

Data Analytics Week 2 Assignment

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DEMATEL의 활용



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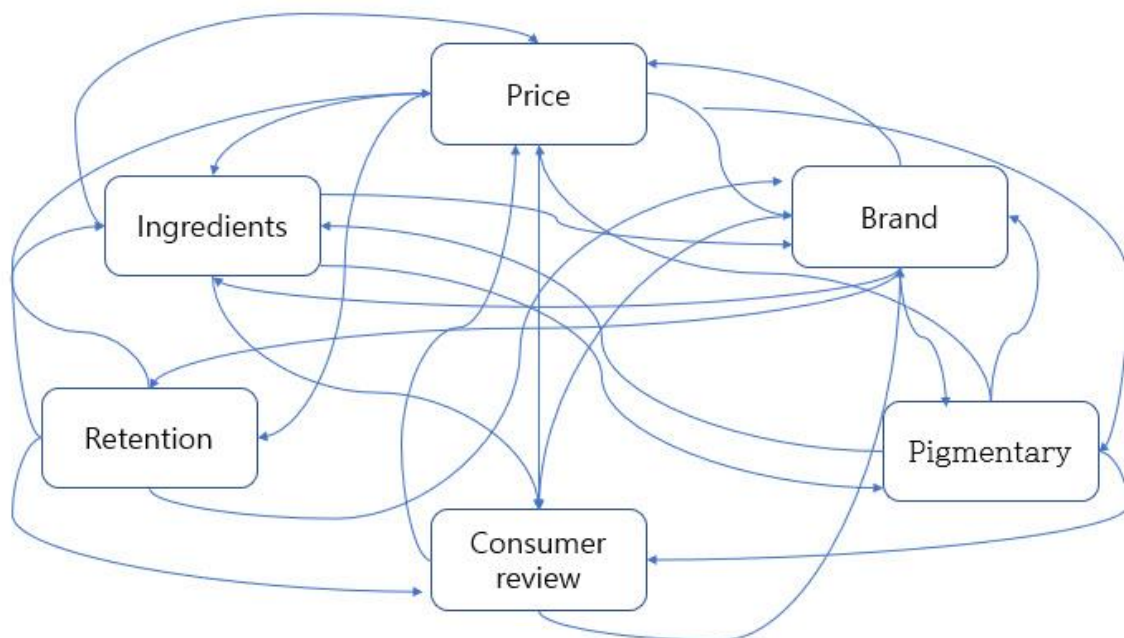
1) Finding factors that has influencing relationships in our problem.

These days, when the keyword of self-development is a hot issue, interest in cosmetics is naturally increasing.

Therefore, we decided to check about the relationship between factors to be considered when purchasing cosmetics.

The six factors are as follows.

: price, pigmentary, ingredients, brand, consumer review, retention



2) Making a direct-relation matrix(DRM).

	Price	Pigmentary	Ingredients	Brand	Consumer review	Retention
Price	2	2	3	3	1	3
Pigmentary	2	2	3	2	3	0
Ingredients	3	3	2	1	3	3
Brand	3	1	1	2	3	1
Consumer review	3	0	0	3	2	0
Retention	2	0	3	2	3	2

3) Making a normalized direct-relation matrix(nDRM).

	Price	Pigmentary	Ingredients	Brand	Consumer review	Retention
Price	2	2	3	3	1	3
Pigmentary	2	2	3	2	3	0
Ingredients	3	3	2	1	3	3
Brand	3	1	1	2	3	1
Consumer review	3	0	0	3	2	0
Retention	2	0	3	2	3	2
Column sum	15	8	12	13	15	9

Normalized DRM $X = k \cdot A$, where $k = \frac{1}{15}$

Normalized DRM (X)

	Price	Pigmentary	Ingredients	Brand	Consumer review	Retention
Price	0.133	0.133	0.200	0.200	0.067	0.200
Pigmentary	0.133	0.133	0.200	0.133	0.200	0.000
Ingredients	0.200	0.200	0.133	0.067	0.200	0.200
Brand	0.200	0.067	0.067	0.133	0.200	0.067
Consumer review	0.200	0.000	0.000	0.200	0.133	0.000
Retention	0.133	0.000	0.200	0.133	0.200	0.133

4) Making a total relation matrix(TRM).

$$(I - X)^{-1}$$

1.925976	0.549384	0.800546	0.888408	0.825662	0.697536
0.797396	1.486681	0.672925	0.71328	0.815275	0.394173
1.017902	0.623218	1.755872	0.798418	0.97346	0.701518
0.790074	0.363287	0.492179	1.666052	0.740524	0.424062
0.626781	0.210617	0.298321	0.589491	1.515274	0.25883
0.797396	0.332834	0.672925	0.71328	0.815275	1.548019

$$\text{TRM } T = X(I - X)^{-1}$$

	Price	Pigmentary	Ingredients	Brand	Consumer review	Retention
Price	0.9260	0.5494	0.8005	0.8884	0.8257	0.6975
Pigmentary	0.7974	0.4867	0.6729	0.7133	0.8153	0.3942
Ingredients	1.0179	0.6232	0.7559	0.7984	0.9735	0.7015
Brand	0.7901	0.3633	0.4922	0.6661	0.7405	0.4241
Consumer review	0.6268	0.2106	0.2983	0.5895	0.5153	0.2588
Retention	0.7974	0.3328	0.6729	0.7133	0.8153	0.5480

5) Analyzing a TRM

	Price	Pigmenta ry	Ingredien ts	Brand	Consumer review	Retentio n	D
Price	0.926	0.5494	0.8005	0.8884	0.8257	0.6975	4.6875
Pigmentary	0.7974	0.4867	0.6729	0.7133	0.8153	0.3942	3.8798
Ingredients	1.0179	0.6232	0.7559	0.7984	0.9735	0.7015	4.8704
Brand	0.7901	0.3633	0.4922	0.6661	0.7405	0.4241	3.4763
Consumer review	0.6268	0.2106	0.2983	0.5895	0.5153	0.2588	2.4993
Retention	0.7974	0.3328	0.6729	0.7133	0.8153	0.548	3.8797
R	4.9556	2.566	3.6927	4.369	4.6856	3.0241	

	D(giving influence)	R(receiving influence)	D+R (total influence)	D-R (casuality)
Price	4.6875	4.9556	9.6431	-0.2681
Pigmentary	3.8798	2.566	6.4458	1.3138
Ingredients	4.8704	3.6927	8.5631	1.1777
Brand	3.4763	4.369	7.8453	-0.8927
Consumer review	2.4993	4.6856	7.1849	-2.1863
Retention	3.8797	3.0241	6.9038	0.8556

6) Getting insights from the TRM

In terms of giving influence: 'Price' factor is the most influential factor.

In terms of receiving influence: 'Price' factor is the most influential factor, too.

In terms of total influence: 'Price' factor is the most influential factor, too.

In terms of causality,

Factors that receiving influence is relatively larger than giving influence:

'Price', 'Brand', 'Consumer review' factors.

Factors that giving influence is relatively larger than receiving influence:

'Pigmentary', 'Ingredients', 'Retention' factors.

Prices should be considered when purchasing cosmetics, but prices should not be prioritized. Various factors should be considered whether the cosmetics I want to purchase are suitable for my skin type, no harmful ingredients, and whether there are any side effects when I use them, but I don't think I should unconditionally prioritize the price of cosmetics when purchasing cosmetics.