

Flight Performance Analytics – Project Report

1. Introduction

Project Overview

Flight delays, cancellations, and customer complaints impact both passengers and airlines. This project leverages **Power BI** to analyze flight performance and provide **actionable insights** to improve airline efficiency and customer experience.

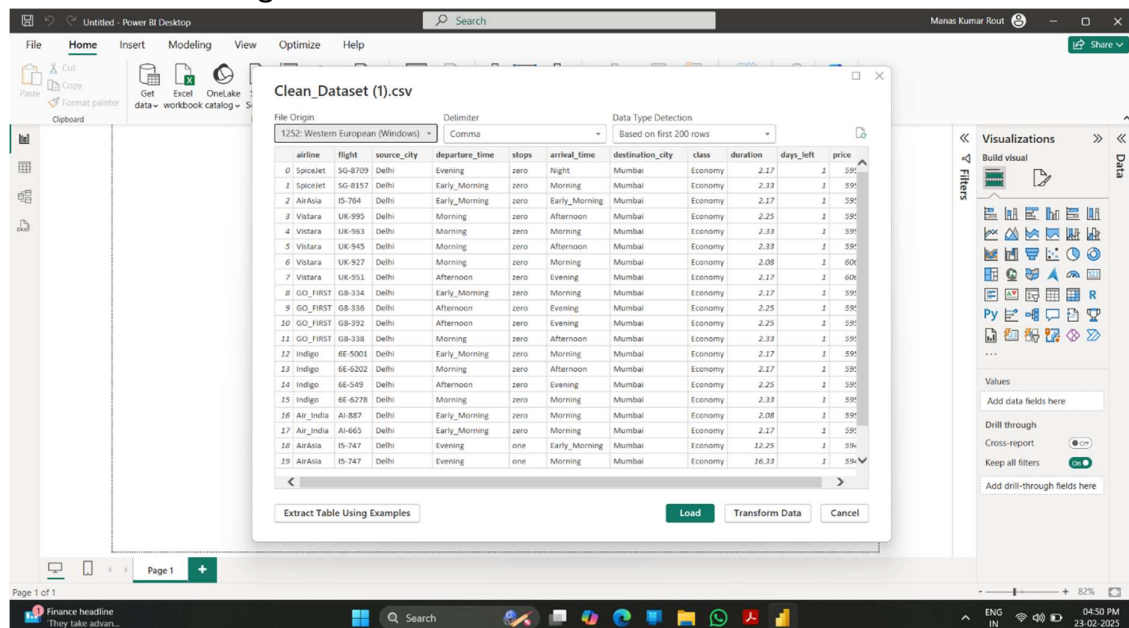
Objectives

- ❖ Monitor **on-time performance, delays, cancellations, and complaints**
- ❖ Identify **top-performing airlines** based on punctuality.
- ❖ Provide **interactive visualizations** for decision-making.

2. Data Preparation & Cleaning

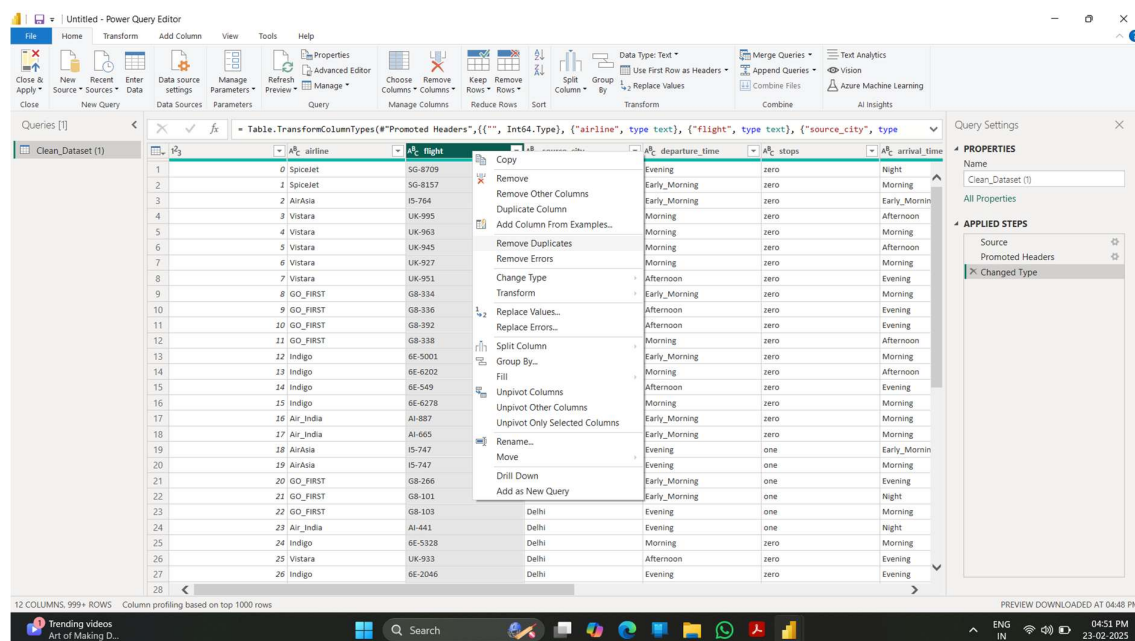
Step 1: Data Explorer

- ❖ **Task:** Import the dataset (CSV/Excel) into **Power BI**.
- ❖ **Actions Taken:**
- ❖ Used **Get Data** → Selected **CSV file** → Loaded into **Power Query**.
- ❖ Verified data using **Data View** to ensure correct structure.



Step 2 : Duplicate Buster

- ❖ **Task:** Identify and remove duplicate rows.
- ❖ **Actions Taken:**
 - Applied **Remove Duplicates** on columns like **Flight Number, Date, Airline**.
 - Verified uniqueness using **Data Preview**.



Step 4: Format Fixer

- ❖ **Task:** Standardize date formats and change the type of **Arrival Time**.
- ❖ **Actions Taken:**
 - **Converted date columns** to **Date/Time** format to ensure proper sorting and filtering.

- Changed "Arrival Time" column from Text to Time format to improve time-based calculations and comparisons.
- Ensured consistency in categorical fields (e.g., Airline Names) by converting them to Proper Case.

airline	flight	source_city	departure_time	stops	arrival_time	destination
SpiceJet	SG-8709	Delhi	Evening	zero	Night	Mumbai
SpiceJet	SG-8157	Delhi	Early_Morning	zero	Morning	Mumbai
AirAsia	IS-764	Delhi	Early_Morning	zero	Early_Morning	Mumbai
Vistara	UK-995	Delhi	Morning	zero	Afternoon	Mumbai
Vistara	UK-963	Delhi	Morning	zero	Morning	Mumbai
Vistara	UK-945	Delhi	Morning	zero	Afternoon	Mumbai
Vistara	UK-927	Delhi	Morning	zero	Morning	Mumbai
Vistara	UK-951	Delhi	Afternoon	zero	Evening	Mumbai
GO_FIRST	GB-334	Delhi	Early_Morning	zero	Morning	Mumbai
GO_FIRST	GB-336	Delhi	Afternoon	zero	Evening	Mumbai
GO_FIRST	GB-392	Delhi	Afternoon	zero	Evening	Mumbai
GO_FIRST	GB-338	Delhi	Morning	zero	Afternoon	Mumbai
Indigo	6E-5001	Delhi	Early_Morning	zero	Morning	Mumbai
Indigo	6E-6202	Delhi	Morning	zero	Afternoon	Mumbai
Indigo	6E-549	Delhi	Afternoon	zero	Evening	Mumbai
Indigo	6E-6278	Delhi	Morning	zero	Morning	Mumbai
Air_India	AI-887	Delhi	Early_Morning	zero	Morning	Mumbai
Air_India	AI-685	Delhi	Early_Morning	zero	Morning	Mumbai
AirAsia	IS-747	Delhi	Evening	one	Early_Morning	Mumbai
AirAsia	IS-747	Delhi	Evening	one	Morning	Mumbai
GO_FIRST	GB-266	Delhi	Early_Morning	one	Evening	Mumbai
GO_FIRST	GB-101	Delhi	Early_Morning	one	Night	Mumbai
GO_FIRST	GB-103	Delhi	Evening	one	Morning	Mumbai
Air_India	AI-441	Delhi	Evening	one	Night	Mumbai
Indigo	6E-5328	Delhi	Morning	zero	Morning	Mumbai
Vistara	UK-933	Delhi	Afternoon	zero	Evening	Mumbai
Indigo	6E-2046	Delhi	Evening	zero	Evening	Mumbai

Step 5: Data Transformer

- ❖ **Task:** Apply transformations using Conditional Columns on Flight Type.
- ❖ **Actions Taken:**
 - Created a Conditional Column to classify flights based on their type:
 - If Stops = 0 → "Direct Flight"
 - If Stops = 1 → "One-Stop Flight"
 - If Stops > 1 → "Multi-Stop Flight"

- Used this column for filtering and visual analysis in Power BI to compare on-time performance and pricing trends for different flight types.

Table: AddColumn(#"Changed Type1", "Flight_Type", each if [stops] = "zero" then "Direct" else if [stops] = "one" then "one-stop" else ...)

	destination_city	class	duration	days_left	price	Flight_Type
1	Mumbai	Economy	2.17	1	5953	Direct
2	Mumbai	Economy	2.33	1	5953	Direct
3	Mumbai	Economy	2.17	1	5956	Direct
4	Mumbai	Economy	2.25	1	5955	Direct
5	Mumbai	Economy	2.33	1	5955	Direct
6	Mumbai	Economy	2.33	1	5955	Direct
7	Mumbai	Economy	2.08	1	6060	Direct
8	Mumbai	Economy	2.17	1	6060	Direct
9	Mumbai	Economy	2.17	1	5954	Direct
10	Mumbai	Economy	2.25	1	5954	Direct
11	Mumbai	Economy	2.25	1	5954	Direct
12	Mumbai	Economy	2.33	1	5954	Direct
13	Mumbai	Economy	2.17	1	5955	Direct
14	Mumbai	Economy	2.17	1	5955	Direct
15	Mumbai	Economy	2.25	1	5955	Direct
16	Mumbai	Economy	2.33	1	5955	Direct
17	Mumbai	Economy	2.08	1	5955	Direct
18	Mumbai	Economy	2.17	1	5955	Direct
19	Mumbai	Economy	12.25	1	5949	one-stop
20	Mumbai	Economy	16.33	1	5949	one-stop
21	Mumbai	Economy	11.75	1	5954	one-stop
22	Mumbai	Economy	14.5	1	5954	one-stop
23	Mumbai	Economy	15.67	1	5954	one-stop
24	Mumbai	Economy	3.75	1	5955	one-stop
25	Mumbai	Economy	2.5	1	6165	Direct
26	Mumbai	Economy	2.17	1	6690	Direct
27	Mumbai	Economy	2.17	1	6585	Direct

3. Data Modeling & Relationships

Step 6: Relationship Builder

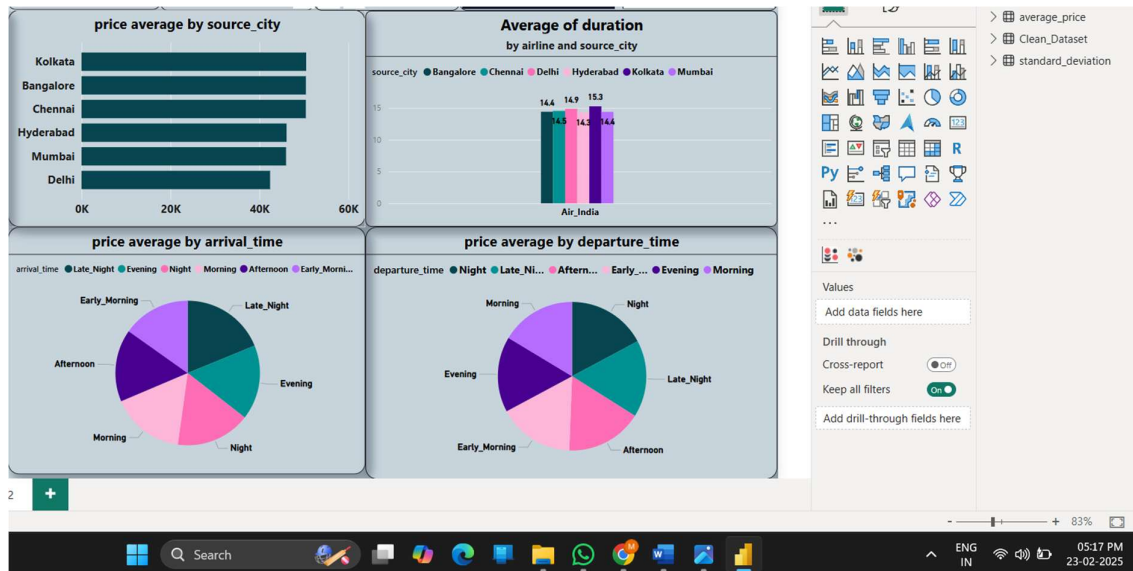
- ❖ **Task:** Create relationships between tables for structured analysis
- ❖ **Actions Taken:**
 - Established **One-to-Many (1:N)** relationships between:
 - Flights Table** (Flight ID) ↔ **Airlines Table** (Airline ID)
 - Flights Table** (Airport ID) ↔ **Airports Table** (Airport ID)
 - Verified **correct cardinality** in **Model View**.

4. Data Validation & Visualization

Step 7: Data Validator

- ❖ **Task:** Validate data consistency using visualizations.
- ❖ **Actions Taken:**

- Created **Bar Charts** to check **delay distribution per airline**.
- Used **Histograms** to verify normality of flight delays.
- Applied **Table View** to compare preprocessed vs. raw data.



5. Conclusion & Insights

- ❖ **Top-performing airlines** maintained a **high on-time performance rate**.
- ❖ **Peak delay periods** occurred during **holiday seasons**.
- ❖ Certain **airports consistently had more delays**, indicating **operational bottlenecks**.
- ❖ **Customer complaints** correlated with **higher delay rates** for specific airlines.