**Assignment #1**

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MIS 381N – User Generated Content Analytics w/ Dr. Anitesh Barua

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1. **Forum Chosen**

I crawled the “Entry Level Luxury Performance Sedans” from Edmunds.com (<http://forums.edmunds.com/discussion/2864/general/x/entry-level-luxury-performance-sedans>) to fetch 200 pages of discussions – 5940 posts.

1. **Ten Brands Selected**

An initial analysis of the extracted data revealed that a lot of models were mentioned. To simply further analysis, I replaced most of the models to brand names. This way, I was able to identify the 10 most popular brands. Find below a summary of the number of mentions for each of them:

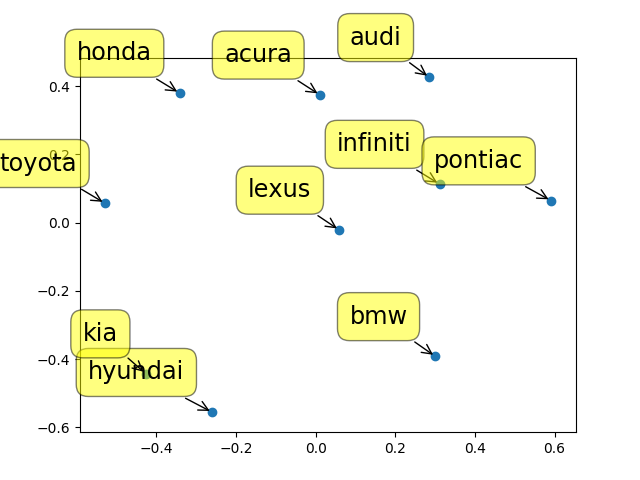
|  |  |
| --- | --- |
| Brand | Number of mentions |
| Hyundai | 1055 |
| Kia | 1027 |
| BMW | 546 |
| Toyota | 454 |
| Pontiac | 257 |
| Audi | 238 |
| Honda | 219 |
| Acura | 138 |
| Nissan | 101 |
| Infiniti | 94 |

1. **Lift Calculations between Brands**

Lift calculations were performed for all pairs of brands to compare associations. Find below summary of lift ratio calculations:

|  |  |  |
| --- | --- | --- |
| Brand 1 | Brand 2 | Lift |
| hyundai | kia | 3.060209 |
| hyundai | bmw | 1.37368 |
| hyundai | toyota | 1.415366 |
| hyundai | pontiac | 1.103729 |
| hyundai | audi | 1.154432 |
| hyundai | acura | 1.206158 |
| hyundai | honda | 1.416519 |
| hyundai | lexus | 1.477996 |
| hyundai | infiniti | 1.203047 |
| kia | bmw | 1.387812 |
| kia | toyota | 1.407362 |
| kia | pontiac | 1.115745 |
| kia | audi | 1.15663 |
| kia | acura | 1.234452 |
| kia | honda | 1.40067 |
| kia | lexus | 1.456127 |
| kia | infiniti | 1.173151 |
| bmw | toyota | 1.300512 |
| bmw | pontiac | 1.402626 |
| bmw | audi | 1.608558 |
| bmw | acura | 1.39175 |
| bmw | honda | 1.276065 |
| bmw | lexus | 2.059043 |
| bmw | infiniti | 1.859565 |
| toyota | pontiac | 1.268181 |
| toyota | audi | 1.332469 |
| toyota | acura | 1.400522 |
| toyota | honda | 1.671054 |
| toyota | lexus | 1.648381 |
| toyota | infiniti | 1.360387 |
| pontiac | audi | 1.549689 |
| pontiac | acura | 1.713526 |
| pontiac | honda | 1.507848 |
| pontiac | lexus | 1.347734 |
| pontiac | infiniti | 2.766592 |
| audi | acura | 2.058077 |
| audi | honda | 1.423185 |
| audi | lexus | 2.133214 |
| audi | infiniti | 2.233493 |
| acura | honda | 2.321193 |
| acura | lexus | 2.408297 |
| acura | infiniti | 2.896588 |
| honda | lexus | 1.451857 |
| honda | infiniti | 1.451857 |
| lexus | infiniti | 3.26073 |

1. **Multi-dimensional Scaling (MDS) map**



1. **Five Attributes Selected**

Attributes were selected based on their popularity among the discussions posts. The 5 most popular attributes of sedans were found through a word frequency analysis. These are the following:

|  |  |
| --- | --- |
| Attributes | Number of mentions |
| Performance | 244 |
| Handling | 108 |
| Price | 105 |
| MPH (fuel economy) | 89 |
| Power | 77 |

**Lift Calculations between Brands and Attributes**

Lift calculations were performed for all pairs of top five brands and attributes to compare associations. Find below summary of lift ratio calculations:

|  |  |  |
| --- | --- | --- |
| Attribute | Brand | value |
| performance | hyundai | 1.592615835 |
| performance | kia | 1.452454337 |
| performance | bmw | 1.622067901 |
| performance | toyota | 1.420780367 |
| performance | pontiac | 1.483552273 |
| handling | hyundai | 1.517533976 |
| handling | kia | 1.543918919 |
| handling | bmw | 1.620076354 |
| handling | toyota | 1.600288566 |
| handling | pontiac | 1.591210129 |
| price | hyundai | 1.23927876 |
| price | kia | 1.250547285 |
| price | bmw | 1.102863634 |
| price | toyota | 1.410682494 |
| price | pontiac | 1.76364179 |
| mph | hyundai | 1.331961829 |
| mph | kia | 1.373941396 |
| mph | bmw | 1.037814766 |
| mph | toyota | 1.721934814 |
| mph | pontiac | 1.694389089 |
| power | hyundai | 1.4043976 |
| power | kia | 1.403856209 |
| power | bmw | 1.488555803 |
| power | toyota | 1.589066973 |
| power | pontiac | 1.755188605 |

**Task A**

For the 10 brands chosen based on popularity in the discussion forum, I calculated the lift ratio for the associations between the brands. A MDS map was created to help view the similarity between the brands. The following are the insights that I can offer to brand managers:

* One of the most surprising findings from the analysis was that an entry-level luxury performance contained many brands that one does not usually associate with the category such as Honda, Toyota, Kia, Hyundai. This tells us that now more than ever, users are comparing economy cars to luxury cars. It is becoming harder for entry-level cars from traditionally luxury brands to differentiate themselves. I would advise a product manager from one of these luxury brands to consider adding features that are not included in the ‘economy’ brands to help drive customers towards their products.
* The informal clusters that were formed tell us about the different “types” of cars that are being discussed on the forum. The four economy brands Honda, Toyota, Kia, and Hyundai were grouped in a large cluster towards the left.
* Infiniti and Pontiac customers were shown to be similar and thus users are more likely to switch between the two. I would advise brand managers from these firms to increase marketing towards the other brand as these can potential lead to increased switching.
* Toyota and Honda were more similar to each other, while Kia and Hyundai were close to one another. This tells us that users are more likely to switch between the respective pairs of brands. Again, I would advise the product managers to advertise more towards the other.
* Lexus seems to have the smallest average lift association with all the other brands. This tells us that it is being compared the most to other cars.
* BMW seems to have differentiated itself relatively well amongst all the brands. Although this means that customers are less likely to switch from the brand, it is surprising that it is so dissimilar to Audi and Acura.

**Task B**

The top 5 most frequently mentioned attributes in the forum were performance, handling, price, mph (fuel economy), and power. Lift calculations were performed for the top 5 brands. The brands with the highest associations for each attribute are the following :

* Price – Pontiac (1.7636)
* Power – Pontiac (1.7552)
* MPG (fuel economy) – Toyota (1.7219)
* Performance – BMW (1.6220)
* Handling – BMW (1.6200)

The following are the insights that I can offer to brand managers:

* Pontiac had the highest association with both power and price. This tells us that there is a perception that there is a good balance between the attributes (i.e. good power for the price). The brand should continue to maintain a high level of power at their price point.
* Toyota had the highest association with fuel economy. It is likely entry-level luxury cars are being compared to Toyota for their mph levels. That being said, Toyota had the lowest performance association. If possible, the product manager should attempt to increase the performance of the cars without sacrificing fuel economy.
* BMW had the highest association with both performance and handling. As stated earlier, this really differentiates the brand from other cars and so the product manager should continue focusing on these attributes. BMW scored the lowest association with price and fuel economy though – they should consider introducing a more economical version to their lineup.
* Hyundai & Kia did not have either the lowest or highest associations for any of the attributes. This tells us that the brands seem to have a more well-rounded brand image. Although this can be a good thing for the products – they should invest more into marketing their brands towards the segment of the market they want to target.

**Task C**

To identify the most aspirational brand, I reorganized the information collected in Task B :

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Performance | Handling | Price | MPH | Power |
| Hyundai | 1.592615835 | 1.517533976 | 1.23927876 | 1.331961829 | 1.4043976 |
| Kia | 1.452454337 | 1.543918919 | 1.543918919 | 1.373941396 | 1.403856209 |
| BMW | 1.622067901 | 1.620076354 | 1.102863634 | 1.037814766 | 1.488555803 |
| Toyota | 1.420780367 | 1.600288566 | 1.410682494 | 1.721934814 | 1.589066973 |
| Pontiac | 1.483552273 | 1.591210129 | 1.76364179 | 1.694389089 | 1.755188605 |

An average association was calculated for the top five most frequently attributes to identify the brand with the largest average association:

* Hyundai – 1.417158
* Kia – 1.462618
* BMW – 1.374276
* Toyota – 1.548551
* Pontiac – 1.657596

Simply comparing the average attribute association would be unfair without factoring in the frequency of mentions of each brand itself. Therefore I multiplied the average association score with the number of mentions for each brand:

|  |  |  |  |
| --- | --- | --- | --- |
| Brand | Average Attribute Score | Frequency of Mentions | Weighted Total |
| Hyundai | 1.417158 | 244 | 345.78 |
| Kia | 1.463618 | 108 | 158.07 |
| BMW | 1.374276 | 105 | 144.29 |
| Toyota | 1.548551 | 89 | 137.82 |
| Pontiac | 1.657596 | 77 | 127.63 |

By combining the frequency of mentions with the average associations of the top five attributes, I was able to compute a weighted total on which to compare the brands with. As seen, Pontiac has the highest attribute score but is not mentioned very often. Hyundai actually turns out to be the most aspirational brand because even though it has a medium average attribute score, it is mentioned the most and therefore can be seen as the most aspirational brand. This finding is surprising as it is a brand that one does not usually consider an entry-level luxury performance sedan but the data shows that is one that is being considered the most.