# Data Analytics Internship

By Niveditha Murali - Jan'24 to Feb'24





# Task 1 - Netflix IMDB Score Analysis

**Problem Statement:** 

Create an engaging Power BI or Tableau dashboard analyzing Netflix shows' IMDb scores. Visualize ratings, genres, and trends to derive insights into viewer preferences..



### **Key Insights:**

### Content Diversity:

 The dataset encompasses a wide array of titles, with 5283 unique records. Despite this diversity, some titles appear more frequently, such as 'The Gift', which occurs three times.

### Release Year Trends:

A notable surge in content production is observed in the 2010-2020 period, indicating a prolific era
for entertainment. Additionally, there's a significant increase in content releases post-2020.

### Viewer Engagement and Preferences:

• TV shows tend to receive higher IMDb scores compared to movies on average, indicating potentially stronger viewer engagement with television content. Moreover, the distribution of IMDb scores suggests different preferences, with movies concentrated in the 5-7 range and TV shows prevalent in the 7-9 range.

### Age Certification Distribution:

• The majority of content carries a TV-MA rating, highlighting potentially mature themes prevalent in Netflix's offerings. However, significant missing values in the age certification column raise concerns about data integrity.



### Runtime Analysis:

Runtimes vary widely across movies and shows, with a concentration around 100 to 120 minutes.
However, outliers, including movies with runtimes exceeding 200 minutes, indicate diverse content lengths.

### Viewer Engagement (IMDb Votes):

• IMDb votes exhibit a wide range, with some titles receiving exceptionally high votes, suggesting widespread acclaim for certain content. This underscores the platform's ability to capture viewer attention across various genres and themes.

### IMDb Score Distribution:

• IMDb scores follow a roughly normal distribution, but outliers with extremely high scores suggest standout titles with exceptional viewer reception. This demonstrates the platform's diverse content library catering to different audience preferences.

### Data Completeness:

 Missing values in critical columns, such as age certification, highlight the need for robust data cleaning and imputation strategies. Ensuring data integrity is crucial for accurate analysis and insights generation.

### Release Year vs. IMDb Scores:

 The analysis of IMDb scores across different release year bins reveals intriguing trends, with certain period exhibiting higher average scores. This indicates potential shifts in viewer preferences and content quality over time.



### Screenshots











# **NETFLIX**

Overview

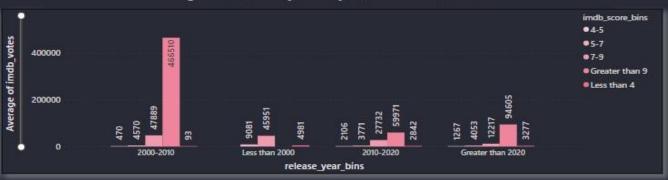
Show



#### Top 10 IMDB rated shows

TV Shows	IMDB Scores				
Who Rules The World	9.20				
The Last Dance	9.10				
Reply 1988	9.20				
Our Planet	9.30				
My Mister	9.20				
Kota Factory	9.30				
Khawatir	9.60				
Breaking Bad	9.50				
Avatar: The Last Airbender	9.30				
Arcane	9.10				
#ABtalks	9.60				

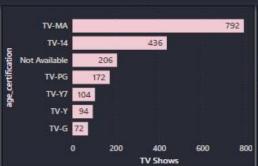
#### Average of imdb\_votes by release\_year\_bins and imdb\_score\_bins



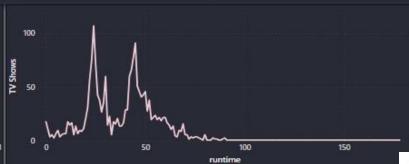
#### Top 10 IMDB voted shows

TV Shows	IMDB Votes				
Breaking Bad	1727694				
Stranger Things	989090				
The Walking Dead	945125				
Black Mirror	515577				
House of Cards	494092				
Peaky Blinders	485506				
The Witcher	465949				
Money Heist	450797				
Supernatural	428639				
Arrow	425716				

### TV Shows by age\_certification



#### TV Shows by runtime





# **NETFLIX**

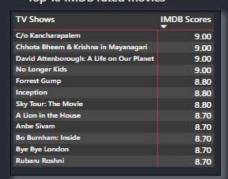
Overview

Show

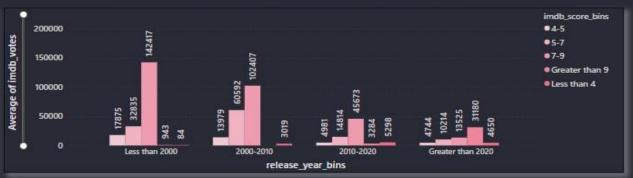
22 Movie



#### Top 10 IMDB rated movies



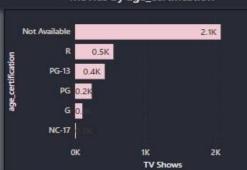
#### Average of imdb\_votes by release\_year\_bins and imdb\_score\_bins



#### Top 10 IMDB voted movies

TV Shows	IMDB Votes			
Inception	2268288			
Forrest Gump	1994599			
Django Unchained	1472668			
Saving Private Ryan	1346020			
Taxi Driver	795222			
The Imitation Game	748654			
Full Metal Jacket	723306			
How to Train Your Dragon	719717			
Silver Linings Playbook	697481			
The Social Network	681286			

#### Movies by age certification



#### Movies by runtime





# Task 2 - Spotify Track Analysis

**Problem Statement:** 

Dive into Spotify's vast music library. Develop a dashboard using Power BI or Tableau to explore and visualize trends in track genres, helping understand user preferences.

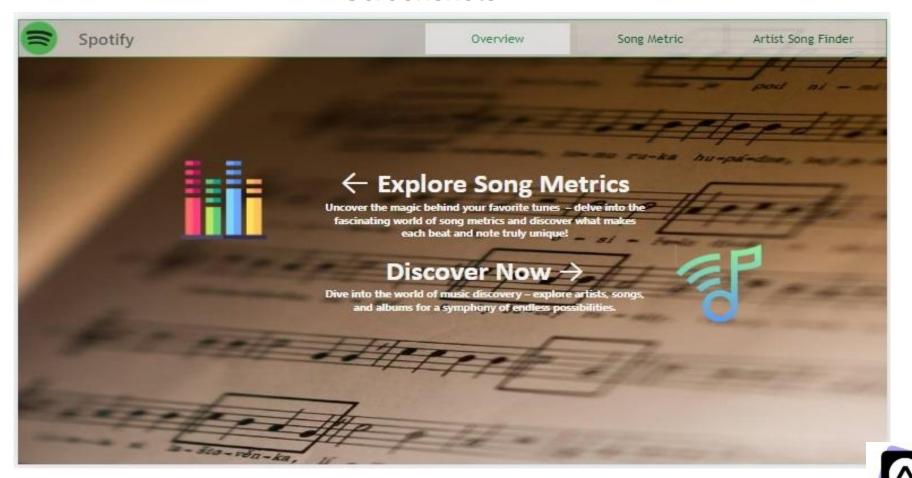


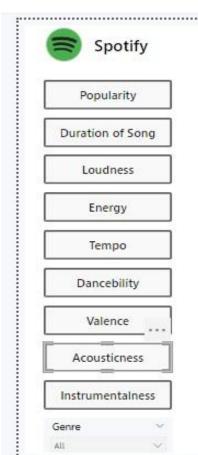
### **Key Insights:**

- Out of 89,740 songs, 9,452 have a popularity rating of 0, indicating a diverse range of tracks.
- Modes include 20 for 2,274 songs, 40 for 1,634 songs, and 45 for 1,724 songs, showcasing variety.
- Higher song duration correlates with lower popularity; happy songs are predominantly 0 to 20 minutes, while sad songs peak at 25 minutes.
- The dataset comprises 46,158 albums, 89,740 tracks, 114 genres, and 28,227 artists, providing rich music diversity.
- Top genres like PopFilm, Kpop, Chill, Sad, and Indian have mean popularity ratings ranging from 60 to 50.
- Arijit Singh leads with 178 albums, followed by Pritam with 136, Vybz Kartel with 107, and Justin Bieber with 105 albums each.
- Only 8.6% of songs contain matured lyrics, reflecting varied content preferences among listeners.
- Drill down to explore artists' stats, including the number of songs, popularity, loudness, and other relevant metrics.
- Further drill down to discover individual songs, their artists, albums, and utilize a song finder based on mood, artist, popularity, genre, and more.
- The presentation offers comprehensive insights into music trends, artist profiles, and user-centric features, enhancing the overall music exploration experience.



### Screenshots

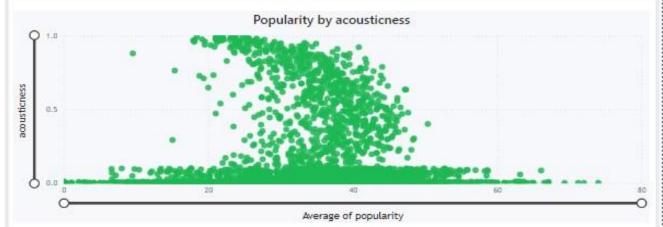




Overview Song Metric

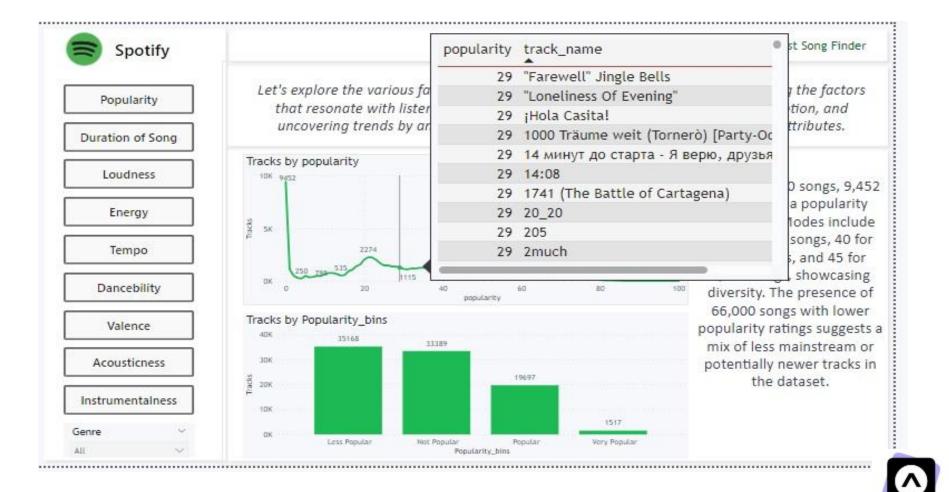
### Acousticness of tracks

Acousticness in music signifies the extent to which a track relies on acoustic or non-electronic instruments. Higher acousticness values indicate a greater reliance on acoustic elements, providing a more organic and natural sound. Lower acousticness values suggest a higher presence of electronic or synthesized components in the track.





Artist Song Finder





Overview

Song Metric

Artist Song Finder



Albums

Tracks 89740



Genres

14

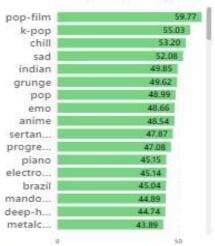
Artists

28227



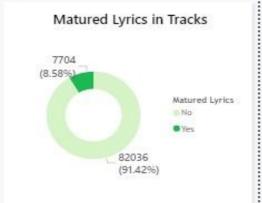
Search for Artists Count of album\_name Average of popularity Artists Arijit Singh 178 59.51 Pritam 136 53.72 Vybz Kartel 107 21.99 Justin Bieber 105 21.06 Sujatha 105 29.60 George Jones 16.07 100 Yuvan Shankar Raia 94 52.56

### Genre by Popularity



### Find a Song for me





Arijit Singh 178

Pritam 136

Vybz Kartel 107

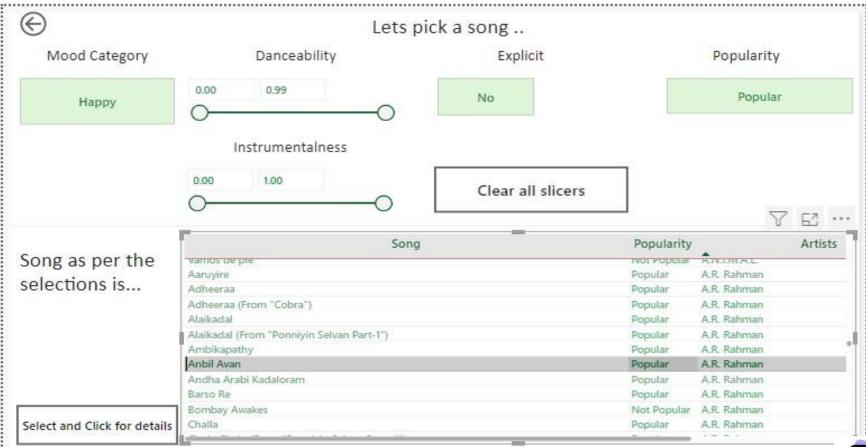
Justin Bieber 105

Sujatha 105

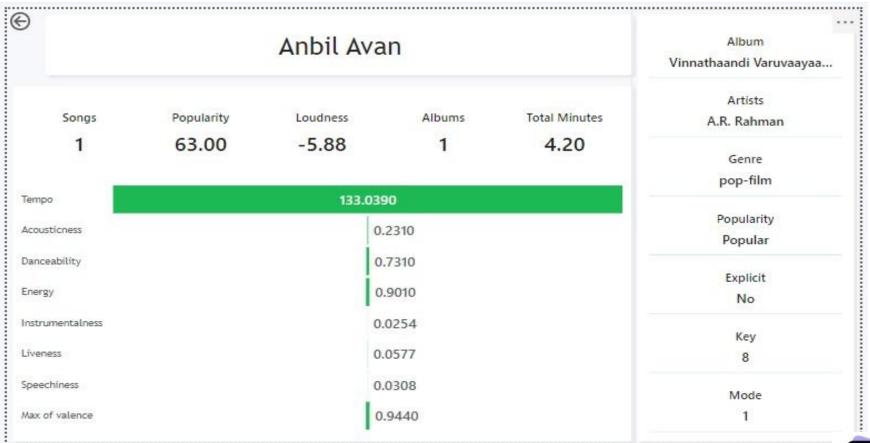














# Task 3 - Flight Price Prediction

### **Problem Statement:**

Utilize data analysis techniques to predict flight prices. Develop models, analyze historical data, and create visualizations to assist in forecasting future airfares for informed decision-making.



# Key Insights:

data\_clean\_v2.describe(include='all').T

	count	unique	top	freq	mean	std	min	25%	50%	75%	max
Airline	10462	9	Jet Airways	3706	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Source	10462	5	Delhi	4345	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Destination	10462	5	Cochin	4345	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Route	10462	128	DEL?BOM?COK	2376	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Total_Stops	10462	5	1	5625	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Additional_Info	10462	8	no info	8185	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Price	10462.0	NaN	NaN	NaN	9026.790289	4624.849541	1759.0	5224.0	8266.0	12344.75	79512.0
Duration_minutes	10462.0	NaN	NaN	NaN	630.876219	501.510421	75.0	170.0	505.0	915.0	2867.0
day_journey	10462.0	10.0	9.0	1375.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN
month_journey	10462	4	May	3395	NaN	NaN	NaN	NaN	NaN	NaN	NaN
arrival_hour	10462.0	NaN	NaN	NaN	13.387689	6.855547	0.0	8.0	14.0	19.0	23.0
arrival_minutes	10462.0	NaN	NaN	NaN	24.719939	16.57045	0.0	10.0	25.0	35.0	55.0
dep_hour	10462.0	NaN	NaN	NaN	12.478494	5.727227	0.0	8.0	11.0	18.0	23.0
dep_minutes	10462.0	NaN	NaN	NaN	24.404989	18.815719	0.0	5.0	25.0	40.0	55.0
Day_of_Week	10462.0	NaN	NaN	NaN	2.935576	2.006599	0.0	1.0	3.0	5.0	6.0
day_details	10462	2	weekday	7390	NaN	NaN	NaN	NaN	NaN	NaN	Nat







### Observations on Univariate Analysis

- The price distribution exhibits a nearly normal shape, albeit with a significant number of outliers skewing towards the higher end, resulting
  in a long right tail. The mean price is approximately 9500, with Kolkata being a notable outlier in this regard.
- In the 'Additional Info' column, nearly 78.2% of the entries are labeled as 'No info', followed by 'Meal not included' at around 18.4%.
- Approximately 53% of flight trips involve one stop, while around 33% are non-stop journeys. Only a fraction, less than 0.5%, opt for trips with 3 or 4 stops.
- Cochin emerges as the most frequented destination, accounting for 41% of trips, followed closely by Bangalore at 27%.
- In terms of departure locations, Delhi is the most common starting point, representing 41% of trips, followed by Kolkata at 27%.
- Jet Airways holds the lion's share of the airline market, covering approximately 35% of all trips, followed by Indigo at 19.5% and Air India at 16.2%.



Observations on Bivariate Analysis

#### Airline vs Price:

- The average ticket price varies significantly among different airlines.
- Jet Airways Business has the highest average price, followed by Multiple carriers and Multiple carriers Premium economy.
- Trujet and SpiceJet have relatively lower average prices compared to other airlines.

### Source vs Price:

- · The average ticket price varies depending on the source city.
- Flights originating from Delhi have the highest average price, while flights from Chennai tend to have the lowest average price.

### **Destination vs Price:**

- · The average ticket price varies depending on the destination city.
- Flights to New Delhi have the highest average price, while flights to Kolkata tend to have the lowest average price.

### Total\_Stops vs Price:

- · The number of stops in a flight affects the ticket price significantly.
- Flights with 4 stops have the highest average price, followed by flights with 3 stops and 2 stops.
- Non-stop flights have the lowest average price.



### The type of additional information provided for the flight also impacts the ticket price.

- Business class flights have the highest average price, followed by flights with a 1 Long layover and 2 Long layover.
- Flights with 'No check-in baggage included' and 'No info' have relatively lower average prices.
- Routes vs Airline Price

Additional\_Info vs Price:

### Routes vs Amme Ti

- The top 10 expensive flight routes include routes operated by Jet Airways Business, with the route from BLR to BOM to DEL being the
  priciest, averaging ₹64,722.67.
- Conversely, the most economical routes feature domestic connections like BOM to HYD by SpiceJet, priced at ₹2,419.86. These insights
  offer travelers valuable information for budget-conscious planning and informed decision-making when booking flights.

### Airlines vs Source/Destinations vs Price

- The cheapest routes from various cities, showcasing affordability for travelers. For instance, from Bangalore, SpiceJet offers the most
  economical fare to Delhi at ₹3,257, while Air Asia provides a budget-friendly option to New Delhi at ₹3,383.
- From Chennai, Air India offers the cheapest fare to Kolkata at ₹3,145. Similarly, in Delhi, GoAir provides an economical option to Cochin at ₹3,876. Moreover, from Kolkata, travelers can find the most affordable route to Bangalore with IndiGo, priced at ₹3,480.

### Duration of Flights vs prices

- Long duration flights with durations ranging from 38 hours to 47 hours and 40 minutes are mainly operated by let Airways and Air India
  - Long-duration flights with durations ranging from 38 hours to 47 hours and 40 minutes are mainly operated by Jet Airways and Air India.
     These flights typically involve multiple stops, with routes spanning from Delhi to Cochin, Delhi to Bangalore via Kolkata and Guwahati, and
    - Bangalore to New Delhi via Mumbai and Ahmedabad.
      The prices for these flights vary but tend to be relatively high, ranging from 2318 to 20694 rupees.
    - The longest duration flight recorded is 47 hours and 40 minutes, belonging to Jet Airways, departing from Delhi and arriving in

```
train performance
   [('DecisionTree',
            RMSE MAE R-squared Adj. R-squared MAPE
    0 210.536548 21.483641 0.997913 0.997905 0.255456),
    ('Bagging',
            RMSE MAE R-squared Adj. R-squared MAPE
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    ('Random Forest',
           RMSE MAE R-squared Adj. R-squared MAPE
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    ('GBM',
           RMSE MAE R-squared Adj. R-squared MAPE
    0 1981.218015 1223.433062 0.815216 0.814447 14.631658),
    ('Adaboost',
            RMSE MAE R-squared Adj. R-squared MAPE
    0 3254.375403 2719.566949 0.50142 0.499345 43.521047),
    ('Xgboost',
            RMSE MAE R-squared Adj. R-squared MAPE
    0 662.305051 425.490279 0.97935 0.979264 5.360432),
    ('Random Forest Tuned',
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    0 652.628294 270.892352 0.979949 0.979866 3.073605),
    ('Bagging Tuned',
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    0 739.580028 342.777477 0.97425 0.974143 3.919794),
    ('XGB Tuned',
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    0 517.583062 326.765928 0.987389 0.987336 4.118408),
    ('Linear Regression',
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    0 3270.937103 2347.046026 0.496332 0.495206 30.64118),
```

```
val performance
[('DecisionTree',
         RMSE MAE R-squared Adj. R-squared MAPE
  0 2450.115354 847.591973 0.743098 0.739865 9.008605),
 ('Bagging',
          RMSE MAE R-squared Adj. R-squared MAPE
  0 1958.218992 762.547772 0.835897 0.833832 8.249377),
 ('Random Forest',
         RMSE MAE R-squared Adj. R-squared MAPE
  0 1962.270525 733.248606 0.835217 0.833143 7.866168),
 ('GBM',
         RMSE MAE R-squared Adj. R-squared MAPE
  0 2038.675863 1288.609005 0.822135 0.819897 15.001453),
 ('Adaboost',
          RMSE MAE R-squared Adj. R-squared MAPE
  0 3481.649444 2772.996156 0.481242 0.474714 43.201384),
  ('Xgboost',
        RMSE MAE R-squared Adj. R-squared MAPE
  0 1613.045461 780.212154 0.888651 0.887249 8.66124),
 ('Random Forest Tuned',
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 ('Bagging Tuned',
         RMSE MAE R-squared Adj. R-squared MAPE
  0 1946.166383 793.008403 0.837911 0.835871 8.596088),
 ('XGB Tuned',
          RMSE MAE R-squared Adj. R-squared MAPE
  0 1777.156459 788.901775 0.864841 0.86314 8.644078),
 ('Linear Regression',
         RMSE MAE R-squared Adj. R-squared MAPE
  0 3518.751657 2414.756451 0.470127 0.466557 30.67243)]
```

Here's a summary of the scores for the Random Forest Tuned model:

### Train Performance:

- RMSE: 652.63
  - MAE: 270.89
- R-squared: 0.97995
- Adjusted R-squared: 0.97987
- MAPE: 3.07%

### Validation Performance:

- RMSE: 1972.16
  - MAE: 734.92
  - R-squared: 0.83355Adjusted R-squared: 0.83146
  - MAPE: 7.87%
- Test Performance:

### • Test Performance

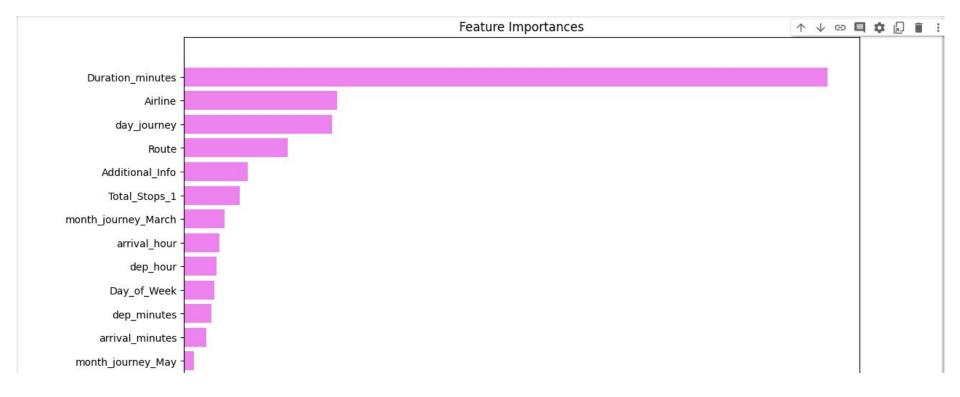
- RMSE: 1336.47
  - o MAE: 677.63
- R-squared: 0.90989
  - o Adjusted R-squared: 0.90876
  - MAPE: 7.93%



Based on the feature importances provided for the Random Forest tuned model:

- 1. **Duration\_minutes (0.457792)**: The duration of the flight in minutes is the most important feature, indicating that flight duration significantly influences the model's predictions.
- Airline (0.109095): The airline operating the flight is the second most important feature, suggesting that different airlines may have different pricing strategies.
- 3. **day\_journey (0.105126)**: The day of the journey also plays a significant role in determining the flight price, with certain days potentially having higher prices than others.
- Route (0.073691): The specific route taken by the flight contributes to predicting the price, although not as much as flight duration or the airline.
- Additional\_Info (0.045579): This feature, likely containing additional information about the flight, also has a moderate importance in predicting the price.
- Total\_Stops\_1 (0.039751): Flights with only 1 stop have some importance in predicting the price, suggesting that the number of stops affects the price.
- month\_journey\_March (0.028753): Flights in March seem to have relatively higher importance compared to other months, indicating seasonal variations.
- 8. arrival\_hour (0.025218): The arrival hour contributes to predicting the price, suggesting that the time of arrival may impact pricing.
- 9. dep\_hour (0.023276): Similarly, the departure hour also plays a role in determining the flight price.
- Day\_of\_Week (0.021611): The day of the week on which the flight occurs influences the price, with certain days having higher important others.







# Task 4 - Space Mission Analysis

### **Problem Statement:**

Build a captivating Power BI or Tableau dashboard using real-time space mission data. Visualize mission details, launch frequencies, and success rates to offer comprehensive insights into space exploration activities.



### Key Insights:

- The dataset comprises a total of 5008 space missions conducted by 62 organizations across 22 countries, utilizing 370 different rocket types and launching from 158 locations worldwide.
- The cumulative cost of rockets used in these missions amounts to \$162 billion, with approximately 3000 rows containing unspecified values.
- The top five countries with the highest number of missions are the USA, Russia, Kazakhstan, France, and China, boasting success rates of 88%, 93%, 87%, 93%, and 93%, respectively. These countries collectively conducted 1519, 1441, 732, 518, and 448 missions, respectively.
- Overall, 90% of the missions recorded in the dataset achieved success, while 10% resulted in failure. Additionally, around 72% of the rockets utilized in these missions are now retired, leaving the remaining 28% still active.
- The dataset spans from 1957 to 2022, showing a consistent line for mission failures throughout the years.
   Conversely, the line representing mission successes started with 7 and 22 missions in the late 1950s and peaked at 162 missions in 2021.

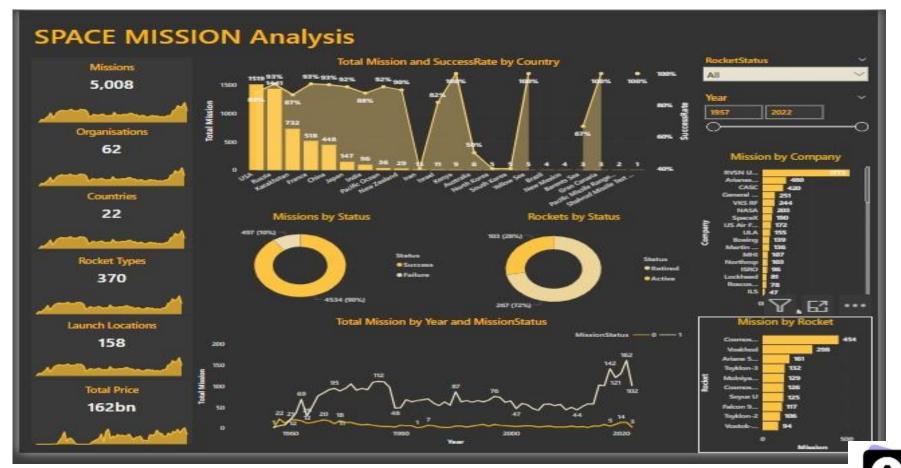
 Among organizations, RVN USSR leads with 1771 missions, followed by Arianespace with 480 missions, CASC with 420 missions, General Dynamics with 251 missions, and VKS RF with 244 missions. NASA follows closely with 203 missions.

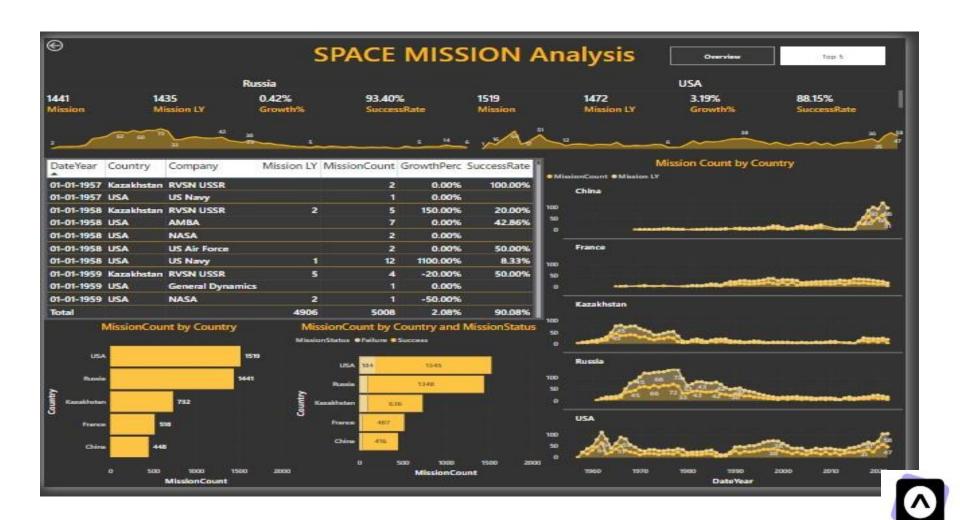
• The top three rockets by the number of missions are Cosmos 3M (11k65M) with 454 missions, Vokshod with 298 missions, and Ariane 5ECA with 161 missions.

- The analysis underscores the extensive and diverse participation of organizations, countries, and rocket types in space exploration activities over the years.
- Success rates vary significantly among countries, organizations, and rocket types, highlighting the importance of robust data analysis for understanding trends and patterns in space missions.

• The findings provide valuable insights into the evolution and impact of space exploration, paving the way for future research and decision-making in the field.

### Screenshots





# Links to Tasks

Task 1

**Dashboard** 

**LinkedIn Post** 

Task 2

**Dashboard** 

LinkedIn Post

Task 3

<u>Github</u>

**LinkedIn Post** 

Task 4

**Dashboard** 

**LinkedIn Post** 

