MKTG_Assignment_4

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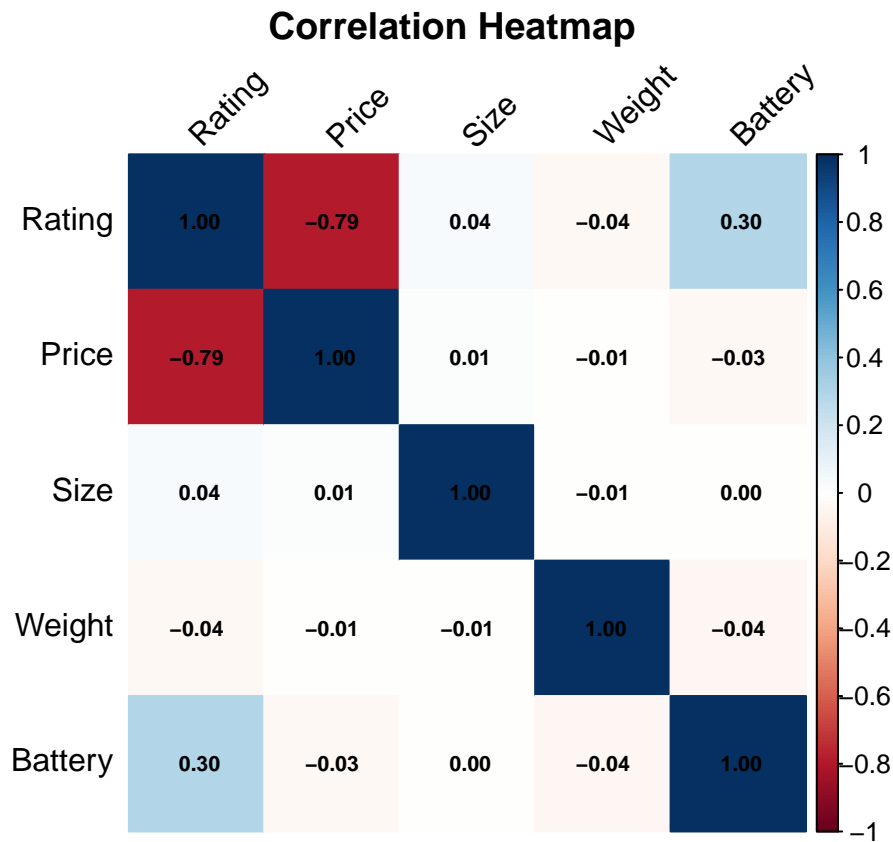**Part 1**

Step 1

```
##      Rating Price Size Weight Battery Material
## 1 4.637272     5    7    1.5       8  Silicon
## 2 3.917012    12    8    1.0      10    Metal
## 3 4.427328     8   10    1.5       6  Silicon
## 4 2.806379    12    9    2.0       8  Ceramic
## 5 5.256741     5    8    2.0      10  Silicon
## 6 2.475075    12    9    2.0       4  Ceramic
```

Step 2

```
##
## Ceramic   Metal Plastic Silicon
##     397     360     372     371


##                Min        Max       Mean
## Rating   2.358852   5.352971   3.973640
## Price    5.000000  12.000000   8.706000
## Size     7.000000  10.000000   8.515333
## Weight   0.500000   2.000000   1.257333
## Battery  4.000000  10.000000   7.012000
```

Step 3

Correlation Heatmap

	Rating	Price	Size	Weight	Battery
Rating	1.00	−0.79	0.04	−0.04	0.30
Price	−0.79	1.00	0.01	−0.01	−0.03
Size	0.04	0.01	1.00	−0.01	0.00
Weight	−0.04	−0.01	−0.01	1.00	−0.04
Battery	0.30	−0.03	0.00	−0.04	1.00

Step 4

```
##
## Call:
## lm(formula = Rating ~ Price + Size + Weight + Battery + Material,
##     data = MobilMax)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.12896 -0.03837 -0.00111  0.03766  0.15410
##
## Coefficients:
##               Estimate Std. Error  t value Pr(>|t|)
## (Intercept)   4.717420   0.007055  668.706   <2e-16 ***
## Price        -0.185192   0.000537 -344.880   <2e-16 ***
## Size8         0.037637   0.003965    9.493   <2e-16 ***
## Size9         0.043227   0.003935   10.986   <2e-16 ***
## Size10        0.098612   0.003975   24.808   <2e-16 ***
## Weight1       0.075714   0.003949   19.171   <2e-16 ***
## Weight1.5    -0.137548   0.003961  -34.727   <2e-16 ***
## Weight2       0.035227   0.003926    8.972   <2e-16 ***
## Battery6      0.382961   0.003930   97.434   <2e-16 ***
## Battery8      0.277156   0.003990   69.469   <2e-16 ***
## Battery10     0.581673   0.003939  147.686   <2e-16 ***
```

```
## MaterialMetal    0.663985   0.003923  169.238   <2e-16 ***
## MaterialPlastic  0.649181   0.003891  166.858   <2e-16 ***
## MaterialSilicon  0.789295   0.003883  203.286   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.05373 on 1486 degrees of freedom
## Multiple R-squared:  0.9928, Adjusted R-squared:  0.9928
## F-statistic: 1.584e+04 on 13 and 1486 DF,  p-value: < 2.2e-16
```

Step 5

```
##     (Intercept)           Price           Size8           Size9          Size10
##      4.71741993     -0.18519233      0.03763707      0.04322668      0.09861227
##         Weight1       Weight1.5         Weight2         Battery6         Battery8
##      0.07571395     -0.13754841      0.03522710      0.38296071      0.27715649
##        Battery10    MaterialMetal MaterialPlastic MaterialSilicon
##      0.58167350      0.66398486      0.64918146      0.78929485
```

```
## (Intercept)
##   -919.7599
```

Part 2

1. Background and Problem Statement MobileMax once led the Indian tablet market, but lost its share as low-cost brands entered. The MobileMax team was unsure of what was more important: price, battery, or design. There was no clear data to support their opinion. To address this issue, MobileMax decided to use combination analysis to figure out what features people really thought were important. The main goal was to create products that customers liked while maintaining reasonable prices and profitability. This approach to data helped MobileMax regain its footing in the highly competitive market.

2. Understanding the Data When we look at the summary and the heat map, price shows the greatest correlation with customer ratings. As the price increases, the rating decreases. Battery life and size have a small but positive effect on satisfaction. In other words, they prefer longer battery life and a larger screen. Weight and material do not significantly affect ratings. In short, people want tablets that are inexpensive, long-lasting, and portable.

3. Understanding Part-worth Utilities

- Part-worth means how much value each feature adds to a customer's preference.
- Based on the regression, (Price) lower is better, (Size) 10 inches gives the best score, (Weight) 1 lb is preferred, (Battery) 10 hours is best, (Material) Silicon is most liked.
- Price has the biggest impact, because price coefficients have the biggest impact on overall utility. Next is battery life. Other factors have an impact, but not as strong as price.

4. Market Share for Existing Products

Product	Key Features	Approx. Utility	Share
A	10k INR / 10 in / 2 lb / 6 h / Ceramic	−0.65	~17 %

Product	Key Features	Approx. Utility	Share
B	8k INR / 8 in / 1 lb / 4 h / Plastic	0.13	~43 %
C	11k INR / 7 in / 0.5 lb / 10 h / Metal	0.08	~40 %

- As we can see from the chart, Product B holds the highest share because the price and basic quality best meet customer expectations.

5. Market Share for New Product D Product D has these features: 8-inch size, 1-pound weight, 8-hour battery, and silicon material. The total non-price utility is -0.245, and customers who do not buy have a utility of 3.4. To get a 30% market share, the product must reach a total utility of $3.4 + \ln(0.3/0.7) = 2.55$.

6. Ideal Product Combination (Product E) (Price = 5,000 INR, Size = 8 in, Weight = 1 lb, Battery = 10 h, Material = Silicon) -Adding the part-worths gives a total utility of about 1.34. This is the best mix of features light, affordable, and long-lasting.