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Text Analytics Group Assignment

The group created a crawler/ scraper to fetch about messages posted on the forum: https://forums.edmunds.com/discussion/7526/general/x/midsize-sedans-2-0 using the Python package 'Beautiful Soup'. A total of 19749 posts were scraped and compiled into a 'csv' file. A summary of the results is outlined in this report, for more details on the methods, see 'Group_Assignment_Text_Analytics.ipynb' file.

Task A

The 10 most frequently mentioned brands are summarized in Table 1.

Table 1. Top 10 most frequently mentioned brands

Rank	Brand Name	Frequency
1	Honda	2725
2	Mazda	2649
3	Ford	2624
4	Toyota	1815
5	Hyundai	1420
6	Nissan	761
7	Kia	636
8	Chrysler	457
9	BMW	423
10	Audi	384

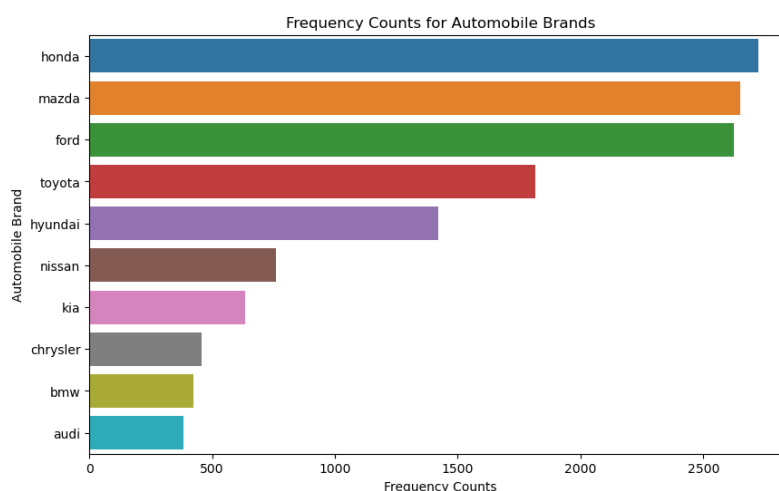A bar chart summarizing the data is also plotted.

Figure 1. Bar plot of frequency

The lift values for the top 10 brands are summarized in Table 2.

Table 2. Lift values for top 10 brands

	Honda	Mazda	Ford	Toyota	Hyundai	Nissan	Kia	Chrysler	BMW	Audi
Honda	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Mazda	0.0001	0.0000	0.0001	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001
Ford	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001
Toyota	0.0001	0.0000	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000
Hyundai	0.0001	0.0000	0.0001	0.0001	0.0000	0.0001	0.0002	0.0001	0.0001	0.0001
Nissan	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001
Kia	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0000	0.0001	0.0000	0.0002
Chrysler	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001
BMW	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0000	0.0001	0.0000	0.0006

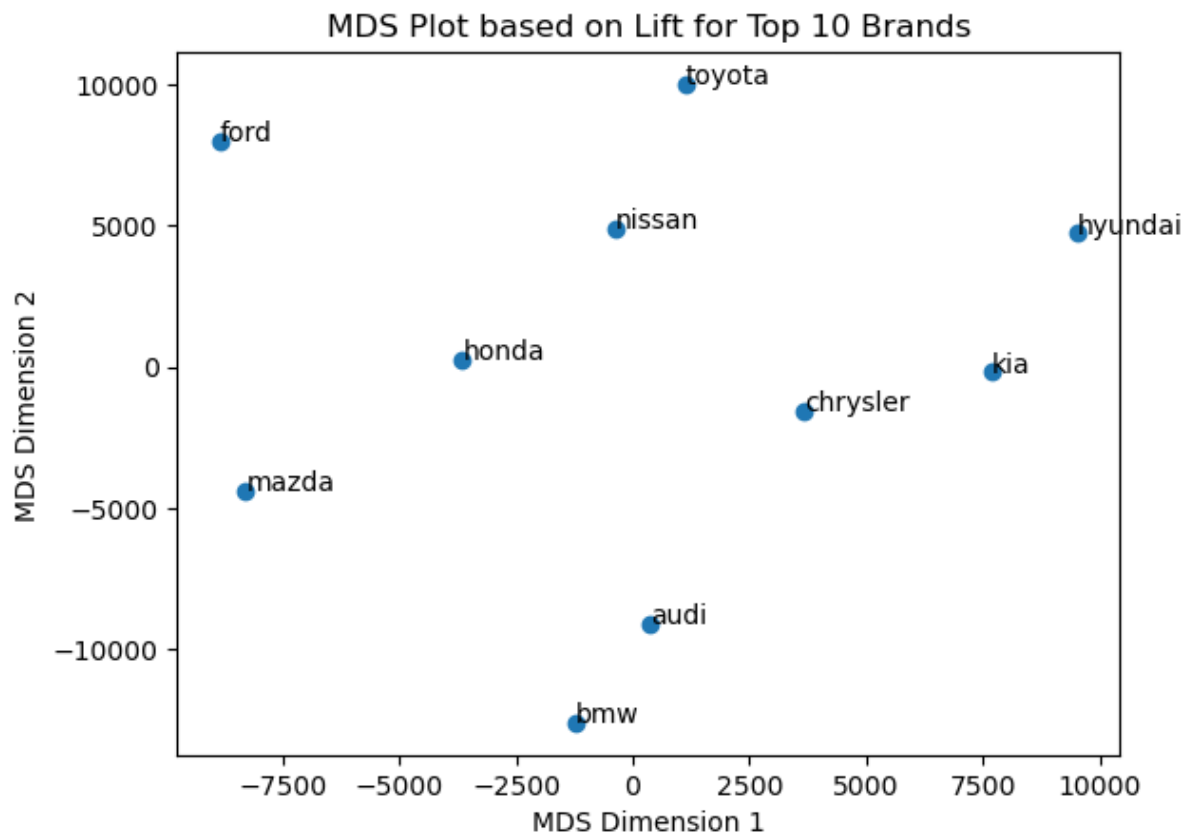The MDS map was plot visualizes the similarity of the top 10 brands in two dimensions.

Figure 2. MDS Map on lift for top 10 brands

Task B

Hyundai

Hyundai appears on the far top right of the plot, suggesting that Hyundai is perceived quite differently from the other brands in certain key aspects. This could indicate a

strong unique selling proposition or a distinctive brand identity from the consumers' perspective.

Brand managers should capitalize on the attributes that drive this uniqueness, which could be innovation, reliability, or consumer trust, depending on the underlying data that contributed to the lift scores. Furthermore, the distance from other brands might also indicate fewer direct competitors in its space (closest is Kia), according to consumer perception. Hyundai can use this as a competitive advantage in its marketing strategies.

BMW

BMW is closely positioned to Audi, suggesting these brands are often mentioned in similar contexts or share similar attributes in the eyes of consumers. They may be competing in the same space, such as luxury or performance.

Brand managers at BMW should consider strategies to differentiate BMW from Audi more clearly. They could focus on what makes BMW unique in its engineering, design, or brand heritage. For example, if the similarity between Audi and BMW is due to perceptions of luxury, BMW might focus on other strong aspects like technology or performance to differentiate itself.

Task C

The 5 most frequently mentioned attributes of the car in the discussion are summarized in the Table 3.

Table 3. Top 5 attributes

Rank	Attribute	Frequency
1	Design	4780
2	Performance	3964
3	Value	3190
4	Comfort	2576
5	Efficiency	2447

The attributes most strongly associated with the top 5 brands are summarized in Table 4.

Table 4. Strongly associated attributes and brands

Attribute	Brand with Highest Proportion	Proportion
Design	Hyundai	0.243191
Performance	Mazda	0.221779
Value	Hyundai	0.179718
Comfort	Hyundai	0.156372
Efficiency	Ford	0.129428

Task D

Hyundai: Hyundai is strongly associated with attributes such as design, value, and comfort. In terms of design, we recommend continuing investing in and highlighting Hyundai's design features by ensuring new models iterate on the design elements that consumers find appealing. For value, product manager should maintain or enhance the aspects that contribute to Hyundai's perception as providing good value, for example, maintaining its low cost of ownership. Lastly, for comfort, product manager should investigate what specific comfort aspects (e.g. seat ergonomics, spaciousness) are driving positive sentiments and incorporate these in future designs and enhancements.

Mazda: Product managers at Mazda should focus on further refining performance aspects such as engine power, handling, and driving dynamics that resonate with consumers.

Ford: Product managers at Ford could emphasize the development of fuel-efficient models or alternative energy vehicles such as electric vehicles. Possibly look into how efficiency can be integrated with other desirable features to create a compelling product offering.

Marketing/ advertising managers

Hyundai: Marketing managers should develop campaigns that spotlight Hyundai's competitive edge in design, value, and comfort. For example, they could leverage on influencers to bring across the brand's strengths in these attributes. To augment existing marketing, marketing managers could leverage positive customer experiences related to design, value, and comfort in generating advertising content.

Mazda: Craft marketing messages that focus on Mazda's performance credentials. For example, sponsor or participate in events that allow showcasing Mazda's performance, such as auto shows or races.

Ford: Position Ford as a leader in efficiency with a focus on sustainability. Highlighting technological advancements that contribute to fuel economy can appeal to eco-conscious consumers.

Task E

Aspirational brand measure

To identify the most aspirational brand, reflecting consumer desire to buy or own, we combined sentiment analysis with a normalization technique.

Utilizing the NLTK Sentiment Intensity Analyzer, each brand mention within the forum messages was evaluated. Mentions with a positive compound sentiment score exceeding 0.5 were classified as aspirational, leveraging this threshold to distinguish messages with significant positive sentiment indicative of a brand aspiration.

Subsequently, we normalized these findings by calculating the proportion of aspirational mentions relative to total mentions for each brand to ensure a balanced comparison across brands.

The most aspirational brand from our analysis is Toyota.

Business implications for brand

Being recognized as the most aspirational brand underscores Toyota's strong position in the market and its successful branding efforts. This status can be leveraged in marketing campaigns to further reinforce Toyota's image as a desirable brand, potentially attracting new customers and retaining existing ones.

Furthermore, in our attributes analysis in Task C, we identified that Toyota has the highest proportion for attribute "Environmental Impact". Combining these two analyses, it provides Toyota with valuable insights into what consumers value and aspire to in a vehicle. This knowledge can inform product development, guiding Toyota to invest in features, technologies, and designs that align with consumer aspirations. For instance, if the aspirational sentiment is tied to eco-friendliness or technology, Toyota might prioritize advancements in hybrid and electric vehicles or cutting-edge in-car technology.