

Car Brand Analysis

Forum URL for Web scraping:

<https://forums.edmunds.com/discussion/7526/general/x/midsize-sedans-2-0>

Top 10 brands by frequency and multi- dimensional scaling (MDS) map

Brand	Frequency
honda	2203
ford	1462
toyota	1020
nissan	761
hyundai	716
mazda	642
chevrolet	309
saturn	278
chrysler	260
dodge	227

The post selected for this assignment talks about midsize sedans 2.0. People exchange their views and opinions on different type of sedans. By using the model.csv, we extracted ten top brands which are shown in the above table. Half of them are Japanese and Korean brands, and the other half are American brands. From the distribution, users discuss the typical cars that are usually owned by a middle-class family.

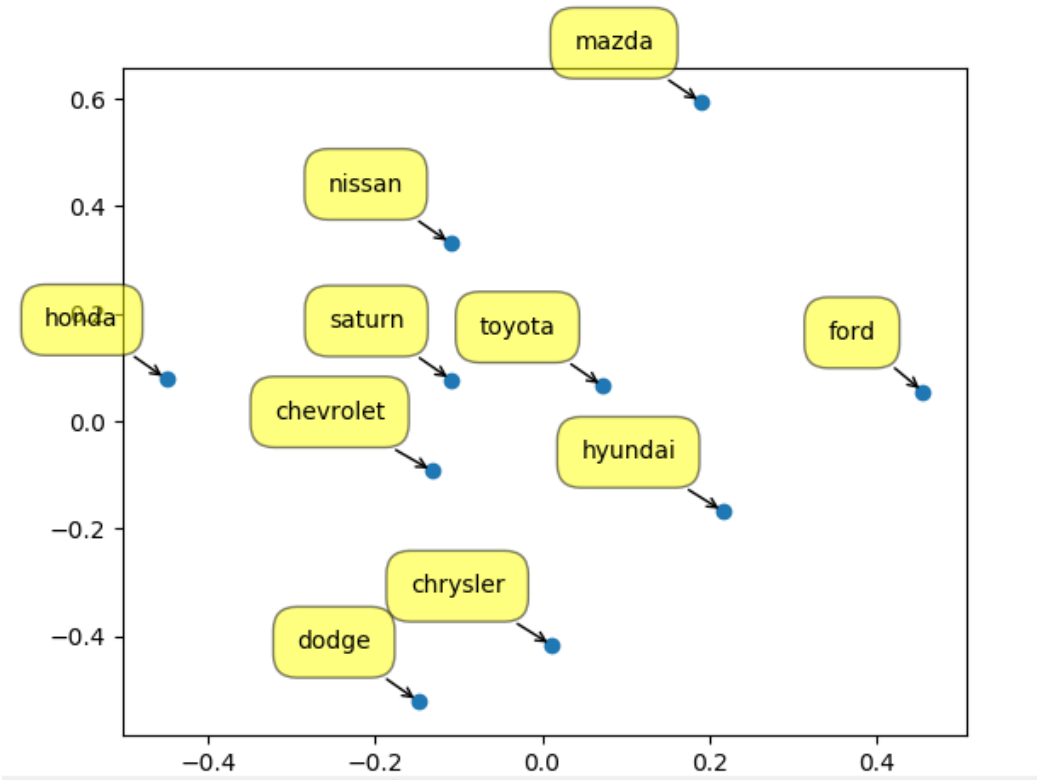
Using co-occurrence matrix, the lift value is calculated. The lift value represents the association/similarity between the brand. But to plot the MDS graph, we need to calculate $1/\text{lift}$ to show how dissimilar the brands are(In other words, we need $1/\text{lift}$ to calculate the distance between 2 brands). The results are shown as follows. In MDS graph with top 10 brands, Dodge and Chrysler are often related together, because they are both American brands. Nissan, Toyota, Saturn, and Chevrolet are all close to each other. On the other hand, Mazda seems to be very distant from all other brands.

Lift ratios:

Index	honda	ford	toyota	nissan	hyundai	mazda	chevrolet	saturn	chrysler	dodge
honda	0	1.18601	1.75443	1.34764	1.46791	1.16472	1.31859	1.29908	1.38901	1.06063
ford	1.18601	0	1.50137	1.22849	1.28622	1.27146	1.37729	1.38029	1.47585	1.06034
toyota	1.75443	1.50137	0	2.06307	1.83659	0.942368	2.05502	2.3741	1.38462	1.1674
nissan	1.34764	1.22849	2.06307	0	1.46951	1.41968	1.67	2.57943	1.15991	0.974257
hyundai	1.46791	1.28622	1.83659	1.46951	0	1.20934	1.54445	1.76792	1.72593	1.25514
mazda	1.16472	1.27146	0.942368	1.41968	1.20934	0	1.10547	1.05729	0.794393	0.944872
chevrolet	1.31859	1.37729	2.05502	1.67	1.54445	1.10547	0	4.92771	2.15833	1.45417
saturn	1.29908	1.38029	2.3741	2.57943	1.76792	1.05729	4.92771	0	1.34062	1.21225
chrysler	1.38901	1.47585	1.38462	1.15991	1.72593	0.794393	2.15833	1.34062	0	3.0244
dodge	1.06063	1.06034	1.1674	0.974257	1.25514	0.944872	1.45417	1.21225	3.0244	0

1/ lift

Index	honda	ford	toyota	nissan	hyundai	mazda	chevrolet	saturn	chrysler	dodge
honda	0	0.84316	0.569987	0.742036	0.681242	0.858572	0.758386	0.769776	0.719935	0.942837
ford	0.84316	0	0.666059	0.814005	0.777475	0.786496	0.726066	0.724485	0.677576	0.943092
toyota	0.569987	0.666059	0	0.484713	0.544487	1.06116	0.486614	0.421212	0.722222	0.856604
nissan	0.742036	0.814005	0.484713	0	0.6805	0.704386	0.598801	0.387682	0.862135	1.02642
hyundai	0.681242	0.777475	0.544487	0.6805	0	0.826897	0.64748	0.565638	0.579396	0.796725
mazda	0.858572	0.786496	1.06116	0.704386	0.826897	0	0.904596	0.945819	1.25882	1.05834
chevrolet	0.758386	0.726066	0.486614	0.598801	0.64748	0.904596	0	0.202934	0.463322	0.687676
saturn	0.769776	0.724485	0.421212	0.387682	0.565638	0.945819	0.202934	0	0.745924	0.824915
chrysler	0.719935	0.677576	0.722222	0.862135	0.579396	1.25882	0.463322	0.745924	0	0.330644
dodge	0.942837	0.943092	0.856604	1.02642	0.796725	1.05834	0.687676	0.824915	0.330644	0



Insights to Brand Managers

From the MDS graph, we can see that most Japanese car brands are in the top half of the graph and American cars are in the bottom half of the graph except Hyundai. 4 brands include Honda, Saturn, Toyota, and Ford are in the middle of the graph. It is interesting to see those brands sitting at the boundary between American and Japanese Car. As Saturn is no longer operational, we decided to exclude it from our discussion. As 3 brands left, we decided to include 1 American brand (Ford) and 1 Japanese brand (Toyota) to investigate.

Ford has a lift value of 1.50 which is the highest among its co-occurrence with Japanese cars. On the other hand, this value is the second highest value among Toyota's co-occurrence with American cars except for Saturn. Toyota is the best-selling Japanese car in the US and Ford is the bestselling American brand in the US (GM constitutes Chevrolet, Buick, GMC, Cadillac) (1). It is common to mention 2 bestselling brands for each category as Japan-American Car discussion has never been ceased since the 1960s. From brand managers' perspective, they may want to investigate further why those 2-bestselling brands are mentioned together and what are compared or contrasted during their co-occurrence. E.g. Find some common positive sentiment features in the post when they mention that other brand can improve on, identify negative sentiment for those 2 brands to improve.

Frequently mentioned attributes of cars

Attributes	Frequency
equipment	2941
aesthetics	2590
performance	2346
Cost	862
Quality	728

The five most frequently mentioned attributes of the cars are illustrated in the chart above. We grouped the words into a total of 8 categories: aesthetics, equipment, performance, safety, quality, cost, environment (eco-friendly, low emission, etc.) and others(referring to general adjectives, such as good, sweet, etc., which are not directly attributable to a car). Out of the eight attributes, equipment, aesthetics and performance are the top three reoccurring themes in the discussion, following by cost and quality. Since the post we selected centered their discussion

around mid-size sedans, cost and quality are relatively constant across the models. People seemed to be focusing more on the equipment, performance and the look of the cars inside the discussion.

Index	honda	ford	toyota	nissan	hyundai	aesthetics	equipment	performance	cost	quality
honda	0	1.18601	1.75443	1.34764	1.46791	1.15036	1.13429	1.08548	1.21391	1.29107
ford	1.18601	0	1.50137	1.22849	1.28622	1.16908	1.14105	1.17617	1.24238	1.33689
toyota	1.75443	1.50137	0	2.06307	1.83659	1.13127	1.16627	1.08056	1.2123	1.50412
nissan	1.34764	1.22849	2.06307	0	1.46951	1.23167	1.19633	1.15123	1.16619	1.20594
hyundai	1.46791	1.28622	1.83659	1.46951	0	1.25682	1.11893	1.13857	1.18991	1.55569
aesthetics	1.15036	1.16908	1.13127	1.23167	1.25682	0	1.20249	1.186	1.2404	1.39839
equipment	1.13429	1.14105	1.16627	1.19633	1.11893	1.20249	0	1.2189	1.17686	1.31011
performance	1.08548	1.17617	1.08056	1.15123	1.13857	1.186	1.2189	0	1.17018	1.48113
cost	1.21391	1.24238	1.2123	1.16619	1.18991	1.2404	1.17686	1.17018	0	1.53601
quality	1.29107	1.33689	1.50412	1.20594	1.55569	1.39839	1.31011	1.48113	1.53601	0

With the top five frequently mentioned brands, quality and aesthetics are most strongly associated with Hyundai, with highest lift value of 1.56 and 1.26 respectively. Cost and performance are both highly correlated with Ford, with lift value of 1.24 and 1.18; whereas equipment is most associated with Nissan.

Advice to top management- product manager, and marketing/advertising manager

It is critical for any brand to deliver the right product at the right time for the right set of target customers. This is when product manager and marketing manager must work together and clearly explain the features and benefits and translate them into market facing messages.

Hyundai Motor has been consistently ranked top among the global automotive industry, selling vast array of cars across 195 countries through more than 5000 dealerships and showrooms. The brand positions itself to be simple, creative, caring, and dedicated to rethink the future of mobility (2). Throughout past marketing campaigns and social presence, we can see that this brand truly internalizes their values and respond rapidly to market changes, bringing values for their consumers.

Hyundai offers a diversified portfolio of cars ranging from hatchbacks to sedans to SUVs, but we will be focusing on sedans such as Aslan, Accent, Genesis, Eon, Elantra, Marcia, Santa Fe, and Hyundai Sonata. From our analysis, we can see that Hyundai exceeds on quality and aesthetics over all other brands. As marketing/advertising manager, these are the two features that should be highlighted. Hyundai currently have American's best warranty program (3), this illustrated

their confidence in the quality of the cars. Hyundai claims that they are the industry leader in quality and dependability (4), this is in line with the perception from Edmunds users. Hyundai's marketing manager should have confidence in keep spreading this message, unlimited to just television and print media, but also online platforms to create higher visibility for their aesthetically pleasing motors.

For the product manager, there are several areas where future Hyundai sedans can focus on and improve. Across all five attributes, Hyundai have the lowest lift value for equipment and performance. Especially for equipment, it is the lowest among all other brands. Hyundai uses competitive pricing strategies since the target consumers are the middle-income group who want to purchase more cost-effective cars. Performance and equipment will be in trade off with price. However, with Honda, Nissan and Toyota having similar cost attributes potentially acting as easy substitutes for customers, Hyundai needs to focus on satisfying customers through improving product performance, equipment design and services in sustaining itself in the highly competitive market.

Which is the most aspirational brand? What are the business implications for this brand?

Brand	Lift
Audi	2.65748031
mercedes	2.00787402
volkswagen	1.95456763
dodge	1.9459572
lincoln	1.85914261

Since we want to gather information on what kind of car people want to buy, we asked all our team members to contribute some characteristics that they think are most important for an ideal car, including strong and reliable. There are 86 adjectives and nouns selected to the attribute aspirational, and most of the words are related to words such as excellent and top and the quality associated with a car. By using the same dataset and recalculate the lift value for all the brand in the data, we found the top five brands with the highest lift values. Because those five brands have a higher chance to appear with aspirational words in the dataset, we think they are the most aspirational brands, and Audi is the top among those five.

Although the posts are mostly contributed by average middle-class families, three of the top five are luxury brand, and they do not appear the most frequent in the dataset. By using this result, the brand manager of Audi should consider targeting the middle-class family as well because Audi is the brand that people talk more positive aspect of the car and the brand already has a positive awareness among those users. Also, Audi can run similar analysis for other posts to verify this

result and promote its cars as the ones that people want the most. In this way, more people will recognize the power of Audi cars and buy them. Moreover, Audi can invest more money into new technology to improve its cars so that people who are interested in technological advancement may also choose Audi. Ultimately, by advertising people's willingness to buy and maintain its quality, Audi can expand its market share and increase its revenue.

However, the study may be subjective to small sample bias. In the entire dataset, Audi is mentioned less than other affordable brands. Because of the small sample we have, we may not have a result that is close to the population's true reaction. Moreover, some people may mention multiple brands in a single comment, we cannot distinguish whether the aspirational aspect is related to Audi or other brand in that comment. We may have a more accurate result if those issues are solved.

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