpected delay/cancellation</li> <li>- Not knowing the news of delay <u>beforehand</u></li> <li>- About the weather</li> <li>- Bored</li> <li>- Don't know how to make use of time</li> </ul> <p>After:</p> <ul style="list-style-type: none"> <li>- Gets to enjoy the airline <u>benefits</u></li> <li>- <u>Stay</u> relaxed after getting a proper update from the airline</li> <li>- Relieved if an alternate solution can be found</li> </ul>	<b>4. Advantages/Disadvantages</b> <span>EM</span> <p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>- Save Time</li> <li>- Reduced Human Errors - Save Money</li> </ul> <p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>- Installation Cost is High</li> <li>- Prediction cannot be completely Accurate</li> <li>- If <u>a</u> external issue such as network issue arises the facility may not work properly</li> </ul>	



## 4.REQUIREMENT ANALYSIS

### 4.1 Functional requirement

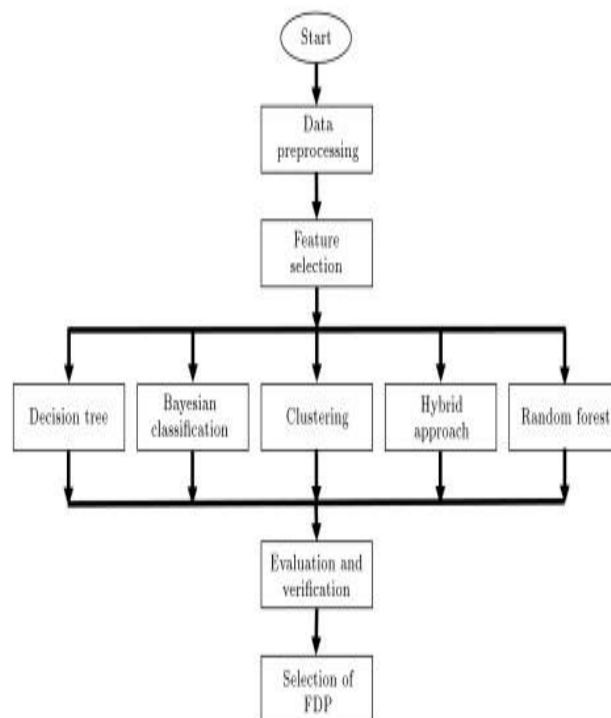
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User registration & login	Registration & login of passengers via Google with email id and password
FR-2	Detailed arrival and departure time of flights	With the flight no and name, the passenger can see the details (time, boarding station, etc) of his/her in the dashboard.
FR-3	Intimate the accurate flight timings to passengers	With the help of various machine learning algorithms, when given the right input features (actual arrival time & departure time, scheduled time, etc) we can predict the delay in time of the flight which will also be shown in the dashboard and updated time-to-time.
FR-4	Airline helpdesk provide alternatives	The contact details of different airlines will be provided, The passenger will also be able to look for any alternative flight in case the flights get cancelled.
FR-5	Passenger feedback	The feedback will be got from the users or how the application was to use, with their feedback and suggestions, we can improve the application further.

### 4.2 Non-Functional requirement

FR No.	Non-Functional Requirement	Description
NFR-1	<b>Usability</b>	The application will have an easy-to-use GUI. Users will find it simple to comprehend and utilize all the capabilities of the application.
NFR-2	<b>Security</b>	The technique known as database replication will be utilised for the application security to ensure the safety of all crucial data
NFR-3	<b>Reliability</b>	The application will be consistent in all scenarios and work without fail in any environment
NFR-4	<b>Performance</b>	The applications response time is direct & faster which is determined by the efficiency of the implemented machine algorithm.
NFR-5	<b>Availability</b>	The application will be accessible to users 24 hours a day, 7 days a week without interruption. They can access it from any part of the world with proper internet.
NFR-6	<b>Scalability</b>	The application will be able to handle a rise in the no. of users & generate higher versions.

## 5.PROJECT DESIGN

### 5.1 Data Flow Diagram



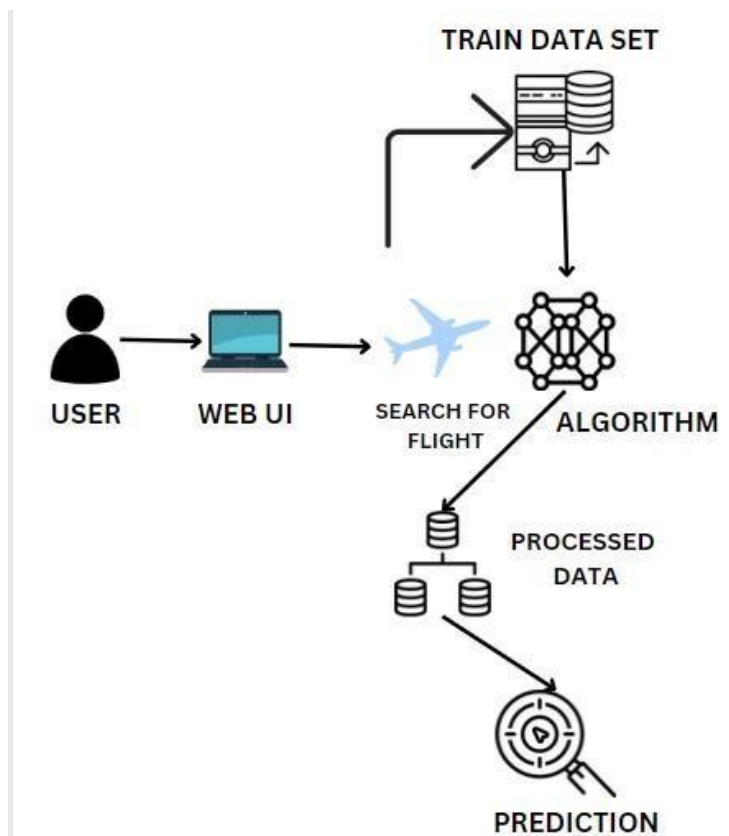
### 5.2 Solution Architecture

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.

- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed, and delivered.

### Solution Architecture Diagram:



### 5.3 User Stories

User Type	Functional requirement	User story number	User story/task	Acceptance criteria	Priority	Release
Customer (Mobile user, Web user, Care executive, Administrator)	Registration	USN-1	As a user, I can register for the application by entering my mail, password, and confirming my password	I can access my account/ dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
	Dashboard	USN-3	As a user, I can register for the application through internet	I can register & access the dashboard with Internet login	Low	Sprint-2
		USN-4	As a user, I can register for the	I can confirm the registration in	Medium	Sprint-1

			application through Gmail	Gmail		
	Login	USN-5	As a user, I can log into the application by entering email & password	I can login with my id and password	High	Sprint-1

## 6.PROJECT PLANNING &SCHEDULING

### 6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story
Sprint-1	Data Collection and Preprocessing	USN-1	As a user, I am unable to engage with anything.	
Sprint-1	Build HTML Pages	USN-2	As a user, I can view the web pages to enter flight details.	
Sprint-2	Build Python Pages	USN-3	As a user, I am unable to engage with anything.	
Sprint-2	Execute And Test Your Model	USN-4	As a user, I can predict flight delays using the best created ML models.	

Sprint-3	Train The ML Model	USN-6	As a user, I can predict flight delays using the best created ML models.	
Sprint-3	Integrate Flask with Model	USN-5	As a user, I can predict flight delays using the user interface.	
<b>Sprint</b>	<b>Functional Requirement (Epic)</b>	<b>User Story Number</b>	<b>User Story / Task</b>	<b>Story</b>
Sprint-4	Model Deployment on IBM Cloud using IBM Watson	USN-8	As a user, I can use the model by requesting the deployed model on Cloud.	

## 7.CODING & SOLUTIONING

### 7.1 Feature 1

- IBM Watson Platform
- Node red
- Web UI
- Python code-Flask
- HTML

- CSS

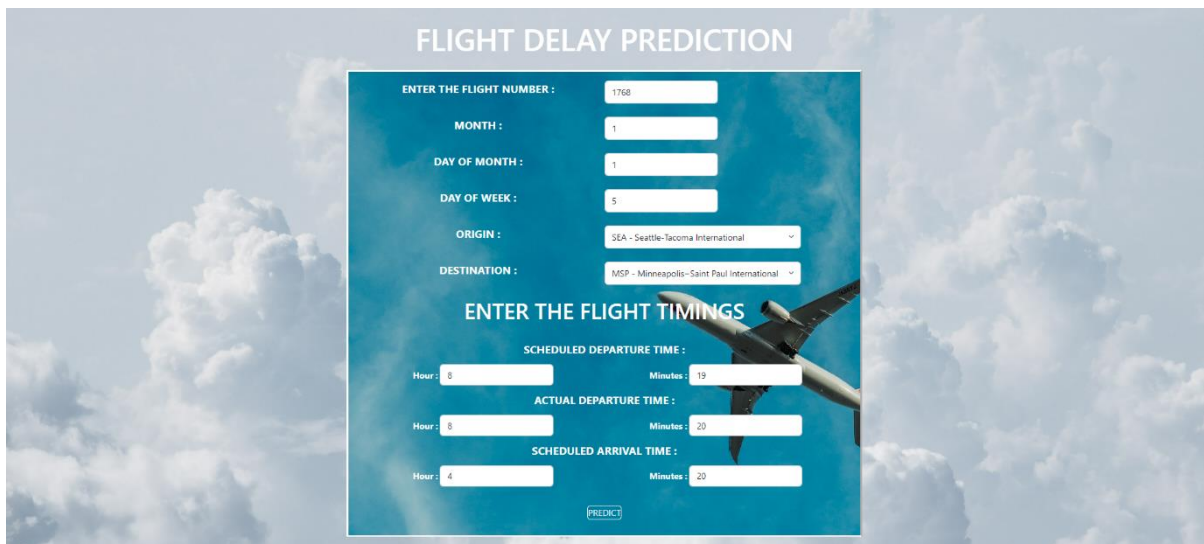
## 7.2 Feature 2

- Data entry page
- Prediction result page

# 8.TESTING AND RESULTS

## 8.1 Test Cases

### Test case 1:



The screenshot shows a web form titled "FLIGHT DELAY PREDICTION" set against a background of a blue sky with white clouds and a portion of an airplane. The form is divided into two main sections: "ENTER THE FLIGHT NUMBER :" and "ENTER THE FLIGHT TIMINGS".

**ENTER THE FLIGHT NUMBER :**

- Flight Number: 1768
- Month: 1
- Day of Month: 1
- Day of Week: 5
- Origin: SEA - Seattle-Tacoma International (dropdown menu)
- Destination: MSP - Minneapolis-Saint Paul International (dropdown menu)

**ENTER THE FLIGHT TIMINGS**

**SCHEDULED DEPARTURE TIME :**

- Hour: 0
- Minutes: 19

**ACTUAL DEPARTURE TIME :**

- Hour: 0
- Minutes: 20

**SCHEDULED ARRIVAL TIME :**

- Hour: 4
- Minutes: 20

At the bottom of the form, there is a small button labeled "PREDICT".

### Test case 2:



## **9.ADVANTAGES**

- Machine learning can predict flight delays with a high degree of accuracy.
- Machine learning can help identify causes of flight delays.
- Machine learning can help reduce the number of flight delays.
- Machine learning can help improve the efficiency of airport operations.

## **10.DISADVANTAGES**

- Machine learning models can be complex and difficult to understand.
- Machine learning models require a large amount of data to train and can be time-consuming to develop.
- Machine learning models can be prone to overfitting, meaning they may not generalize well to new data.
- Machine learning models can be expensive to develop and maintain.

## **11.CONCLUSION**

In this project, we use flight data, weather, and demand data to predict flight departure delay. Our result shows that the Random Forest method yields the best performance compared to the SVM model. Somehow the SVM model is very time consuming and does not necessarily produce better



results. In the end, our model correctly predicts 91% of the non-delayed flights. However, the delayed flights are only correctly predicted 41% of time. As a result, there can be additional features related to the causes of flight delay that are not yet discovered using our existing data sources.

In the second part of the project, we can see that it is possible to predict flight delay patterns from just the volume of concurrently published tweets, and their sentiment and objectivity. This is not unreasonable; people tend to post about airport delays on Twitter; it stands to reason that these posts would become more frequent, and more profoundly emotional, as the delays get worse. Without more data, we cannot make a robust model and find out the role of related factors and chance on these results. However, as a proof of concept, there is potential for these results. It may be possible to routinely use tweets to ascertain an understanding of concurrent airline delays and traffic patterns, which could be useful in a variety of circumstances.

## **12.FUTURE SCOPE**

This project is based on data analysis from year 2008. A large dataset is available from 1987-2008 but handling a bigger dataset requires a great amount of preprocessing and cleaning of the data. Therefore, the future work of this project includes incorporating a larger dataset. There are many different ways to preprocess a larger dataset like running a Spark cluster over a server or using a cloud-based services like AWS and Azure to process the data. With the new advancement in the field of deep learning, we can use Neural Networks algorithm on the flight and weather data. Neural Network works on the pattern matching methodology. It is divided into three basic parts for data modelling that includes feed forward networks, feedback networks, and selforganization network. Feed-forward and feedback networks are generally used in the areas of prediction, pattern recognition, associative memory, and optimization calculation, whereas self-organization networks are generally used in cluster analysis. Neural Network offers distributed computer architecture with important learning abilities to represent nonlinear relationships.

Also, the scope of this project is very much confined to flight and weather data of United States, but we can include more countries like China, India, and Russia. Expanding the scope of this project, we can also add the flight data from international flights and not just restrict our self to the domestic flights.

## **13.APPENDIX**

### **13.1 Source Code**

```
from flask import Flask,render_template,request
import requests

# NOTE: you must manually set API_KEY below using information retrieved
from your IBM Cloud account.
```

# NOTE: you must manually set API\_KEY below using information retrieved from your IBM Cloud account.

```
API_KEY = "2SNGxCC84_SnT4w-CK18BSgHa22dH7hgM673se9fq57B"
```

```
token_response = requests.post('https://iam.cloud.ibm.com/identity/token',  
data={"apikey":
```

```
API_KEY, "grant_type": 'urn:ibm:params:oauth:grant-type:apikey'})
```

```
mltoken = token_response.json()["access_token"]
```

```
header = {'Content-Type': 'application/json', 'Authorization': 'Bearer ' + mltoken}
```

```
app=Flask(__name__)
```

```
@app.route('/')  
def index():  
    return render_template('index.html')
```

```
@app.route('/prediction',methods=["POST"])
```

```
def predict():
```

```
    if request.method=="POST":
```

```
        name=request.form["name"]
```

```
        month=request.form["month"]
```

```
        if(int(month)>12):
```

```
            ans="Please Enter the correct Month"
```

```
            return render_template("index.html" ,y=ans)
```

```
        dayofmonth=request.form["dayofmonth"]
```

```
        if(int(dayofmonth)>31):
```

```
ans="Please Enter the correct Day of Month"
return render_template("index.html" ,y=ans)
```

```
dayofweek=request.form["dayofweek"]
if(int(dayofweek)>7):
    ans="Please Enter the correct Day of Week"
    return render_template("index.html" ,y=ans)
```

```
origin=request.form["origin"]
destination=request.form['destination']
```

```
if(origin==destination):
    ans="Origin airport and destination airport can't be same"
    return render_template("index.html" ,y=ans)
```

```
if(origin=="msp"):
    origin1,origin2,origin3,origin4,origin5=0,0,0,1,0
if(origin=="dtw"):
    origin1,origin2,origin3,origin4,origin5=0,1,0,0,0
if(origin=="jfk"):
    origin1,origin2,origin3,origin4,origin5=0,0,1,0,0
if(origin=="sea"):
    origin1,origin2,origin3,origin4,origin5=0,0,0,0,1
if(origin=="alt"):
    origin1,origin2,origin3,origin4,origin5=1,0,0,0,0
```

```

if(destination=="msp"):

destination1,destination2,destination3,destination4,destination5=0,0,0,1,0

if(destination=="dtw"):

destination1,destination2,destination3,destination4,destination5=0,1,0,0,0

if(destination=="jfk"):

destination1,destination2,destination3,destination4,destination5=0,0,1,0,0

if(destination=="sea"):

destination1,destination2,destination3,destination4,destination5=0,0,0,0,1

if(destination=="alt"):

destination1,destination2,destination3,destination4,destination5=1,0,0,0,0

```

```

depthr=request.form['depthr']
deptmin=request.form['deptmin']
if(int(depthr)>23 or int(deptmin)>59):
    ans="Please enter the correct Departure time"
    return render_template("index.html" ,y=ans)
else:
    dept=depthr+deptmin

actdepthr=request.form['actdepthr']

```

```
actdeptmin=request.form['actdeptmin']
if(int(actdeptthr)>23 or int(actdeptmin)>59):
    ans="Please enter the correct Actual Departure time"
    return render_template("index.html" ,y=ans)
else:
    actdept=actdeptthr+actdeptmin
```

```
arrtimehr=request.form['arrtimehr']
arrtimemin=request.form['arrtimemin']
if(int(arrtimehr)>23 or int(arrtimemin)>59):
    ans="Please enter the correct Arrival time"
    return render_template("index.html" ,y=ans)
else:
    arrtime=arrtimehr+arrtimemin
```

```
if((int(actdept)-int(dept))<15):
    dept15=0
else:
    dept15=1
```

```
print(dept15)
```

```
total=[[month,dayofmonth,dayofweek,origin1,origin2,origin3,origin4,origin5,d
```

```
estination1,destination2,destination3,destination4,destination5,dept,actdept,dept15,arrtime]]
```

# NOTE: manually define and pass the array(s) of values to be scored in the next line

```
payload_scoring = {"input_data": [{"fields": ["f0","f1","f2","f3","f4","f5","f6","f7","f8","f9","f10","f11","f12","f13","f14","f15","f16"], "values": total}]]}
```

```
response_scoring = requests.post('https://us-south.ml.cloud.ibm.com/ml/v4/deployments/74fb0eec-a7f5-4bb6-ab8b-d423e91a872c/predictions?version=2022-11-16', json=payload_scoring,
```

```
headers={'Authorization': 'Bearer ' + mltoken})
```

```
print("Scoring response")
```

```
print(response_scoring.json())
```

```
pred = response_scoring.json()
```

```
value = pred['predictions'][0]['values'][0][0]
```

```
print(value)
```

```
if(value==[0.]):
```

```
    ans="THE FLIGHT WILL BE ON TIME"
```

```
else:
```

```
    ans="THE FLIGHT WILL BE DELAYED"
```

```
return render_template("results.html" ,y=ans)
```

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

## 13.2 Github Link

**Github Link :** <https://github.com/IBM-EPBL/IBM-Project-10948-1659246792>

Project demo Link : <https://github.com/IBM-EPBL/IBM-Project-10948-1659246792/blob/main/FINAL%20DELIVARABLES/DemoVideo.mp4>



