Pooja Agrawal

Calculation Assignment: Cluster Analysis

July 29, 2019

INTRODUCTION:

Acme Dog Nutrition, a company that provides organic, gluten-free food for active dogs. In this study we are trying to identify groups among dog owners, to find the group who will appreciate the extra care and quality found in every kernel of Acme Dog Nutrition.

Pet Food Industry Overview

The pet food industry is broken into three different markets: dog food, cat food, and small pet food. The dog food market has proven to be the most profitable market of the three as it accounted for 60% of the $75.25 billion total pet food sales in 2016. The global cat food industry is also a major contributor to the total pet food sales, representing 35% of the market share. Within the dog and cat food markets, there are three product categories consisting of dry food, wet food, and treats. The dry food category is the primarily demanded product in both markets as it offers both convenience, lower prices, and better storage capabilities than wet food; all factors which consumers seem to value most. Horizontal integration of the dog and cat food markets has been a successful strategy in helping them achieve the leading role in the global pet food market. In 2016, Mars. Inc. offered products in all dog food, cat food, dog treats, and cat treats categories; ranking first amongst wet pet food sales and second in dry pet food sales (Pet Food Industry, 2017).

DATASET:

Statements Were Given in the Survey:

S1: It is important for me to buy dog food that prevents canine cavities

S2: I like dog food that gives my dog a shiny coat

S3: Dog food should strengthen gums

S4: Dog food should make my dog's breath fresher

S5: It is not a priority for me that dog food prevents tooth decay or cavities (reverse coded)

S6: When I buy dog food, I look for food that gives my dog shiny teeth

The measuring scale that is being used to build up the agreement with the announcements was the 7-point Liker. The same scale shifts from 1 (Strongly Disagree) to 4 (Neutral) to 7 (Strongly Agree). The information gathered comprises of 45 respondents that reacted six questions or articulations. The initial ten perceptions appear as follows. To examine dataset R programming software has been utilized. We utilized beneath code to import the dataset into R.

DATA LOADING:

```
> load("C:\\Users\\mailp\\OneDrive\\Documents\\Cluster.csv")
Error in load("C:\\Users\\mailp\\OneDrive\\Documents\\Cluster.csv") :
  bad restore file magic number (file may be corrupted) -- no data loaded
In addition: Warning message:
file 'Cluster.csv' has magic number 'ï»¿S1'
  Use of save versions prior to 2 is deprecated
> Cul<- read.csv("C:\\Users\\mailp\\OneDrive\\Documents\\Cluster.csv", header=T, sep=",")
> head(Cul)
  ï..S1 S2 S3 S4 S5 S6
1     7  3  6  4  2  4
2     1  3  2  4  5  4
3     6  2  7  4  1  3
4     4  5  4  6  2  5
5     1  2  2  3  6  2
6     6  3  6  4  2  4
> str(Cul)
'data.frame':   45 obs. of  6 variables:
 $ ï..S1: int  7 1 6 4 1 6 5 6 3 2 ...
 $ S2   : int  3 3 2 5 2 3 3 4 4 6 ...
 $ S3   : int  6 2 7 4 2 6 6 7 2 2 ...
 $ S4   : int  4 4 4 6 3 4 3 4 3 6 ...
 $ S5   : int  2 5 1 2 6 2 4 1 6 7 ...
 $ S6   : int  4 4 3 5 2 4 3 4 3 6 ...
```
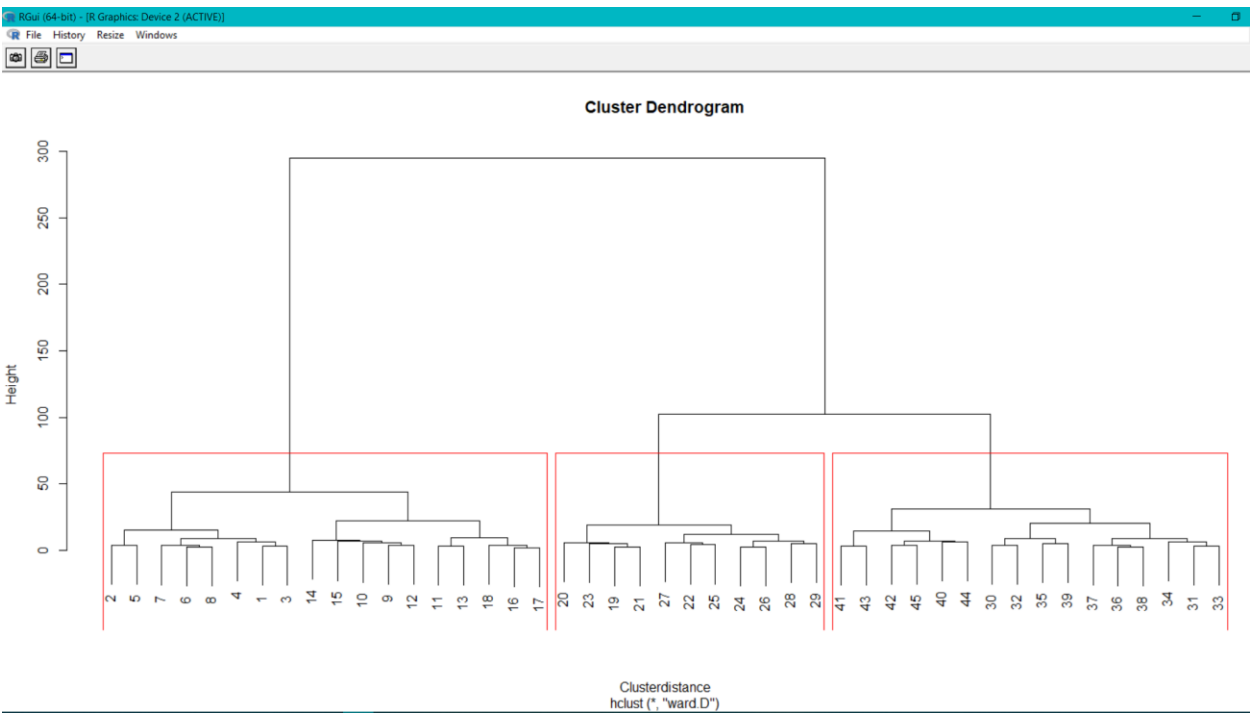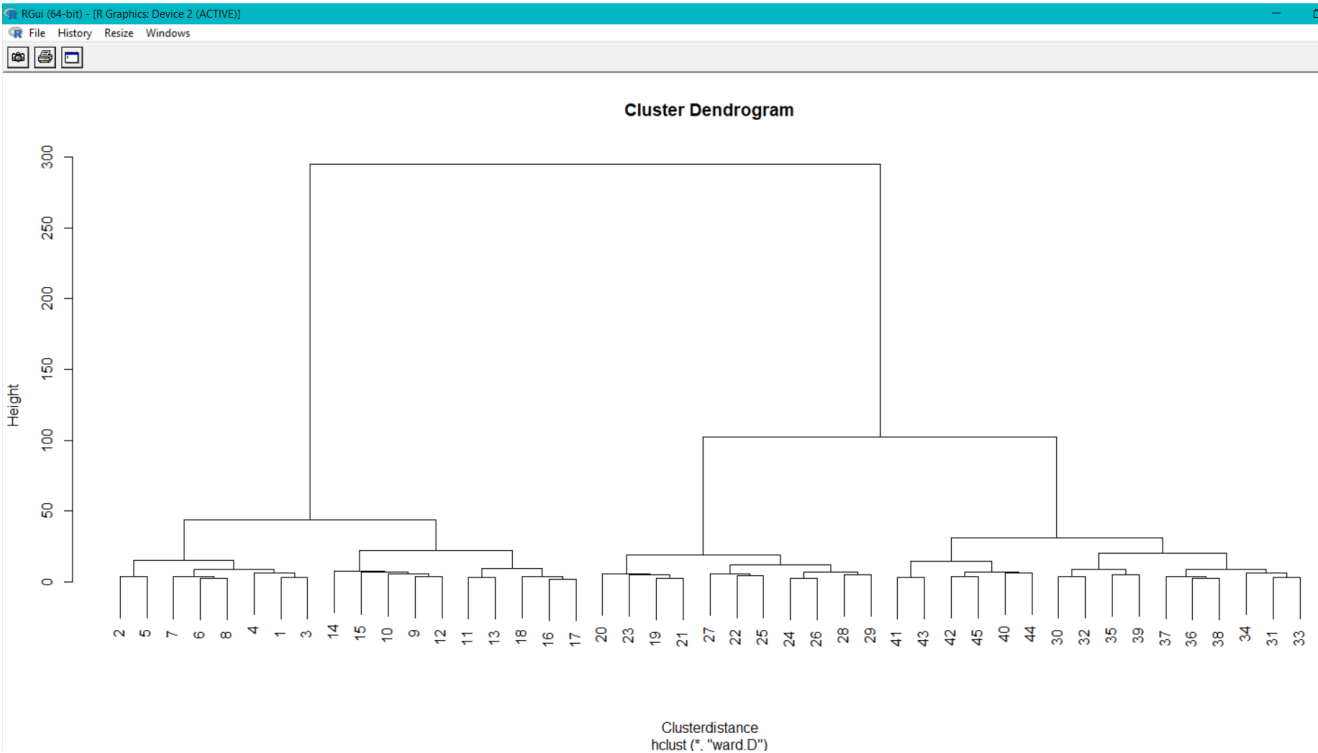
ANALYSIS:

DISTANCE MATRIX FOR WARDS:

Plotted a dendrogram for hierarchical clustering model

```
 $ S6   : int  4 4 3 5 2 4 3 4 3 6 ...
>
> dist.matrix<-dist(Cul, method="euclidean")
> tree<- hclust(dist.matrix, method="ward.D2")
> plot(tree)
> |
```

CLUSTER ANALYSIS

DENDOGRAMS FOR WARDS:

CLUSTER ANALYSIS

FINDINGS:

Cluster 1

```
> Cluster1 = subset ( Cul, CutCluster ==1)
> Cluster1
   ï..S1 S2 S3 S4 S5 S6
1       7  3  6  4  2  4
3       6  2  7  4  1  3
6       6  3  6  4  2  4
7       5  3  6  3  4  3
8       6  4  7  4  1  4
11      6  4  7  3  2  3
13      7  2  6  4  1  3
16      6  4  6  3  3  4
17      5  3  6  3  3  4
18      7  3  7  4  1  4
22      5  4  5  4  2  4
25      6  5  4  2  1  4
27      4  4  7  2  2  5
31      7  3  6  4  2  4
33      6  2  7  4  1  3
36      6  3  6  4  2  4
37      5  3  6  3  4  3
38      6  4  7  4  1  4
41      6  4  7  3  2  3
43      7  2  6  4  1  3
```

Cluster 2

```
> Cluster2 = subset ( Cul, CutCluster ==2)
> Cluster2
   ï..S1 S2 S3 S4 S5 S6
2       1  3  2  4  5  4
5       1  2  2  3  6  2
9       3  4  2  3  6  3
12      2  3  1  4  5  4
15      1  3  2  2  6  4
19      2  4  3  3  6  3
21      1  3  2  3  5  3
23      2  2  1  5  4  4
30      2  3  2  4  7  2
32      1  3  2  4  5  4
35      1  2  2  3  6  2
39      3  4  2  3  6  3
42      2  3  1  4  5  4
45      1  3  2  3  6  4
```

Cluster 3

```
> Cluster3 = subset ( Cul, CutCluster ==3)
> Cluster3
   ï..S1 S2 S3 S4 S5 S6
4      4  5  4  6  2  5
10     2  6  2  6  7  6
14     4  6  4  5  3  6
20     3  5  3  6  4  6
24     4  6  4  6  4  7
26     3  5  4  6  4  7
28     3  7  2  6  4  3
29     4  6  3  7  2  7
34     4  5  4  6  2  5
40     2  6  2  6  7  6
44     4  6  4  5  3  6
>|
```

Calculated the summary statistics of clusters, indicating the mean of each statement. ColMeans function is used for the same.

CLUSTER MEAN: SUMMARY

```
> colMeans(Cluster1)
ï..S1     S2     S3     S4     S5     S6
 5.95   3.25   6.25   3.50   1.90   3.65
> colMeans(Cluster2)
   ï..S1          S2          S3          S4          S5          S6
1.642857 3.000000 1.857143 3.428571 5.571429 3.285714
> colMeans(Cluster3)
   ï..S1          S2          S3          S4          S5          S6
3.363636 5.727273 3.272727 5.909091 3.818182 5.818182
~ |
```

SUMMARY INTERPRETATION:

S1: It is important for me to buy dog food that prevents canine cavities

S2: I like dog food that gives my dog a shiny coat

S3: Dog food should strengthen gums

S4: Dog food should make my dog's breath fresher

S5: It is not a priority for me that dog food prevents tooth decay or cavities (reverse coded)

S6: When I buy dog food, I look for food that gives my dog shiny teeth

Cluster 1	S1-5.91 S3-6.25	Health Segment	Buys dog food because of the health advantages the food provides
Cluster 2	S5-5.571429	Don't Care Segment	No interest in how food impacts dogs
Cluster 3	S2-5.2727273 S4-5.909091 S6-5.818182	Beauty Segment	Buys dog food so that it makes their dog beautiful and shiny

RESEARCH WITH OTHER STUDIES:

The research "An Exploratory Study on the Pet Food Purchasing Behavior of New Zealand Consumers" explains attributes of pet food products have an influence on purchasing behavior. The global trend of pet parenting has influenced pet owners to have greater concern for the health and wellbeing of their pets. The study did research with real time data in New Zealand. This study shows that pet owners are actively following the health and wellbeing trend for pets. (Surie, 2014)

Another study "A Comparison of Dog Food Choice Criteria Across Dog Owner Segments" also backs our analysis. The study segments the dog owner market into distinct meaningful groups based on the nature of the owner's relationships with their dogs and investigated the dog food purchasing patterns across these different segments of dog owners. It tried to provide managers with suggestions for how to better target these different segments. (Boya et al, 2018)

Both these researches appear to agree well with the above analysis findings. Both the studies predict the strong relationship between the dog owners and their dogs. Also, both claims that the beauty and health impacts great deal with owners. All the dog owner at least meets the basic needs of their dog health and food.

CONCLUSION:

With the help of cluster analysis and both the research study the three segments of dog owners can be identified. These sections will help Acme Dog Nutrition to concentrate on the interests and needs of their clients, concerning the properties of dog food items. The three cluster can be translated as cluster 1 will be represented for dog owners with enthusiasm for purchasing food nutriments items that treat dental wellbeing. Cluster 2, which demonstrate that respondents having a place with this bunch are not curious to purchase nourishment items for treating dental wellbeing of their canines. At last, Cluster 3 showing that these gatherings of individuals are keen on food nutrients that assistance improve the appearance of their dogs.

RECOMMDATIONS:

There is an opportunity for Acme nutrition to provide educational information to pet owners. It is important opinion leaders' producers should ensure they receive information about the benefits of their pet food brands. By identifying various segments and segmenting the products according to these segments will help dog food manufactures to sale to these segments. The group that will appreciate the extra care and quality found in every kernel of Acme Dog Nutrition need to given nutrition information which will increase the sales.

REFERENCES

Boya, U, O., Dotson, M, J., Hyatt, E, M. (2014, December 04). A comparison of dog food choice criteria across dog owner segments. Retrieved from
https://onlinelibrary.wiley.com/doi/full/10.1111/ijcs.12145#accessDenialLayout

Pet Food Industry. (2018, April 18). Top Pet Food Companies. Retrieved from
https://www.petfoodindustry.com/directories/211-top-pet-food-companies

Surie, M, L. (2014). An exploratory study on the pet food purchasing behavior of New Zealand consumers. Retrieved from
https://pdfs.semanticscholar.org/434a/8167369a4a029c241889f8adc65f1b90f76c.pdf