Project Title: Data Analytics on IndiGo Business Model

* Problem Statement :

Analize the data of Indian Airlines and bring out the following: (DATA ANALYTICS ON **INDIGO** BUSINESS MODEL)

1. Top 3 sectors

2. Which sector in future will see more demand

3. Which airline is more likely to grow by market share

* Problem Description:

As India witnesses rapid growth in air travel, especially with the expansion of regional airports and rising middle-class demand, it becomes essential for airlines to strategically analyze operational data to stay competitive. **IndiGo Airlines**, India’s largest low-cost carrier, has maintained profitability and market leadership by leveraging data analytics across its operations. From optimizing ticket pricing and managing high-yield routes to forecasting demand in emerging sectors, data-driven decisions have helped IndiGo improve efficiency and expand strategically. By analyzing passenger trends, load factors, and route performance, the airline identifies profitable routes and adjusts its network accordingly.

This project focuses on analyzing the business model(datasets) of **IndiGo Airlines** through data analytics, with the objective of understanding route performance, market trends, and future growth opportunities in the Indian aviation sector. Using real-world air traffic data, the project identifies the **top-performing sectors (routes)** by passenger volume, and applies forecasting techniques to predict **emerging high-demand routes**.

The project also evaluates **market share trends** among major Indian carriers to determine which airline is best positioned for future growth. By simulating and visualizing route-level data, the analysis demonstrates how IndiGo and similar airlines can make **data-driven decisions** to improve profitability, expand strategically, and enhance operational efficiency.

This work showcases the role of data analytics in aviation and offers practical insights into how airlines can align their route planning with actual demand patterns using historical data, predictive modeling, and visual storytelling tools.

* Objectives:

1. Identify the Top 3 Sectors (Routes) for IndiGo:
2. Identifying the Busiest months of every Routes
3. Year-wise Growth of IndiGo's Market Share
4. Seasonal Travel Peaks
5. How Airlines are coming up with New Routes? What Data and What Data Analysis is helping them to arrive at the introduction of the new Routes.(top 5 growing routes or in demand routes)

* Datasets Used :

The datasets used in this project were sourced from the **Indian Aviation Traffic** repository on GitHub, which compiles and shares publicly available data released by the **Directorate General of Civil Aviation (DGCA), Government of India**. This repository includes monthly records of airline-wise passenger traffic, sector-level city pair movements, and market share data of domestic airlines. From this repository, two datasets — city.csv and carrier.csv — were extracted, cleaned, and transformed into flight\_data.csv and market\_share.csv to align with the project’s analysis requirements.

|  |  |
| --- | --- |
| flight\_data.csv | - Monthly passenger traffic on each route (Sector-wise) |

|  |  |
| --- | --- |
| market\_share.csv | * Monthly market share (%) of all airlines including IndiGo |

* Key Analysis Of The Project :

 **Top Performing Routes (Sectors)**

* Identified the **top 3 busiest flight routes** based on total passenger volume.
* These routes represent high-demand travel corridors which are essential for airline route planning and prioritization.

 **Fastest Growing Sectors**

* Calculated the **growth percentage in passenger traffic** over time for each sector.
* Revealed the **top 5 routes with the highest growth**, indicating emerging demand and future expansion opportunities.

 **Busiest Month per Route**

* Found the **month with the highest passenger count** for every individual route.
* Useful for understanding **route-specific peak travel seasons** to optimize fleet utilization and scheduling.

 **Seasonal Travel Peaks**

* Aggregated all flight data by **calendar month** to discover consistent **seasonal travel patterns** (e.g., summer or festive spikes).
* Supports **dynamic pricing**, promotional campaigns, and **staff allocation planning**.

 **IndiGo Market Share Trends**

* Filtered and analyzed IndiGo’s monthly market share.
* Visualized its **market dominance and fluctuation** over time, which helps assess brand positioning and business strategy.
* Outcome and Benefits :

**Outcome**

* Successfully analyzed and visualized real-world flight data focused on IndiGo Airlines and domestic Indian aviation routes.
* Identified:
  + **Top 3 busiest routes** based on total passengers.
  + **Top 5 fastest-growing sectors** indicating rising travel demand.
  + **Busiest month for each route**, useful for operational planning.
  + **Seasonal travel peaks** by aggregating data across months.
  + **IndiGo’s market share trends** over time.
* Delivered clear, easy-to-understand **visualizations** using Python’s matplotlib.
* Organized the code into modular, beginner-friendly components (main.py, analysis.py, visualization.py).

**Benefits**

* **Airlines** can use this data to optimize flight schedules, plan new routes, and manage fleet capacity during high-demand months.
* **Revenue Managers** can implement **seasonal pricing strategies** based on passenger trends.
* **Market Analysts** can monitor competitor performance, such as IndiGo’s market share trajectory.
* **Airport Authorities** can use this to plan terminal capacity and staffing during peak periods.
* **Students and educators** benefit from a clean, modular project structure ideal for learning data analytics and Python visualization.
* Data Sources :

Data sources include:

**Indian Aviation Traffic** repository from GitHub

DGCA India

data.gov.in

Airline websites (IndiGo, Air India, etc.)

* Tools & Technologies Used:

Programming Language: Python

Libraries: pandas, matplotlib, seaborn, numpy, scikit-learn/statsmodels (for forecasting)

Constraints & Assumptions:

If real-world data is unavailable, synthetic/mock data may be created for analysis.

The forecasting will be basic or intermediate-level (no deep learning).

The project should maintain focus on IndiGo but include comparative analysis with other airlines.

Data should be cleaned, visualized, and interpreted clearly for business users.

Expected Outcomes:

Cleaned and well-structured dataset(s)

Insights on the top 3 revenue or traffic-generating sectors for IndiGo

Prediction on which flight sectors will grow in demand

Forecast on market share trends and expected airline growth