Maths Digital Assignment

22BCE1357

Anantabh Sahu

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1) Pop. mean = 9

Sample mean ($\bar{x}$) = 7.9

sample size (n) = 50

std. dev (σ) = 0.6

lvl of significance = 0.01

$$\cancel{z =} \quad t = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{7.9 - 9}{0.6/\sqrt{50}} = -12.9$$

DF = 49

$t_{0.01}$ at DF_{49} = 2.976

$t > t_{0.01}$ ∴ we reject the Hypothesis

2) Pop. mean = 32.7

Sample mean = 33.0

sample size = 70

σ = 5.9 min

α = 0.05

$\Bigg\}$ Given

$$t = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$$

$t = \dfrac{\bar{X} - \mu}{\sigma/\sqrt{n}}$

$t = \dfrac{33.8 - 32.7}{5.9/\sqrt{70}} = \dfrac{1.1}{5.9/8.366}$

$t = 1.54$

H_0: Avg time is 32.7 min

calculated t-test value is greater then critical (1.761)

Hence we reject H_0 at 0.05 LOS

3) H_0: 72 beats/min = avg rate

H_1: 72 b/m > avg rate

$\mu = 72$ bpm

$\bar{X} = 69$ bpm

$n = 25$

$\sigma = 6.5$

$\alpha = 0.05$

$t = \dfrac{\bar{X} - \mu}{\sigma/\sqrt{n}}$

$= \dfrac{69-72}{6.5/\sqrt{25}} = \dfrac{-3}{6.5/5} = \dfrac{-3}{1.3} = 2.30$

for one tailed test with $t_{0.05}$ is $\simeq -1.782$

Since $-2.30 < -1.782$

we reject this hypothesis

4)

H_0: there is no significant diff.

H_1: there is significant diff.

$$\text{mean} = 50+40+48+39+46+48+50+45+39+44+40+39 \;/12$$

$$= 27.3$$

$$F_{sales} = (SS_{sales}) \; (s_{salesper})^2$$

$df_{sales} = 3$; $df_{months} = 2$

$df_{interaction} = 6$

$$df_{error} = (n-1) - df_{sales} + df_{month} + df_{interaction}$$
$$= -5$$

$$SS\_between = (3 * ((46.67-42.44)^2 + (39.33-42.44)^2 + (42.33-42.44)^2))$$
$$= 218.7$$

$$df_{between} = \mu - 1 = 3-1 = 2$$

$$SS_{within} = ((50-46.67)^2 + (46-46.67)^2 + (44-46.67)^2 + (39-39.33)^2 + \cdots \quad = 353.33$$

$$dt_{within} = N - \mu = 9-3 = 6$$

$$MS_{within} = SS_{within} \cancel{p} / df_{within} = \frac{3533}{6}$$

$$F_{critical} = F_{(2/6)} = 5.143$$

whereas P value for months is 50.05

there is a ~~rate~~ variation of ~~stat~~ sales.

5) Calculate row means

Row1 = 77/5 = 15.4 kgs

Row2 = 78/5 = 15.6 kgs

Row3 = ~~78~~77/5 = 15.4 kgs

Row4 = 78/5 = 15.6 kg

Row = 78/5 = 15.6 kg

Calculate column means

Column1 = 55/5 = 11 kgs

Column2 = 76/5 = 15.2 kgs

Column3 = 98/5 = 19.6 kgs

Column 4 = 86/5 = 17.2 kgs

Column 5 = 73/5 = 14.6 kg

overall mean = $\frac{387}{25}$ = 15.48

Row deviation

Row1 = -0.08

Row2 = 0.12

Row3 = -0.08

Row4 = 0.12

Row5 = 0.12

Col. deviations

C1 = -4.48

C2 = -0.28

C3 = 4.12

C4 = 1.72

C5 = -0.88

Treatment A = 9 kgs/plot

T B = 13.6 kgs/plot

T C = 17.6 kgs/plot

T D = 21.8 kgs/plot

T E = 16.6 kgs/plot

Treatment deviation

$d_A = -6.48$

$d_B = -1.88$

$d_C = 2.12$

$d_D = 6.32$

$d_E = 1.12$

SSR = 0.0016 + 0.0144 + 0.0016 + 0.0144 + 0.0144 + = 0.0476 kgs

SST = 91.29 kgs

SSC = 41.856 kgs

DPR = 4(5-1)

DPC = 4

DPT = 4

$MSR = \frac{SSR}{DFR} = \frac{0.0406}{4} = 0.0119$ kg/plot

$MSC = \frac{SSC}{DPC} = \frac{41.856}{4} = 10.464$ kg/plot

$MST = \frac{SST}{DFT} = \frac{91.2956}{4} = 22.82$ kg/plot

Calculate F-radio :

$F\text{-column} = \frac{MSC}{MST} = 10.464/22.8239 = 0.45$

$F\text{-Row} = 0.0005$

$0.0025 < 3.49$ hence no significant differences in row means

$F\text{-column} = 0.45 < 3.49$

no significant difference in column means.

Hence Latin ANOVA, no difference.