**Hypothesis Testing Module**

1. A F&B manager wants to determine whether there is any significant difference in the diameter of the cutlet between two units. A randomly selected sample of cutlets was collected from both units and measured? Analyse the data and draw inferences at 5% significance level. Please state the assumptions and tests that you carried out to check validity of the assumptions.

Check whether the diameter of both the donuts are same or not

Ho --> No difference in diameter

H1 --> There is significant difference in diameter of 2 donuts

Usng Z test as number of samples are more than 30

data: ct$Unit.A and ct$Unit.B

z = 0.72287, p-value = 0.4698

0.4698 >0.05 Null Hypothesis Accepted

Using ChiSquare test

X-squared = 1190, df = 1156, p-value = 0.2376

0.2376 >0.05 so null hypothesis accepted

Normality test

Shapiro Wilk Test Gives the output as

W = 0.96495, p-value = 0.32 .Accept null hypothesis

Variance Test

p-value = 0.3136 null hypothesis accepted

Conclusion::No difference in diameter of donuts

1. A hospital wants to determine whether there is any difference in the average Turn Around Time (TAT) of reports of the laboratories on their preferred list. They collected a random sample and recorded TAT for reports of 4 laboratories. TAT is defined as sample collected to report dispatch. Analyze the data and determine whether there is any difference in average TAT among the different laboratories at 5% significance level.

Check whether the TAT of labs matter if they are different avg TAT

Ho --> No difference in TurnAround Time for labs

H1 --> There is significant difference TAT for labs

Proportional Z Test because more than 30 samples.

All Std Deviation required for formula.

sd(lab$Laboratory\_1)

13.91967

sd(lab$Laboratory\_2)

14.95711

sd(lab$Laboratory\_3)

15.7948

sd(lab$Laboratory\_4)

15.08508

z.test(lab$Laboratory\_1, lab$Laboratory\_2, alternative = "two.sided", mu = 0,

sigma.x = 13.91967,

sigma.y = 14.95711, conf.level = 0.95)

We got the result from R

z = -0.34612, p-value = 0.7293

0.7293 >0.05 Null Hypothesis Accepted

. Using Chi -Square Method

X-squared = 13720, df = 13570, p-value = 0.1811

Normality test

W = 0.98867, p-value = 0.4232 .Accept null hypothesis

Variance Test

F = 0.86609, num df = 119, denom df = 119, p-value = 0.4341..Accept null hypothesis

Conclusion::No difference in TAT for labs

1. ) Sales of products in four different regions is tabulated for males and females. Find if male-female buyer rations are similar across regions.

T-Test

t.test(sales$East, sales$West)

t = -0.82307, df = 1.1545, p-value = 0.5461

0.5461 >0.05 Null Hypothesis Accepted

:No difference in Proportion of sales in any EAST and WEST Direction by Men and Women

t.test(sales$North, sales$South)

t = -0.82307, df = 1.1545, p-value = 0.6921

0.6921 >0.05 Null Hypothesis Accepted

Using ChiSquare test

X-squared = 2, df = 1, p-value = 0.1573 Accept Null hypothesis

Using Variance Test

var.test(East, West) 0.07772023

F = 0.07772, num df = 1, denom df = 1, p-value = 0.3462..Accept null hypothesis

X-squared = 3.859, df = 6, p-value = 0.6958

Conclusion::No difference in Proportion of sales in any north and south Direction by Men and Women

1. Telecall uses 4 centers around the globe to process customer order forms. They audit a certain % of the customer order forms. Any error in order form renders it defective and must be reworked before processing. The manager wants to check whether the defective % varies by center. Please analyze the data at 5% significance level and help the manager draw appropriate inferences

Check whether the error is there in centers through customer Order form

Ho --> No error /defect in Customer form from 4 centers

H1 --> There is significant error in Customer Form from 4 centers

Using Chi Square test

Chi Square because it has categorical, since chi-square works with categorical and numerical

data: table(stacked\_cof$ind, stacked\_cof$values)

X-squared = 3.859, df = 6, p-value = 0.6958 So

## Result :Since 0.69 > 0.005 (alpha) we accept null hypothesis which there is no error in customer form or defect through 4 centers

1. ) Fantaloons Sales managers commented that % of males versus females walking into the store differ based on day of the week. Analyze the data and determine whether there is evidence at 5 % significance level to support this hypothesis.

Check whether the

Ho --> No change in stores in which males go into (by day)

H1 --> There is significant change in % for males v females walking in different stores

# looking at summary we get

'Weekdays Weekend

: 25 : 25

Female:287 Female:233

Male :113 Male :167 '

#data: fanta2

X-squared = 15.434, df = 1, p-value = 8.543e-05. p value less than 0.05 .So we reject the null hypothesis (Ho Rejected) (Alternative Hypothesis)

There is a shift in the Males v females going to different stores by % with 95% confidence.