FLEXIBLE FLIGHT FINDER

WEB ANALYTICS
GROUP 10

Andrés Díaz Ruano
Diego Ramos Escobar
Filip Markovic
Lukas Bilicky

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PROBLEM

- Traditional flight search engines require users to specify exact dates and fixed destinations.

- This becomes a limitation for travelers with flexible schedules or those simply looking for the cheapest time or place to fly.
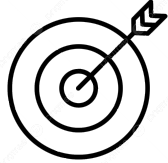
QUESTION TO ADDRESS

How can we identify the most cost-effective flight options for travelers with flexible origins, time windows, and destinations?

The goal is to transform flexible search criteria into clear, data-driven insights that reveal the cheapest destinations and best travel periods.
(for instance, 'fly to any city in Western Europe' ; 'next 3 months')
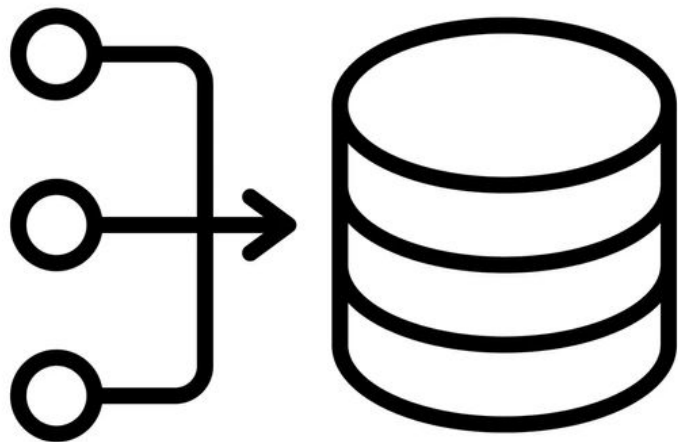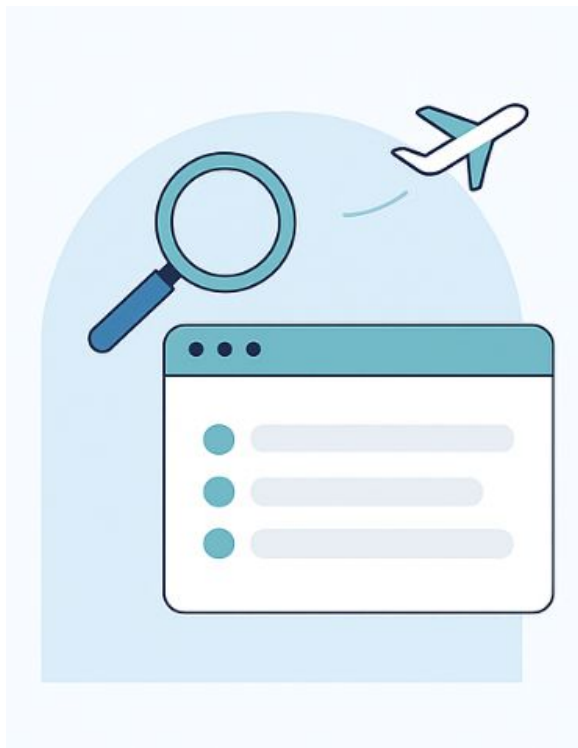
GOAL

To build an analytical tool (dashboard) that scrapes flight data and provides users with a dynamic, visual overview of the cheapest destinations and best travel dates within a defined flexible search space.

DATA SOURCE & RETRIEVAL METHOD

DATA ACQUISITION STRATEGY

PRIMARY: FLIGHT SEARCH API's	FALLBACK: PYTHON WEB SCRAPING
Amadeus Self-Service API or Skyscanner API. (Focus: *structured data, stability*, flexible search endpoints.)	Python Web Scraping (Beautiful Soup/Selenium) on platforms like Google Flights. (Focus: *High-volume data collection*, handling dynamic content.) *Extract up-to-date information based on flexible search queries*

Self-Service APIs

Flights ⌃

Flight Booking ⌄

Flight Inspiration ⌄

Flight Schedule ⌄

Airport ⌄

Airlines ⌄

Destination experiences ⌄

Market insights ⌄

Cars and Transfers ⌄

Hotels ⌄

Flight APIs

Help your travelers find the perfect flight with our Self-Service Flight APIs. This complete collection includes airline APIs, airport APIs, countless plane routes and deals to fly all around the globe, as you would demand from a leading air travel API provider, but with Amadeus you can also expect the highest volumes of reliable and detailed data in the market, while having the opportunity to benefit from a deep range of extended functionalities that will make full-scale flight API integration much easier.

You'll be able to compare offers from **over 400 airlines worldwide** and access advanced features like flight inspiration, multi-city search, cheapest dates available and calendar view. Once a flight is chosen, use our booking APIs to purchase the flight ticket and manage your reservations.

Design a more personalized experience triggering Amadeus Flight GDS artificial intelligence capabilities to predict delays, analyze prices or recommend destinations to travelers, and take advantage of handy utilities to search IATA & ICAO codes, display seating charts, get airline bundles, and more.

To obtain instant access to all these REST JSON Flight APIs, sign up and visit our Get Started section to learn how to get your API key and make your first call. Don't forget to check out our SDKs, the documentation page and this step-by-step guide on how to create a flight booking engine.

AMADEUS API

Search ctrl K

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Flights Indicative Prices API
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🏠 › Flights Live Prices API › Multi-City

Multi-City

Multi-City is a feature supported in Flights Live Prices API. It allows users to search flights worldwide using multiple stops in their query by adding extra legs with stopovers in several different cities.

How to use it?

To make a multi-city search you can use the same query as the one for Flights Live Prices Query Object by adding more query legs to the queryLeg object indicating it's a multi-city search.

How to use it?
Limitations

✈ Flights 🛏 Hotels 🚗 Car Hire

🔍 Berlin Brandenburg (BER) - London Heathrow (LHR) 4 flights
Thu, 24 Nov - Tue, 20 Dec | 1 adult | Economy

◯ Return   ◯ One way   ⦿ Multi-city

Berlin Brandenburg (BER)	▸	Barcelona (BCN)	24/11/2022	✕
Madrid (MAD)	▸	Thessaloniki (SKG)	30/11/2022	✕
Athens International (ATH)	▸	Rome Fiumicino (FCO)	10/12/2022	✕

```
{
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    "currency": "GBP",
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          "iata": "LHR"
        },
        "date": {
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          "month": "11",
          "day": "24"
        }
      },
      {
        "originPlaceId": {
          "iata": "LHR"
        },
        "destinationPlaceId": {
          "iata": "CDG"
        }
```

SKYSCANNER API

WHY THESE SOURCES?

- **Directly Relevant**: It provides the **core data** (price, date, route) needed to answer the question.

- **Real-world Data**: Flight prices are highly dynamic, making the analysis and visualization relevant and non-trivial.

- **Scalability challenge:** Real-world challenge in data volume, API management

PLANNED ANALYSIS AND TECHNIQUES

Data Cleaning & Pre-processing:
Normalize currency, convert date formats, and handle missing values.

Analysis Techniques

Descriptive Statistics
Calculate minimum, maximum, and average price within search window.

Clustering
Use a clustering algorithm (e.g., K-Means) on a feature set like *Price, Duration,* and *Date Seasonality* to group flights into categories.

Time Series Analysis
Analyze the price fluctuations for popular routes over the time window to identify specific days of the week or month when prices historically drop.
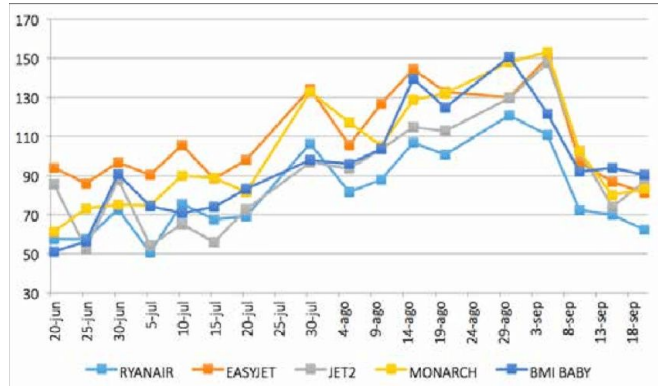
VISUALIZATION PLANNING

Heatmap
Destination on one axis, Month on the other, with cell color representing the minimum flight price

Scatter Plot
Price vs. Duration, with points colored by the identified Cluster (e.g., Best Value).

Bar Chart
Average flight price by departure day of the week.

STATE-OF-THE-ART ANALYSIS

Current solutions: Many flight search engines (Skyscanner's Everywhere search) already address flexibility

	Current solutions (Google Explore, Skyscanner)	Our unique value
Methodology	Show prices on a map for broad region/dates	Clustering analysis to categorize results into "Best Value" and "Fastest" groups
Logic	Report minimum price found in search window	Classify the optimal trade-off between price, duration…
Customization	Limited to pre-set geographic filter	Custom filtering: Allow users to define their own flexible destinations ("All cities with a population over 500k in Europe")
Transparency	Commercial algorithms are opaque	The project will demonstrate the data retrieval and analytical tools used

THANK YOU FOR LISTENING

ANY QUESTIONS?