

## INTRODUCTION

For this analysis, I chose the business category “*Airport Shuttles*” in Arizona from the Yelp dataset. This category focuses on businesses offering shuttle services to and from airports, which is a crucial transportation service for travelers. The decision to analyze this category was based on its relevance to both local and out-of-state travelers, who rely on these services for convenience and reliability. Additionally, studying this category allows me to explore various aspects such as customer ratings, review patterns, and business performance trends, which are vital for understanding customer preferences and business growth in this business category.

## APPROACH

To analyze the “*Airport Shuttles*” business category in Arizona, I followed a systematic approach using Spark SQL and Python. Here's a breakdown of the steps:

### 1. Data Preparation:

- I started by loading the Yelp dataset's business JSON file into a Spark DataFrame.
- I converted the data into Parquet format for efficient querying and analysis.
- I filtered the dataset to include only businesses located in Arizona (**state == “AZ”**) and then cached this filtered data for better performance. There were a total of **24** airport shuttle business in Arizona.

### 2. Category Identification:

- I used the categories column to extract distinct business categories and identify the ones available in Arizona.
- I selected “*Airport Shuttles*” as the category for detailed analysis.

### 3. Spark SQL Queries:

- I wrote five queries to analyze the selected category. These queries ranged from simple ones, such as listing top-rated businesses, to complex ones that combined multiple datasets and filters to gather insights like review trends and customer engagement.

### 4. Visualization and Insights:

- I created visualizations such as bar charts, scatter plots, and trend lines to support my findings. These visualizations were used where necessary in the code to enhance the analysis.

## ANALYSIS OF QUERIES

I performed the analysis using five Spark SQL queries, each focusing on different aspects of the “*Airport Shuttles*” businesses in Arizona. Below, for each query, I explain what it does, its analysis and its conclusion:

### 1. Top-Rated Airport Shuttle Businesses:

- I retrieved the top 5 airport shuttle businesses based on their star ratings. In case of ties, I sorted them further by the number of reviews. This helped identify the most popular and well-rated businesses.
- The results showed businesses with consistently high ratings and significant customer engagement through reviews. These are likely the most trusted and preferred services in Arizona.
- Highly rated businesses tend to also have a higher number of reviews, which indicates customer satisfaction and visibility in the market.

### 2. Average Rating Calculation:

- I calculated the average star rating for all airport shuttle businesses in Arizona to determine the overall quality of service in this category.
- The average rating was above 4 stars, which reflects a generally high level of customer satisfaction for these services.
- Airport shuttle services in Arizona maintain a high standard of service based on customer feedback.

### 3. Review Trends by Year:

- I analyzed the review trends over the years by aggregating the total number of reviews, average ratings, and average review lengths for each year.
- The results revealed fluctuations in review activity, with some years showing spikes in customer engagement. Average review lengths also remained consistent, suggesting steady customer behavior.
- Understanding review trends over time can help businesses identify peak periods and adapt their strategies accordingly.

### 4. Customer Engagement Metrics:

- I identified the top 10 businesses based on total customer engagement, defined by the number of reviews they received. The query also calculated the average review length and star ratings for these businesses.

- Businesses with higher customer engagement often have better visibility and customer trust. Review length analysis provided insights into how detailed customer feedback tends to be for highly engaged businesses.
  - Strong customer engagement correlates with high business performance and better customer trust.
5. **Review and Rating Patterns:**
- I explored the relationship between average star ratings and review lengths for the top-rated businesses. This query aimed to find patterns that could indicate customer satisfaction levels.
  - Businesses with higher ratings often received more detailed reviews, suggesting that satisfied customers tend to leave more descriptive feedback.
  - A positive customer experience not only results in high ratings but also encourages customers to provide detailed reviews.

## **METHODS**

I used simple SQL commands such as **SELECT**, **FROM**, **WHERE**, **ORDER BY** with **DESC**, **GROUP BY**, **JOIN**, and methods such as **AVG()**, **YEAR()**, **COUNT()**, **LENGTH()**.

## **RESULTS**

1. The first query resulted in a **4.08** average rating of airport shuttle businesses in Arizona.
2. The second query resulted in a **19.75** average number of reviews per airport shuttle business.
3. The third query resulted in a **4.05** overall average rating (average of the average rating of each business) and an overall average review length of **500.61** characters.
4. The fourth query resulted in identifying the review trends over the years for Airport Shuttle businesses by retrieving the review year, total reviews, average rating and average review length for each business.
5. The fifth query resulted in identifying the top 10 airport shuttle businesses by customer engagement by retrieving the name, city, average business rating, total reviews, average review length and total review engagement for each business.

## **CONCLUSION**

The analysis of the Yelp dataset for airport shuttle businesses in Arizona has provided several key insights into customer preferences, business performance, and review trends. From the queries executed, the following conclusions can be drawn:

1. **High Customer Satisfaction:**
  - The top-rated businesses, which were found to have the highest star ratings and most reviews, demonstrated that customer satisfaction plays a significant role in a business's success. The concentration of top-rated businesses in larger cities suggests that competition and demand in urban areas influence the quality of service.
2. **Importance of Customer Engagement:**
  - The businesses with the highest number of reviews also had longer reviews, which indicates that customers who are satisfied with the service tend to engage more by providing detailed feedback. This highlights the importance for businesses to foster an environment that encourages customer engagement, leading to valuable insights for improvement.
3. **Review Trends and Business Growth:**
  - The trend of increasing reviews over time points to a growing interest in online platforms where customers share their experiences. This suggests that businesses should be proactive in managing their online presence to ensure positive reviews and address concerns promptly. The average rating of 4.05 across airport shuttle businesses indicates overall satisfaction but also signals that there is room for improvement.
4. **Actionable Insights for Businesses:**
  - The results of this analysis provide actionable insights for airport shuttle businesses in Arizona. Businesses should focus on maintaining high ratings and customer engagement to continue growing their customer base. Additionally, businesses in highly competitive areas should pay close attention to customer feedback and strive for consistent service quality to maintain their positions in the market.

In conclusion, this analysis not only highlights the importance of customer satisfaction and engagement but also provides a roadmap for businesses to improve their performance and reputation in a competitive market. Businesses that are able to leverage customer feedback, maintain high service standards, and adapt to review trends will likely continue to thrive in the dynamic airport shuttle industry in Arizona.