

part2

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```
# Importing Libraries
```

```
library(readr)  
library(ggplot2)  
library(dplyr)
```

```
##
```

```
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
```

```
##
```

```
## filter, lag
```

```
## The following objects are masked from 'package:base':
```

```
##
```

```
## intersect, setdiff, setequal, union
```

```
library(tidyr)
```

```
library(maps)
```

```
## Warning: package 'maps' was built under R version 4.3.3
```

```
library(mapdata)
```

```
library(corrplot)
```

```
## Warning: package 'corrplot' was built under R version 4.3.3
```

```
## corrplot 0.95 loaded
```

```
## Task 1: TABLE BOOKING AND ONLINE DELIVERY
```

```
# Load Dataset
```

```
data <- read.csv("~/Desktop/data_analysis_restaurant_data/Dataset.csv")
```

```
# View top 10 rows of the dataset
```

```
head(data, 10)
```

##	Restaurant.ID	Restaurant.Name	Country.Code
## 1	6317637	Le Petit Souffle	162
## 2	6304287	Izakaya Kikufuji	162
## 3	6300002	Heat - Edsa Shangri-La	162
## 4	6318506	Ooma	162
## 5	6314302	Sambo Kojin	162
## 6	18189371	Din Tai Fung	162
## 7	6300781	Buffet 101	162
## 8	6301290	Vikings	162
## 9	6300010	Spiral - Sofitel Philippine Plaza Manila	162
## 10	6314987	Locavore	162
##	City		
## 1	Makati City		
## 2	Makati City		
## 3	Mandaluyong City		
## 4	Mandaluyong City		
## 5	Mandaluyong City		
## 6	Mandaluyong City		
## 7	Pasay City		
## 8	Pasay City		
## 9	Pasay City		
## 10	Pasig City		
##		Address	
## 1		Third Floor, Century City Mall, Kalayaan Avenue, Poblacion, Makati City	
## 2		Little Tokyo, 2277 Chino Roces Avenue, Legaspi Village, Makati City	
## 3		Edsa Shangri-La, 1 Garden Way, Ortigas, Mandaluyong City	
## 4		Third Floor, Mega Fashion Hall, SM Megamall, Ortigas, Mandaluyong City	
## 5		Third Floor, Mega Atrium, SM Megamall, Ortigas, Mandaluyong City	
## 6		Ground Floor, Mega Fashion Hall, SM Megamall, Ortigas, Mandaluyong City	
## 7		Building K, SM By The Bay, Sunset Boulevard, Mall of Asia Complex (MOA), Pasay City	
## 8		Building B, By The Bay, Seaside Boulevard, Mall of Asia Complex (MOA), Pasay City	
## 9		Plaza Level, Sofitel Philippine Plaza Manila, CCP Complex, Pasay City	
## 10		Brixton Technology Center, 10 Brixton Street, Kapitolyo, Pasig City	
##		Locality	
## 1		Century City Mall, Poblacion, Makati City	
## 2		Little Tokyo, Legaspi Village, Makati City	
## 3		Edsa Shangri-La, Ortigas, Mandaluyong City	
## 4		SM Megamall, Ortigas, Mandaluyong City	
## 5		SM Megamall, Ortigas, Mandaluyong City	
## 6		SM Megamall, Ortigas, Mandaluyong City	
## 7		SM by the Bay, Mall of Asia Complex, Pasay City	
## 8		SM by the Bay, Mall of Asia Complex, Pasay City	
## 9		Sofitel Philippine Plaza Manila, Pasay City	
## 10		Kapitolyo	
##		Locality.Verbose Longitude	
## 1		Century City Mall, Poblacion, Makati City, Makati City	121.0275
## 2		Little Tokyo, Legaspi Village, Makati City, Makati City	121.0141
## 3		Edsa Shangri-La, Ortigas, Mandaluyong City, Mandaluyong City	121.0568
## 4		SM Megamall, Ortigas, Mandaluyong City, Mandaluyong City	121.0565
## 5		SM Megamall, Ortigas, Mandaluyong City, Mandaluyong City	121.0575
## 6		SM Megamall, Ortigas, Mandaluyong City, Mandaluyong City	121.0563
## 7		SM by the Bay, Mall of Asia Complex, Pasay City, Pasay City	120.9797
## 8		SM by the Bay, Mall of Asia Complex, Pasay City, Pasay City	120.9793
## 9		Sofitel Philippine Plaza Manila, Pasay City, Pasay City	120.9801

```

## 10                               Kapitolyo, Pasig City 121.0565
## Latitude                        Cuisines Average.Cost.for.two
## 1 14.56544      French, Japanese, Desserts      1100
## 2 14.55371                        Japanese      1200
## 3 14.58140      Seafood, Asian, Filipino, Indian      4000
## 4 14.58532                        Japanese, Sushi      1500
## 5 14.58445                        Japanese, Korean      1500
## 6 14.58376                        Chinese      1000
## 7 14.53133                        Asian, European      2000
## 8 14.54000      Seafood, Filipino, Asian, European      2000
## 9 14.55299                        European, Asian, Indian      6000
## 10 14.57204                        Filipino      1100
## Currency Has.Table.booking Has.Online.delivery Is.delivering.now
## 1 Botswana Pula(P)      Yes      No      No
## 2 Botswana Pula(P)      Yes      No      No
## 3 Botswana Pula(P)      Yes      No      No
## 4 Botswana Pula(P)      No      No      No
## 5 Botswana Pula(P)      Yes      No      No
## 6 Botswana Pula(P)      No      No      No
## 7 Botswana Pula(P)      Yes      No      No
## 8 Botswana Pula(P)      Yes      No      No
## 9 Botswana Pula(P)      Yes      No      No
## 10 Botswana Pula(P)      Yes      No      No
## Switch.to.order.menu Price.range Aggregate.rating Rating.color Rating.text
## 1      No      3      4.8 Dark Green Excellent
## 2      No      3      4.5 Dark Green Excellent
## 3      No      4      4.4      Green Very Good
## 4      No      4      4.9 Dark Green Excellent
## 5      No      4      4.8 Dark Green Excellent
## 6      No      3      4.4      Green Very Good
## 7      No      4      4.0      Green Very Good
## 8      No      4      4.2      Green Very Good
## 9      No      4      4.9 Dark Green Excellent
## 10     No      3      4.8 Dark Green Excellent
## Votes
## 1 314
## 2 591
## 3 270
## 4 365
## 5 229
## 6 336
## 7 520
## 8 677
## 9 621
## 10 532

```

```
# Percentage of restaurants that offer table booking and online delivery
```

```
# Total number of restaurants
```

```
total_num_restaurants <- nrow(data)
```

```
# Percentage calculation
```

```
table_booking_percentage <- sum(data$Has.Table.booking == 'Yes') / total_num_restaurants * 100
```

```
online_delivery_percentage <- sum(data$Has.Online.delivery == 'Yes') / total_num_restaurants * 100
```

```

# Display results
cat(sprintf("Percentage of restaurants that offer Table Booking: %.2f%%\n", table_booking_percentage))

## Percentage of restaurants that offer Table Booking: 12.12%

cat(sprintf("Percentage of restaurants that offer Online Delivery: %.2f%%\n", online_delivery_percentage))

## Percentage of restaurants that offer Online Delivery: 25.66%

# Compare the average ratings of restaurants with table booking and those without

avg_rating_with_table <- mean(data[data$Has.Table.booking == 'Yes', "Aggregate.rating"], na.rm = TRUE)
avg_rating_without_table <- mean(data[data$Has.Table.booking == 'No', "Aggregate.rating"], na.rm = TRUE)

# Display results
cat(sprintf("Average rating with Table Booking: %.2f\n", avg_rating_with_table))

## Average rating with Table Booking: 3.44

cat(sprintf("Average rating without Table Booking: %.2f\n", avg_rating_without_table))

## Average rating without Table Booking: 2.56

# Analyze the availability of online delivery among restaurants with different price ranges

# Select price ranges
price_ranges <- ifelse(data$Average.Cost.for.two < 500, 'Low',
                       ifelse(data$Average.Cost.for.two >= 500 & data$Average.Cost.for.two <= 1000, 'Medium', 'High'))

# Group by price range and online delivery availability
online_delivery_by_price_range <- table(price_ranges, data$Has.Online.delivery)
online_delivery_by_price_range <- prop.table(online_delivery_by_price_range, margin = 1)

# Display results
cat("Online Delivery Availability by Price Range:\n")

## Online Delivery Availability by Price Range:

print(online_delivery_by_price_range)

##
## price_ranges      No      Yes
##      High  0.7191489 0.2808511
##      Low   0.8585234 0.1414766
##      Medium 0.5662086 0.4337914

```

```
# Create a bar plot to visualize online delivery availability by price range
ggplot(data, aes(price_ranges, fill = Has.Online.delivery)) +
  geom_bar() +
  labs(title = "Online Delivery Availability by Price Range",
       x = "Price Range",
       y = "Count")
```



Task 2: PRICE RANGE ANALYSIS

```
# Determine the most common price range among all the restaurants
```

```
# Most common price range among all the restaurants
```

```
most_common_price_range <- names(sort(table(data$Price.range), decreasing = TRUE))[1]
```

```
# Display result
```

```
cat("Most Common Price Range: ", most_common_price_range, "\n")
```

```
## Most Common Price Range: 1
```

```
# Calculate the average rating for each price range
```

```
# Group by 'Price range' and calculate the average rating
```

```
avg_rating_by_price_range <- aggregate(data$Aggregate.rating, by = list(data$Price.range), FUN = mean, 1
```

```
# Rename the columns
colnames(avg_rating_by_price_range) <- c("Price range", "Average rating")
```

```
# Display result
cat("Average rating for each price range:\n")
```

```
## Average rating for each price range:
```

```
print(round(avg_rating_by_price_range, 2))
```

```
##   Price range Average rating
## 1           1           2.00
## 2           2           2.94
## 3           3           3.68
## 4           4           3.82
```

```
# Identify the color that represents the highest average rating among different price ranges
```

```
# Find the price range with the highest average rating
highest_avg_rating_color <- which.max(avg_rating_by_price_range$`Average rating`)
```

```
# Create a bar plot
```

```
barplot(avg_rating_by_price_range$`Average rating`,
        names.arg = avg_rating_by_price_range$`Price range`,
        col = ifelse(1:length(avg_rating_by_price_range$`Price range`) == highest_avg_rating_color,
                     "red", "blue"),
        xlab = "Price Range",
        ylab = "Average Rating",
        main = "Average Rating by Price Range")
```



Task 3: FEATURE ENGINEERING

```
# Extract additional features from the existing columns,
#such as the length of the restaurant name or address

# Create a new column for the length of restaurant names
data$`Restaurant Name Length` <- nchar(data$Restaurant.Name)

# Create a new column for the length of restaurant addresses
data$`Address Length` <- nchar(data$Address)

# Display the updated DataFrame
head(data)
```

```
##   Restaurant.ID      Restaurant.Name Country.Code      City
## 1      6317637      Le Petit Souffle         162    Makati City
## 2      6304287      Izakaya Kikufuji         162    Makati City
## 3      6300002 Heat - Edsa Shangri-La         162 Mandaluyong City
## 4      6318506                      Ooma         162 Mandaluyong City
## 5      6314302          Sambo Kojin         162 Mandaluyong City
## 6      18189371      Din Tai Fung           162 Mandaluyong City
##
##                                     Address
## 1 Third Floor, Century City Mall, Kalayaan Avenue, Poblacion, Makati City
## 2   Little Tokyo, 2277 Chino Roces Avenue, Legaspi Village, Makati City
## 3           Edsa Shangri-La, 1 Garden Way, Ortigas, Mandaluyong City
```

```

## 4 Third Floor, Mega Fashion Hall, SM Megamall, Ortigas, Mandaluyong City
## 5 Third Floor, Mega Atrium, SM Megamall, Ortigas, Mandaluyong City
## 6 Ground Floor, Mega Fashion Hall, SM Megamall, Ortigas, Mandaluyong City
## Locality
## 1 Century City Mall, Poblacion, Makati City
## 2 Little Tokyo, Legaspi Village, Makati City
## 3 Edsa Shangri-La, Ortigas, Mandaluyong City
## 4 SM Megamall, Ortigas, Mandaluyong City
## 5 SM Megamall, Ortigas, Mandaluyong City
## 6 SM Megamall, Ortigas, Mandaluyong City
## Locality.Verbose Longitude
## 1 Century City Mall, Poblacion, Makati City, Makati City 121.0275
## 2 Little Tokyo, Legaspi Village, Makati City, Makati City 121.0141
## 3 Edsa Shangri-La, Ortigas, Mandaluyong City, Mandaluyong City 121.0568
## 4 SM Megamall, Ortigas, Mandaluyong City, Mandaluyong City 121.0565
## 5 SM Megamall, Ortigas, Mandaluyong City, Mandaluyong City 121.0575
## 6 SM Megamall, Ortigas, Mandaluyong City, Mandaluyong City 121.0563
## Latitude Cuisines Average.Cost.for.two
## 1 14.56544 French, Japanese, Desserts 1100
## 2 14.55371 Japanese 1200
## 3 14.58140 Seafood, Asian, Filipino, Indian 4000
## 4 14.58532 Japanese, Sushi 1500
## 5 14.58445 Japanese, Korean 1500
## 6 14.58376 Chinese 1000
## Currency Has.Table.booking Has.Online.delivery Is.delivering.now
## 1 Botswana Pula(P) Yes No No
## 2 Botswana Pula(P) Yes No No
## 3 Botswana Pula(P) Yes No No
## 4 Botswana Pula(P) No No No
## 5 Botswana Pula(P) Yes No No
## 6 Botswana Pula(P) No No No
## Switch.to.order.menu Price.range Aggregate.rating Rating.color Rating.text
## 1 No 3 4.8 Dark Green Excellent
## 2 No 3 4.5 Dark Green Excellent
## 3 No 4 4.4 Green Very Good
## 4 No 4 4.9 Dark Green Excellent
## 5 No 4 4.8 Dark Green Excellent
## 6 No 3 4.4 Green Very Good
## Votes Restaurant Name Length Address Length
## 1 314 16 71
## 2 591 16 67
## 3 270 22 56
## 4 365 4 70
## 5 229 11 64
## 6 336 12 71

```

```

# Create new features like "Has Table Booking" or
#"Has Online Delivery" by encoding categorical variables

# Create new columns
data$`Has Table Booking` <- ifelse(data$Has.Table.booking == "Yes", 1, 0)
data$`Has Online Delivery` <- ifelse(data$Has.Online.delivery == "Yes", 1, 0)

# Display the updated DataFrame

```



```
head(data)
```

```
##      Restaurant.ID      Restaurant.Name Country.Code      City
## 1      6317637      Le Petit Souffle      162      Makati City
## 2      6304287      Izakaya Kikufuji      162      Makati City
## 3      6300002 Heat - Edsa Shangri-La      162 Mandaluyong City
## 4      6318506      Ooma      162 Mandaluyong City
## 5      6314302      Sambo Kojin      162 Mandaluyong City
## 6      18189371      Din Tai Fung      162 Mandaluyong City
##                                     Address
## 1 Third Floor, Century City Mall, Kalayaan Avenue, Poblacion, Makati City
## 2 Little Tokyo, 2277 Chino Roces Avenue, Legaspi Village, Makati City
## 3 Edsa Shangri-La, 1 Garden Way, Ortigas, Mandaluyong City
## 4 Third Floor, Mega Fashion Hall, SM Megamall, Ortigas, Mandaluyong City
## 5 Third Floor, Mega Atrium, SM Megamall, Ortigas, Mandaluyong City
## 6 Ground Floor, Mega Fashion Hall, SM Megamall, Ortigas, Mandaluyong City
##                                     Locality
## 1 Century City Mall, Poblacion, Makati City
## 2 Little Tokyo, Legaspi Village, Makati City
## 3 Edsa Shangri-La, Ortigas, Mandaluyong City
## 4 SM Megamall, Ortigas, Mandaluyong City
## 5 SM Megamall, Ortigas, Mandaluyong City
## 6 SM Megamall, Ortigas, Mandaluyong City
##                                     Locality.Verbose Longitude
## 1 Century City Mall, Poblacion, Makati City, Makati City 121.0275
## 2 Little Tokyo, Legaspi Village, Makati City, Makati City 121.0141
## 3 Edsa Shangri-La, Ortigas, Mandaluyong City, Mandaluyong City 121.0568
## 4 SM Megamall, Ortigas, Mandaluyong City, Mandaluyong City 121.0565
## 5 SM Megamall, Ortigas, Mandaluyong City, Mandaluyong City 121.0575
## 6 SM Megamall, Ortigas, Mandaluyong City, Mandaluyong City 121.0563
##      Latitude      Cuisines Average.Cost.for.two
## 1 14.56544      French, Japanese, Desserts      1100
## 2 14.55371      Japanese      1200
## 3 14.58140 Seafood, Asian, Filipino, Indian      4000
## 4 14.58532      Japanese, Sushi      1500
## 5 14.58445      Japanese, Korean      1500
## 6 14.58376      Chinese      1000
##      Currency Has.Table.booking Has.Online.delivery Is.delivering.now
## 1 Botswana Pula(P)      Yes      No      No
## 2 Botswana Pula(P)      Yes      No      No
## 3 Botswana Pula(P)      Yes      No      No
## 4 Botswana Pula(P)      No      No      No
## 5 Botswana Pula(P)      Yes      No      No
## 6 Botswana Pula(P)      No      No      No
##      Switch.to.order.menu Price.range Aggregate.rating Rating.color Rating.text
## 1      No      3      4.8      Dark Green      Excellent
## 2      No      3      4.5      Dark Green      Excellent
## 3      No      4      4.4      Green      Very Good
## 4      No      4      4.9      Dark Green      Excellent
## 5      No      4      4.8      Dark Green      Excellent
## 6      No      3      4.4      Green      Very Good
##      Votes Restaurant Name Length Address Length Has Table Booking
## 1      314      16      71      1
```

## 2	591	16	67	1
## 3	270	22	56	1
## 4	365	4	70	0
## 5	229	11	64	1
## 6	336	12	71	0
##	Has Online Delivery			
## 1		0		
## 2		0		
## 3		0		
## 4		0		
## 5		0		
## 6		0		