SLICE INSIGHT

" A COMPREHENSIVE ANALYSIS OF PIZZA BRAND AND QUALITY BY CUSTOMER PREFERENCES"

ADVANCE STATISTICAL METHOD

MARCH 10, 2024

PURVI RAVIKUMAR SINGH
23MBD030

INDEX

INTRODUCTION

In the ever-growing and competitive world of pizza consumption, understanding customer preferences and evaluating the quality of pizza brands are crucial factors for success in the food industry. "Slice Insight" aims to delve into the relationship between pizza brand, quality and customer preferences, offering a comprehensive analysis that goes beyond the taste buds.

By examining factors such as taste, texture, pricing, brand perception, and delivery services, we aim to uncover valuable insights that can guide both pizza enthusiasts and industry stakeholders.

Join us on a flavorful journey as we examine the details of pizza enjoyment, seeking to uncover patterns and preferences that may revolutionize the way we understand and appreciate this beloved dish. "Slice Insight" is not just a study; it's an exploration into the heart of consumer satisfaction and brand excellence within the pizza landscape.

OBJECTIVES

Descriptive Analysis:

- Identify mean, median, variance and standard deviation of Ratings of different variable such as is Quality and Size of Pizza
- Identify Kurtosis Ratings of different variable i.e is Quality and Size of Pizza
- Identify Mode for the rating of quality of pizza

Graphical Representation:

- How does a pie chart represent the distribution of pizza consumption, restaurants among survey
- How does a bar plot illustrate the frequency of menu list, order method, etc.
- How does a boxplot represent the frequency of Menu list or order method.

Regression Analysis:

- Perform regression analysis to understand the impact of independent variables on dependent)
- To check how do Size Rating, Quality rating and Pizza Size impact Restaurants (MLR)

Contingency Table:

- Contingency table with respect to Order and Restaurants
- Contingency table with respect to Gender and menu

Hypotheses testing:

- Are there Mean differences in the frequency of Restaurants based on Menu list and Quality rating test with different types of tests of hypothesis (MANOVA)
- Is there a significant association between Brands and Factor Influencing and test the hypothesis (Chi-square)
- Is there a significant difference in the mean frequency of Quality rating and restaurants test the hypothesis (ANOVA)

METHODOLOGY

Data collection

Data collection is done by the use of Google Form. First created a survey form with MCQs questionnaire and forwarded it to all family and friends via social media. I got 127 records then exported the csv file for analysis out of which I selected total 120 observations.

Here is the snipped image of the excel file:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	ID	Timestam	Gender	Like_it	Frequency	Menu	Pizza_size	Restauran	Factors_In	Satisfied	Size_awar	Size_ratin	Factors_In	Quality_ra	Order_me	Brand	Reason_for_bra
2	1	2024/03/0	Male	YES	Occasiona	Chicken	8	Dominos	Quality an	Yes	Partial awa	4	Appetite	4	Dine-in	Dominos	Quality
3	2	2024/03/0	Female	YES	Occasiona	Margherita	6	Dominos	Quality an	Yes	Partial awa	4	No. of pec	4	Dine-in	Dominos	Both
4	3	2024/03/0	Female	YES	Occasiona	Vegies	8	Dominos	Quality an	Yes	Partial awa	4	No. of pec	4	Delivery	Dominos	Both
5	4	2024/03/0	Female	YES	Occasiona	Chicken	8	Pizza expr	Quality an	Yes	Partial awa	4	No. of pec	4	Delivery	Dominos	Both
6	5	2024/03/0	Male	YES	Occasiona	Margherita	8	Dominos	Taste	Yes	Partial awa	4	Appetite	4	Dine-in	Dominos	Both
7	6	2024/03/0	Female	YES	Occasiona	Chicken	12	Pappa joh	Taste	Yes	Yes, aware	5	Appetite	5	Delivery	Dominos	Quality
8	7	2024/03/0	Female	YES	Occasiona	Other	6	Dominos	Taste	Yes	Yes, aware	3	No. of pec	4	Delivery	Dominos	Both
9	8	2024/03/0	Female	YES	Occasiona	Chicken	6	Pizza hut	Quality an	Yes	Partial awa	5	Occasion	5	Dine-in	Dominos	Both
10	9	2024/03/0	Female	YES	Occasiona	Chicken	8	Dominos	Taste	Yes	Partial awa	4	No. of pec	3	Takeout	Dominos	Quality
11	10	2024/03/0	Male	YES	Occasiona	Other	8	Pizza hut	Quality an	Yes	Yes, aware	4	Appetite	3	Dine-in	Dominos	Both
12	11	2024/03/0	Female	YES	Occasiona	Chicken	8	Pizza hut	Price	Yes	Partial awa	3	No. of pec	4	Takeout	Dominos	Both
13	12	2024/03/0	Female	YES	Occasiona	Chicken	12	Dominos	Quality an	Yes	Yes, aware	5	No. of pec	5	Delivery	Dominos	Both
14	13	2024/03/0	Female	YES	Occasiona	Vegies	8	Dominos	Taste	Yes	Yes, aware	3	No. of pec	4	Delivery	Dominos	Both
15	14	2024/03/0	Male	YES	Twice in a	Vegies	8	Dominos	Taste	Yes	No, not av	4	No. of pec	5	Takeout	Dominos	Quality
16	15	2024/03/0	Male	NO	Occasiona	Margherita	8	Pappa joh	Taste	Yes	Partial awa	3	Appetite	1	Takeout	Pizza hut	Quality
17	16	2024/03/0	Female	YES	Occasiona	Chicken	8	Pizza hut	Quality an	Yes	Yes, aware	3	No. of pec	4	Delivery	Pizza hut	Both
18	17	2024/03/0	Female	YES	Occasiona	Chicken	6	Dominos	Quality an	Yes	Partial awa	3	No. of pec	3	Takeout	Dominos	Both
19	18	2024/03/0	Female	YES	Occasiona	Chicken	8	Dominos	Quality an	Yes	Yes, aware	4	Occasion	3	Delivery	Dominos	Both
20	19	2024/03/0	Male	YES	Twice in a	Vegies	6	Dominos	Taste	Yes	Yes, aware	5	Appetite	4	Delivery	Dominos	Quality
21	20	2024/03/0	Female	YES	Occasiona	Chicken	6	Pizza hut	Taste	Yes	No, not av	3	No. of pec	4	Delivery	Pizza hut	Quality
22	21	2024/03/0	Male	YES	Daily	Chicken	12	Dominos	Quality an	Yes	Yes, aware	2	Appetite	3	Delivery	Pizza hut	Quality
23	22	2024/03/0	Female	YES	Occasiona	Mushroom	8	Dominos	Quality an	Yes	Partial awa	3	No. of pec	4	Dine-in	Dominos	Quality
24	23	2024/03/0	Female	YES	Occasiona	Chicken	12	Dominos	Taste	Yes	Yes, aware	4	No. of pec	5	Delivery	Dominos	Quantity
25	24	2024/03/0	Female	YES	Occasiona	Mushroom	6	Dominos	Taste	Yes	Yes, aware	3	Occasion	4	Dine-in	Dominos	Both
26	25	2024/03/0	Female	YES	Occasiona	Vegies	6	Pizza hut	Taste	Yes	Yes, aware	5	Occasion	3	Dine-in	Pizza hut	Quality

Data cleaning

I used Ms excel itself for data cleaning by removing the records with missing values plus replacing few values as it were very less.

Data Analysis

a) Descriptive Analysis:

Summarize the data using descriptive statistics such as mean, median, mode, range, and standard deviation**.**

b) Hypothesis testing

hypothesis testing was employed using R programming to find the significance of gender-based variations in brand preferences, etc. Used statistical tests such as chi-square test, ANOVA and MANOVA to test the hypotheses and determine if the relationships are statistically significant.

c) Regression analysis

It is employed to examine the relationships and dependencies between key variables, allowing for a quantitative understanding of the impact of various factors on pizza brand preferences.

Visualization

Visualization tools such as ggplot2 in R were employed for creating insightful charts, graphs, and plots. These visuals aided in presenting complex data patterns and trends in an accessible format, enhancing the way of analysis. I have done box plot, bar plots, etc. to visualize the frequency distribution of categorical variables such as pizza size, brand , menu, etc.

RESULTS AND ANALYSIS

Reading .csv file in R

Code:

```
data=read.csv("pizza_dataset.csv",header=TRUE)

head(data)
```

output:

```
> data=read.csv("pizza_dataset.csv",header=TRUE)
> head(data)
  ID                Timestamp Gender Like_it    Frequency       Menu Pizza_size   Restaurants  Factors_Influencing Satisfied
1  1 2024/03/04 12:10:23 PM GMT+5:30   Male      YES Occasionally    Chicken          8       Dominos Quality and Quantity       Yes
2  2 2024/03/04 12:13:11 PM GMT+5:30 Female      YES Occasionally Margherita          6       Dominos Quality and Quantity       Yes
3  3  2024/03/04 1:41:19 PM GMT+5:30 Female      YES Occasionally     Vegies          8       Dominos Quality and Quantity       Yes
4  4  2024/03/04 2:11:11 PM GMT+5:30 Female      YES Occasionally    Chicken          8 Pizza express Quality and Quantity       Yes
5  5  2024/03/04 3:48:11 PM GMT+5:30   Male      YES Occasionally Margherita          8       Dominos                Taste       Yes
6  6  2024/03/04 3:54:52 PM GMT+5:30 Female      YES Occasionally    Chicken         12   Pappa johns                Taste       Yes
           Size_awareness Size_rating Factors_Influencing._Size_ Quality_rating Order_method   Brand Reason_for_brand
1        Partial awareness           4                  Appetite              4      Dine-in Dominos          Quality
2        Partial awareness           4              No. of people             4      Dine-in Dominos             Both
3        Partial awareness           4              No. of people             4     Delivery Dominos             Both
4        Partial awareness           4              No. of people             4     Delivery Dominos             Both
5        Partial awareness           4                  Appetite              4      Dine-in Dominos             Both
6 Yes, aware of all options          5                  Appetite              5     Delivery Dominos          Quality
```

Descriptive analysis

Objective: Identify mean, median, variance and standard deviaton of Ratings of different variable such as is Quality and Size of Pizza

Code:

```
mean(data$Size_rating)
mean(data$Quality_rating)
sd(data$Size_rating)
sd(data$Quality_rating)
var(data$Quality_rating)
var(data$Size_rating)
median(data$Pizza_size)
```

Output:

```
> mean(data$Size_rating)
[1] 3.758333
> mean(data$Quality_rating)
[1] 3.875
> sd(data$Size_rating)
[1] 1.076844
> sd(data$Quality_rating)
[1] 1.025412
> var(data$Quality_rating)
[1] 1.051471
> var(data$Size_rating)
[1] 1.159594
> median(data$Pizza_size)
[1] 8
```

Objective: Identify Kurtosis and Skewness Ratings of different variable i.e is Quality and Size of Pizza

Code:

```
kurtosis(data$Quality_rating)

kurtosis(data$Size_rating)
```

Output:

```
> library(moments)
> kurtosis(data$Quality_rating)
[1] 3.788784
> kurtosis(data$Size_rating)
[1] 3.436768
```

Conclusion:

A kurtosis of 3.788784 suggests that the distribution of the "Quality_rating" variable is leptokurtic, meaning it has relatively heavy tails and is more peaked compared to a normal distribution.

Objective: Identify Mode for the rating of quality of pizza

Code:

```
mode<-function(v){
 uniqv<-unique(v)
 uniqv[which.max(tabulate(match(v,uniqv)))]
}
result=mode(data$Size_rating)
result
```

```
> mode<-function(v){
+   uniqv<-unique(v)
+   uniqv[which.max(tabulate(match(v,uniqv)))]
+ }
>
> result=mode(data$Size_rating)
> result
[1] 4
```

Conclusion:

A mode of 4 means most of the people from our survey dataset rated 4 to the quality of pizza of their preferred brand

Objective: Correlation between Pizza size, size_rating and Quality_rating

Code:

```
cor(data[, c("Pizza_size", "Size_rating", "Quality_rating")])
```

Output:

```
> cor(data[, c("Pizza_size", "Size_rating", "Quality_rating")])
              Pizza_size Size_rating Quality_rating
Pizza_size     1.0000000   0.2557616      0.2927537
Size_rating    0.2557616   1.0000000      0.4594716
Quality_rating 0.2927537   0.4594716      1.0000000
```

Conclusion:

The correlation coefficient ranges from -1 to 1, indicating the strength and direction of the linear relationship between two variables.

A value of 1 indicates a perfect positive correlation, -1 indicates a perfect negative correlation, and 0 indicates no linear correlation.

Graphical Representation:

Objective: How does a pie chart represent the distribution of different pizza consumption from menu among survey

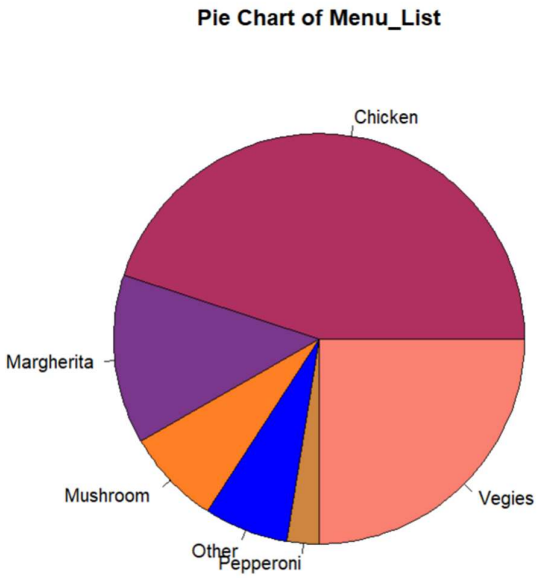
Code:

```
data=read.csv("pizza_dataset.csv",header=TRUE)
table(data$Menu)
pie(table(data$Menu),labels = c("Chicken","Margherita","Mushroom
","Other","Pepperoni","Vegies"),
   col = c('maroon','mediumorchid4','chocolate1','blue','peru','salmon'),
   main = "Pie Chart of Menu_List")
```

Output:

```
> #pie chart for menu offered and ordered
> data=read.csv("pizza_dataset.csv",header=TRUE)
> table(data$Menu)

   Chicken Margherita   Mushroom      Other  Pepperoni     Vegies
        54         16          9          8          3         30
> pie(table(data$Menu),labels = c("Chicken","Margherita","Mushroom ","Other","Pepperoni","Vegies"),
+     col = c('maroon','mediumorchid4','chocolate1','blue','peru','salmon'),
+     main = "Pie Chart of Menu_List")
```



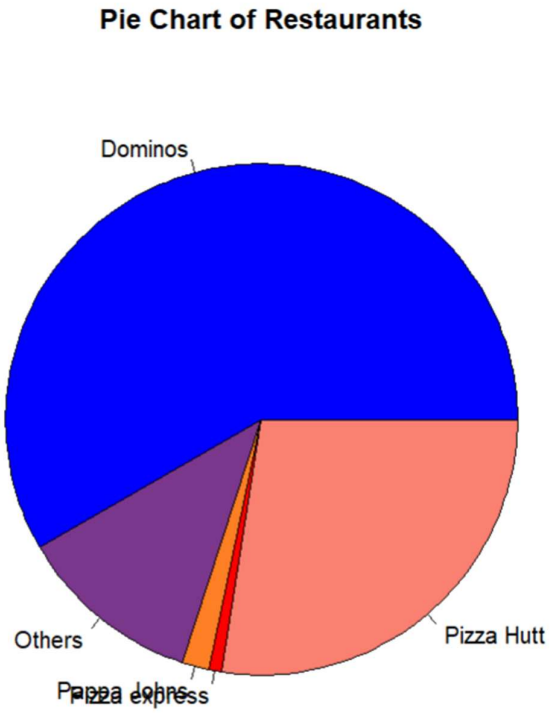
Conclusion: Chicken pizza is more preferred menu item by customers where as pepperoni pizza is least preferred item.

Objective: How does a pie chart represent the distribution of pizza consumption from various restaurants among survey dataset.

Code:

```
table(data$Restaurants)
pie(table(data$Restaurants),col = c('blue','mediumorchid4','chocolate1','red','salmon'),
   labels = c('Dominos','Others','Pappa Johns','Pizza express','Pizza Hutt'),
   main = "Pie Chart of Restaurants")
```

Output**:**



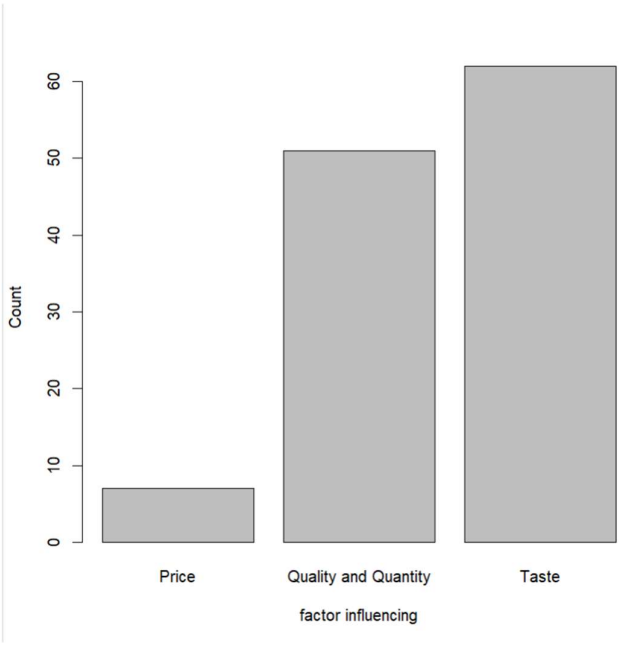
Conclusion: Dominos is more preferred brand/ restaurant than others. Pappa johns and Pizza express are the least preferred brand.

Objective: How does a bar plot illustrate the frequency of factor influencing to choose the selected brand.

Code:

```
barplot(table(data$Factors_Influencing), xlab="factor influencing", ylab="Count")
```

Output:



Conclusion:

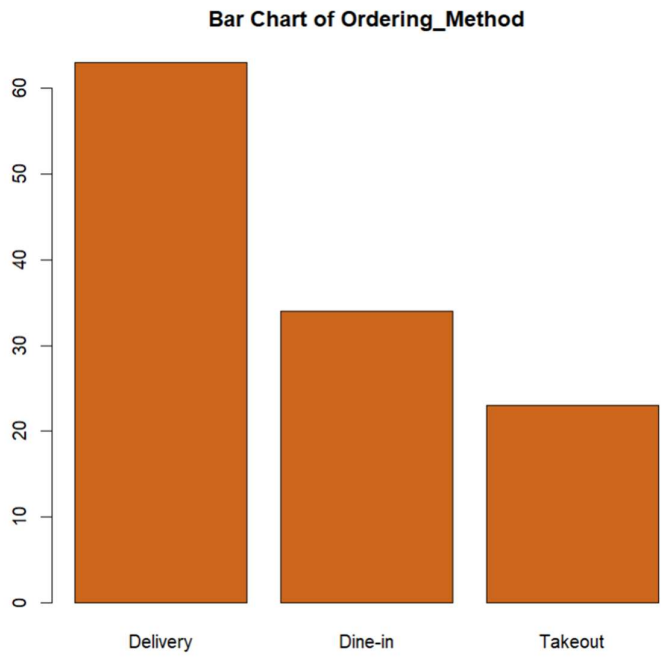
Out of my sample data most of the people go for the taste and a few less than that go for the quality and quantity rather than price.

Objective: How does a bar plot represent the frequency of order method from the sample population.

Code**:**

```
barplot(table(data$Order_method),col="chocolate3",main="Bar Chart of
Ordering_Method")
```

Output:



Conclusion:

From the above bar plot we can conclude that the most preferred order method is delivery and less than 25 people out of 120 prefer take away pizza order.

Regression Analysis:

Objective: Can we predict the probability of 'Like it' attribute based on Menu and pizza size (Logistic Regression)

Code:

```
data$Like_it <- ifelse(data$Like_it == "YES", 1, 0)
str(data$Like_it)
logi_res=glm(Like_it ~ Menu + Pizza_size, data = data, family = "binomial")
logi_res
prediction=predict(logi_res,type = 'response')
head(prediction)
table(data$Like_it,prediction>0.5)
accuracy=mean((prediction>0.5)==data$Like_it)
accuracy
```

Output:

```
> # Convert "YES" to 1 and "NO" to 0 in the Like_it variable
> data$Like_it <- ifelse(data$Like_it == "YES", 1, 0)
> str(data$Like_it)
 num [1:120] 1 1 1 1 1 1 1 1 1 1 ...
> logi_res=glm(Like_it ~ Menu + Pizza_size, data = data, family = "binomial")
> logi_res

Call:  glm(formula = Like_it ~ Menu + Pizza_size, family = "binomial",
    data = data)

Coefficients:
   (Intercept)  MenuMargherita     MenuMushroom       MenuOther   MenuPepperoni      MenuVegies
        2.5530         -1.2117         -2.5332         -1.8176         13.7433         -1.1524
    Pizza_size
        0.1746

Degrees of Freedom: 119 Total (i.e. Null);  113 Residual
Null Deviance:      53.37
Residual Deviance: 47.31        AIC: 61.31
> prediction=predict(logi_res,type = 'response')
>
> head(prediction)
        1         2         3         4         5         6
0.9810990 0.9159595 0.9425174 0.9810990 0.9392206 0.9905075
> table(data$Like_it,prediction>0.5)

    TRUE
  0    7
  1  113
> accuracy=mean((prediction>0.5)==data$Like_it)
> accuracy
[1] 0.9416667
```

Conclusion:

Here the accuracy is 0.941667 means the model is good fit.

Objective: To check how do Size Rating, Quality rating and Pizza Size impact Restaurants uing MLR

Code:

```
#Back Ward Selection
data$Restaurants=factor(data$Restaurants,levels = c("Dominos","Pizza express","Pizza hut","Pappa johns","Other"),
                        labels = c("1","2","3","4","5"))
data$Restaurants=as.numeric(data$Restaurants)
set.seed(123)

model=lm(formula =Restaurants~Size_rating+Quality_rating+Pizza_size,data=data)
summary(model)
```

Output:

```
> #Back Ward Selection
> data$Restaurants=factor(data$Restaurants,levels = c("Dominos","Pizza express","Pizza hut","Pappa john
s","Other"),
+                         labels = c("1","2","3","4","5"))
> data$Restaurants=as.numeric(data$Restaurants)
> set.seed(123)
> model=lm(formula =Restaurants~Size_rating+Quality_rating+Pizza_size,data=data)
> summary(model)

Call:
lm(formula = Restaurants ~ Size_rating + Quality_rating + Pizza_size,
    data = data)

Residuals:
    Min      1Q  Median      3Q     Max
-1.4032 -1.0895 -0.8949  0.9965  3.2822

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)    1.70419    0.68396   2.492   0.0141 *
Size_rating    0.08593    0.13748   0.625   0.5332
Quality_rating -0.10349    0.14597  -0.709   0.4798
Pizza_size     0.05694    0.07198   0.791   0.4305
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.42 on 116 degrees of freedom
Multiple R-squared:  0.01059,   Adjusted R-squared:  -0.015
F-statistic: 0.4137 on 3 and 116 DF,  p-value: 0.7435
```

Conclusion:

As per the summary of model the highest probability value means the attribute is not much affecting the target variable(Restaurants)

1st we will remove size_rating attribute withp_value=0.5332 later Quality_rating with p_value=0.4798.

Only Size_rating is afftecting more to the choice of restaurant more rather than other attributes.

Contingency table

Objective: Contingency table is made to know the relationship between Order and Restaurants also between Gender and menu by the number of observations that fall into each combination of categories.

Code:

```
contingency_table=table(data$Gender,data$Menu)

contingency_table

contingency_table=table(data$Gender,data$Order_method)

contingency_table
```

Output:

```
> contingency_table=table(data$Gender,data$Menu)
> contingency_table

        Chicken Margherita Mushroom Other Pepperoni Vegies
  Female      34         12        6     5         2     18
  Male        20          4        3     3         1     12
```

```
> contingency_table=table(data$Gender,data$Order_method)
> contingency_table

        Delivery Dine-in Takeout
  Female       45      17      15
  Male         18      17       8
```

Conclusion:

The result of contingency table B/W gender and ordering method conclude that females prefer pizza Delivery over Dine in but male are equally likely to prefer either of them.

Hypothesis testing

Objective: Are there significant differences in the frequency of Restaurants based on Menu list and Pizza_size test with different types of tests of hypothesis (MANOVA)

Code: Test 1

```
h0='there are no significant differences among group'
h1='there are significant differences among group'
data$Menu=factor(data$Menu,levels=c("Margherita","Mushroom
","Other","Pepperoni","Vegies","Chicken"),
            labels = c("1","2","3","4","5","6"))
data$Menu=as.numeric(data$Menu)
mano_res=manova(cbind(Pizza_size, Menu)~Restaurants, data=data)
wilks=summary(mano_res,test = 'Wilks')
wilks
pval=wilks$stats['Restaurants','Pr(>F)']
pval
LOS=0.05 #bydefault level of significance

if (pval>LOS){
  print('Accept h0')
  print(h0)
}else{
  print('can not accept h0')
  print(h1)
}
```

Output:

```
> h0='there are no significant differences among group'
> h1='there are significant differences among group'
> data$Menu=factor(data$Menu,levels=c("Margherita","Mushroom ","Other","Pepperoni","Vegies","Chicken"),
+                  labels = c("1","2","3","4","5","6"))
> data$Menu=as.numeric(data$Menu)
> mano_res=manova(cbind(Pizza_size, Menu)~Restaurants, data=data)
> wilks=summary(mano_res,test = 'Wilks')
> wilks
            Df   Wilks approx F num Df den Df Pr(>F)
Restaurants   1 0.99321  0.36933      2    108 0.6921
Residuals   109
> pval=wilks$stats['Restaurants','Pr(>F)']
> pval
[1] 0.6920644
> LOS=0.05 #bydefault level of significance
> if (pval>LOS){
+   print('Accept h0')
+   print(h0)
+ }else{
+   print('can not accept h0')
+   print(h1)
+ }
[1] "Accept h0"
[1] "there are no significant differences among group"
```

Code: Test 2

```
roy=summary(mano_res,test = 'Roy')
roy
pval=roy$stats['Restaurants','Pr(>F)']
pval
LOS=0.05 #by default level of significance

if (pval>LOS){
  print('Accept h0')
  print(h0)
}else{
  print(' can accept h0')
  print(h1)
}
```

Output:

```
> roy=summary(mano_res,test = 'Roy')
> roy
             Df       Roy approx F num Df den Df Pr(>F)
Restaurants   1 0.0068395  0.36933      2    108 0.6921
Residuals   109
> pval=roy$stats['Restaurants','Pr(>F)']
> pval
[1] 0.6920644
> LOS=0.05 #by default level of significance
>
> if (pval>LOS){
+   print('Accept h0')
+   print(h0)
+ }else{
+   print(' can accept h0')
+   print(h1)
+ }
[1] "Accept h0"
[1] "mean size ordered is equal for all the restaurants"
```

Conclusion:

I have used Wilks and Roy test for MANOVA and I can conclude that there is no significant difference among Restaurants and pizza size and menu item selected. Which means the restaurant is independent of pizza size and menu item to be chosen.

Objective:

Is there a significant association between Gender and order method and test the hypothesis (Chi-square test)

Code:

```
# Chi-square test for independence between Gender and order method
h0='There is association between Gender and Order Method'
h1='There is no association between Gender and Order Method'
result=chisq.test(table(data$Gender, data$Order_method))
p_value=result$p.value
p_value
if (p_value>0.05){
  print('Accept h0')
  print(h0)
}else{
  print('Can not accept h0')
  print(h1)
}
```

Output:

```
> # Chi-square test for independence between Gender and Like_it
> h0='There is association between Gender and Order Method'
> h1='There is no association between Gender and Order Method'
> result=chisq.test(table(data$Gender, data$Order_method))
> p_value=result$p.value
> p_value
[1] 0.1095006
> if (p_value>0.05){
+   print('Accept h0')
+   print(h0)
+ }else{
+   print('Can not accept h0')
+   print(h1)
+ }
[1] "Accept h0"
[1] "There is association between Gender and Order Method"
```

Conclusion:

From above testing we can conclude that order method depends upon the Gender also the result of contingency table B/W gender and ordering method conclude that females prefer pizza Delivery over Dine_in but male are equaly likely to prefer either of them.

Objective: Is there a significant difference in the mean frequency of Quality rating and restaurants test the hypothesis (ANOVA)

Code:

```
h0='mean size ordered is equal for all the restaurants'
h1='mean size ordered is equal for all the restaurants'
anova_result <- aov(Pizza_size ~ Restaurants, data =data)
res=summary(anova_result)
res
pvalue=res[[1]][1,5]
pvalue

if (pvalue>0.05){
  print('Accept h0')
  print(h0)
}else{
  print('Can not accept h0')
  print(h1)
}
```

Output:

```
> h0='mean size ordered is equal for all the restaurants'
> h1='mean size ordered is equal for all the restaurants'
> anova_result <- aov(Pizza_size ~ Restaurants, data =data)
> res=summary(anova_result)
> res
             Df Sum Sq Mean Sq F value Pr(>F)
Restaurants   1    2.2   2.248   0.614  0.435
Residuals   118  432.1   3.662
> pvalue=res[[1]][1,5]
> pvalue
[1] 0.4348857
> if (pvalue>0.05){
+   print('Accept h0')
+   print(h0)
+ }else{
+   print('Can not accept h0')
+   print(h1)
+ }
[1] "Accept h0"
[1] "mean size ordered is equal for all the restaurants"
```

Conclusion:

From the above we can conclude that the mean of ‘pizza size’ ordered is same for all restaurants means size doesn’t depend on the restaurant chosen.

Overall Conclusion

Key Insights

- **Female customers are more likely to eat pizza**
- **Dominos is the most preferred by the customers**
- **Chicken pizza is the most ordered menu item**
- **There are no dependencies of gender on restaurant selection**
- **Female prefer to get home deliveries rather than take away where as male prefer either of them**
- **Taste is the most important factor while choosing any brand or restaurant**

Recommendation and Decision making

Targeting Female Customers:

Given the higher likelihood of females choosing pizza, marketing strategies and promotions can be tailored to appeal specifically to this demographic.

Domino's Market Dominance:

Acknowledging Domino's as the preferred choice, other pizza providers may consider analyzing and adopting some of the factors contributing to Domino's success in order to enhance their own market positions.

Promoting Chicken Pizza:

Since chicken pizza is the most ordered item, it would be sensible for restaurants to emphasize and promote chicken pizza varieties in their marketing efforts.

Diverse Menu Planning:

While taste is crucial, ensuring a diverse menu that caters to different preferences, including vegetarian and other non-chicken options, can help attract a broader customer base.

In conclusion understanding customer preferences and tailoring services accordingly can contribute to increased customer satisfaction and brand loyalty.