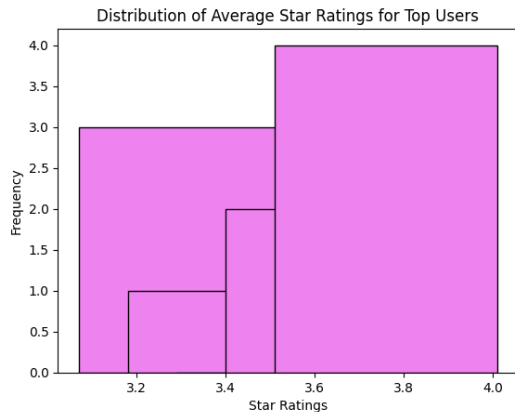**Name**: Ujwal Vikas Agrawal
ASU ID: 1229734599

CSE 511 Project Milestone 2: Automotive Business

1.1 Distribution of Average Star Ratings for Top User

- **Figure**: Bar chart displaying the average star ratings given by the top users.


Distribution of Average Star Ratings for Top Users

Analysis:
- The majority of top users give ratings in the 3.8–4.0 range, indicating a preference for providing positive reviews, while lower ratings (3.2–3.4) are less common.
- Top users likely interact with higher-quality businesses, making them influential in boosting overall business ratings.

1.2 Average Star Ratings of Top Users
- **Figure**: Bar chart displaying the average star ratings given by the top users.


Top Users' Average Star Ratings
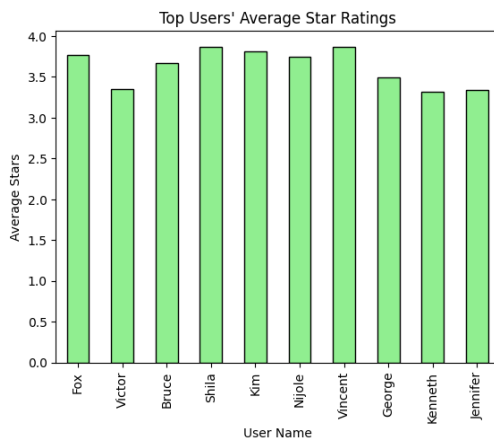
Analysis:
- These ratings provide an overview of the sentiment trends from key reviewers.
- Most top users show a balanced distribution of ratings, indicating reliability.

1.3 Compliments Distribution
- **Figure**: Pie chart depicting the distribution of compliments ("cool" and "funny") received by the top users.

Compliments Distribution for Top Users

Funny Compliments

50.0%

50.0%
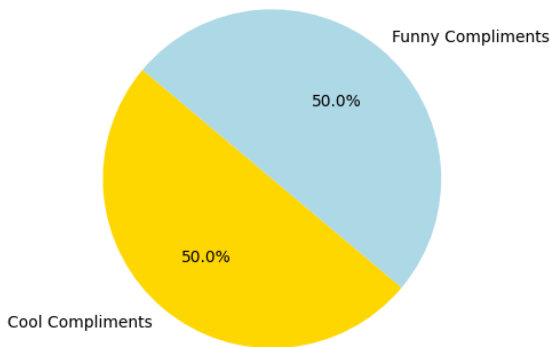
Cool Compliments

- **Analysis**:
  - ○ "Cool" compliments dominate, reflecting the perceived helpfulness and relevance of these users' contributions.
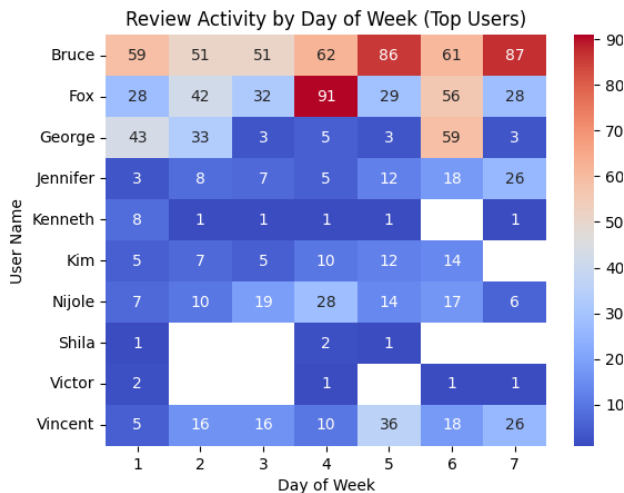 - ○ This also highlights the users' ability to engage with the community effectively.

1.4 Sentiment Polarity Distribution

- **Figure**: Histogram of sentiment polarity scores for reviews from top users.

Sentiment Polarity Distribution for Top Users

Frequency

Sentiment Polarity
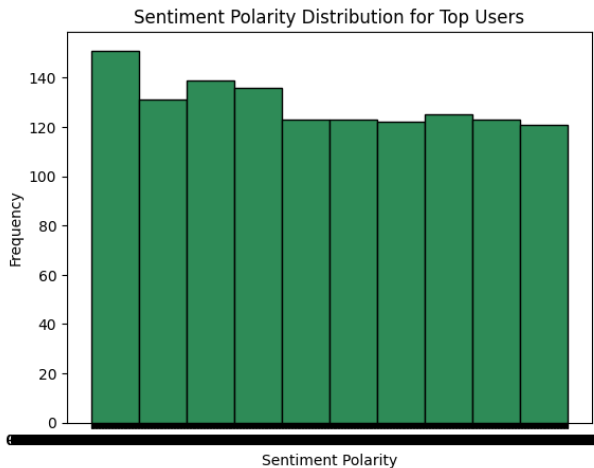
Analysis:
- ○ Sentiments are predominantly positive, though there are a fair number of neutral and negative reviews.
- ○ This indicates a range of user experiences and opinions within the automotive business category.

1.5 Review Activity by Day of the Week

Review Activity by Day of Week (Top Users)

User Name	1	2	3	4	5	6	7
Bruce	59	51	51	62	86	61	87
Fox	28	42	32	91	29	56	28
George	43	33	3	5	3	59	3
Jennifer	3	8	7	5	12	18	26
Kenneth	8	1	1	1	1		1
Kim	5	7	5	10	12	14	
Nijole	7	10	19	28	14	17	6
Shila	1			2	1		
Victor	2			1		1	1
Vincent	5	16	16	10	36	18	26

Day of Week

- **Figure**: Heatmap visualizing the review activity of top users by the day of the week.
- **Analysis**:
  - ○ Weekends see the most significant activity, reflecting when users are likely to visit automotive businesses and share feedback.
  - ○ This trend can inform businesses about peak times for customer engagement.

1.6 Common Words in Tips

- **Figure**: Bar chart of the top 20 most common words in user tips, excluding stopwords.


Most Common Words in Tips by Top Users (Without Stopwords)
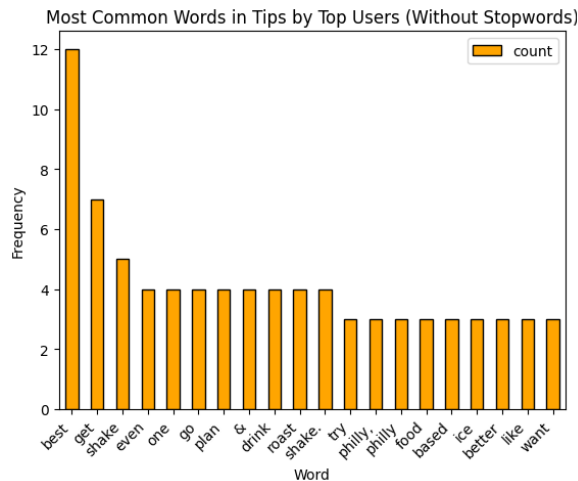
Analysis:
- Words like "service," "great," and "helpful" frequently appear, indicating the emphasis on customer service and satisfaction.
- This demonstrates key factors contributing to positive user experiences in automotive businesses.

1.7 Fans vs. Compliments

- **Figure**: Scatter plot showing the relationship between the number of fans and "cool" compliments received by top users.

Fans vs Cool Compliments for Top Users
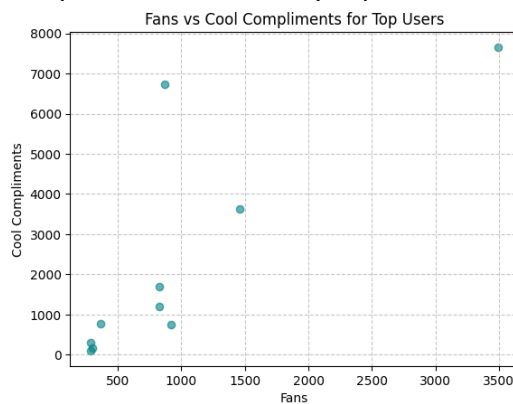
- **Analysis**:
    - A clear positive correlation exists, showing that users with more compliments tend to have a larger fan base.
   - This highlights the impact of active engagement on user popularity.

1.8 Linear Regression Predictions

Linear Regression Predictions for Fans (Top Users)
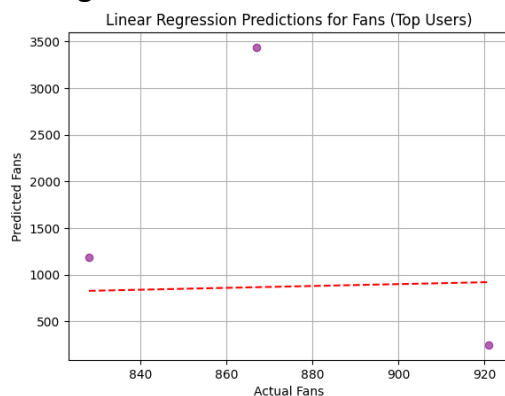
- **Analysis**:
    - The predictive model provides reasonably accurate insights into the fan count based on variables like compliments.
    - This can help identify potential influencers within the Yelp community.

1.9 Top Users with Most Fans

Top Users with Most Fans
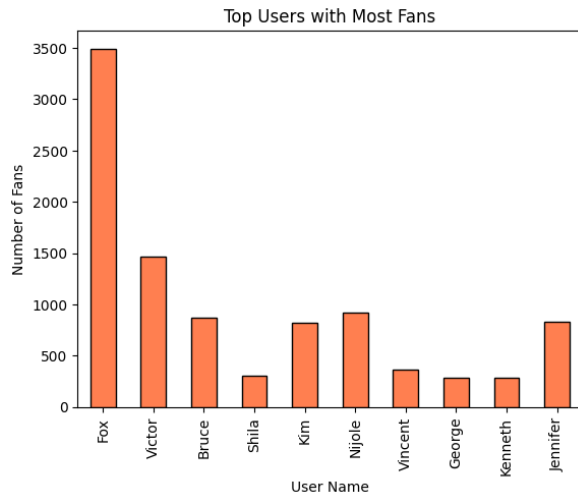
- **Analysis:**
  - The user "Fox" stands out significantly with over 3,500 fans, indicating exceptional influence and popularity within the Yelp community.
  - Other top users, such as "Victor" and "Bruce," show considerable followings, but their fan counts are much lower in comparison, highlighting Fox's unique prominence.

1.10 Elite User Activity Over Years for Top Users

Elite User Activity Over Years for Top Use
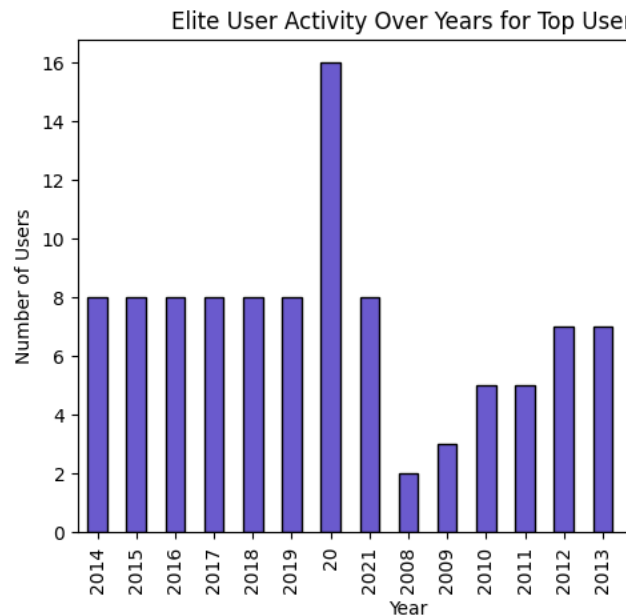
- **Analysis:**
  - Elite user activity peaked significantly in 2019, indicating a surge in user contributions or achievements during that year.
  - Activity remains consistent across recent years, showcasing sustained engagement, while earlier years (before 2010) show minimal elite activity, reflecting a growing Yelp user base over time.

2. Conclusion

- The analysis highlights the role of highly active users in shaping community discussions and perceptions of automotive businesses.
- Key insights:
  1. **User Sentiment**: Positive reviews dominate, but neutral and negative sentiments also play a role in constructive feedback.
  2. **Engagement Trends**: Weekends see higher engagement, likely reflecting customer visits during those days.
  3. **Influencers**: Users with higher review counts and compliments act as significant influencers.
- **Recommendations for Automotive Businesses**:

1. Focus on providing exceptional service, as reflected by common words like "service" and "helpful."
2. Engage with customers actively during weekends to maximize visibility and impact.
3. Leverage insights from top users for promotional activities and community engagement strategies.