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.

2. 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

3. 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

4. Multi-dimensional Scaling (MDS) map
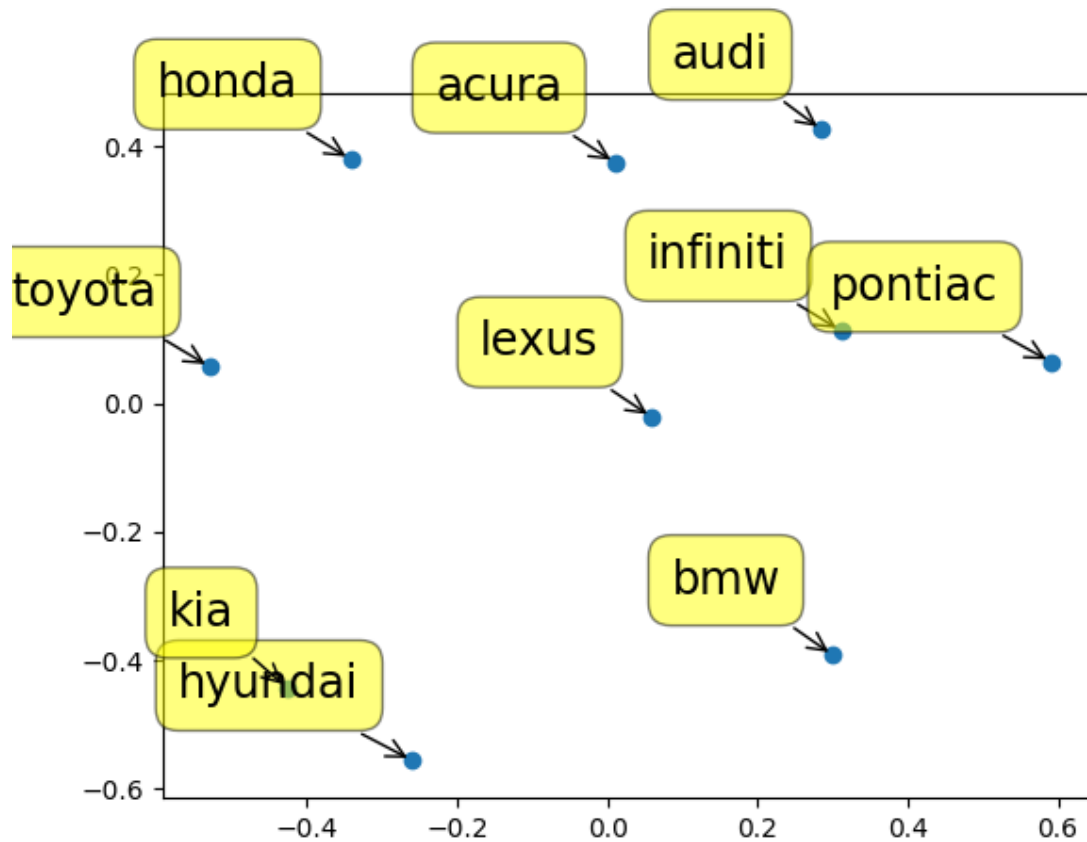
5. Five Attributes Selected

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.