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THURSDAY - NOVEMBER

WK-47 • 326-039

NOVEMBER 2018

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
19 20 21 22 23 24 25 26 27 28 29 30
M T W T F S S M T W T F S S M T W T F S S

Assignment - 1

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Q. H0 → Preferred reading & gender are no correlated in a group

H1 → Preferred reading & gender are correlated in a grp

Given frequencies

$e_{11} = \{ \text{count (male)} \times \text{count (friction)} \} / N$

$e_{11} = 90$ $e_{21} = 210$

$e_{12} = 360$ $e_{22} = 840$

Compute x^2

$$x^2 = \frac{\Sigma (\text{observed} - \text{expected})}{(\text{expected})}$$

$$= \frac{(250-90)^2}{90} + \frac{(50-210)^2}{210} + \frac{(200-360)^2}{360} + \frac{(1000-840)^2}{840}$$

$$x^2 = 507.93$$

For 2×2 table
degree of freedom = $(2-1)(2-1) = 1$

For 1 degree of freedom x^2 value needed to reject the hypothesis at 0·001 significant level is 10·828

We observe that the compared value is greater therefore we reject the null hypothesis ie
Preferred reading & gender are not correlated in a group

Conclusion - Preferred reading and gender are correlated in the group

Q P(Class = On time) = 14/20
   P(Class = Late) = 2/20
   P(Class = very late) = 3/20
   P(Class = cancelled) = 1/20

I) | Days | Ontime | late | very late | cancelled |
|---|---|---|---|---|
| Weekday | 9/14 | 1/2 | 3/3 | 0/1 |
| Holiday | 2/14 | 1/2 | 0/3 | 0/1 |
| Saturday | 2/14 | 0/2 | 0/3 | 1/1 |
| Sunday | 1/14 | 0/2 | 0/3 | 0/1 |

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II) | season | Ontime | late | very late | cancelled |
|---|---|---|---|---|
| Spring | 4/14 | 0/2 | 0/3 | 1/1 |
| Summer | 6/14 | 0/2 | 0/3 | 0/1 |
| Winter | 2/14 | 2/2 | 2/3 | 0/1 |
| Autumn | 2/14 | 0/2 | 1/3 | 0/1 |

III)

Fog	on time	late	v.late	cancelled
High	4/14	1/2	0/3	1/1
Normal	4/14	1/2	2/3	0/1
None	5/14	0/2	0/3	0/1

IV)

Rain	ontime	late	verylate	cancelled
None	6/14	1/2	1/3	0/1
Slight	6/14	1/2	0/3	0/1
Heavy	2/14	0/2	2/3	1/1

< Day = weekday, Season = winter, Fog = High, Rain = None>

$$V_{NB} = \underset{v_j \in \{yes,no\}}{argmax} \quad P(v_j) \, \pi_i \, (a_i v_j)$$

$$V(ontime) = \frac{14}{20} \times \frac{9}{14} \times \frac{2}{14} \times \frac{4}{14} \times \frac{6}{14} = \underline{0.0078}$$

$$V(late) = \frac{2}{20} \times \frac{1}{2} \times \frac{2}{2} \times \frac{1}{2} \times \frac{1}{2} = \underline{0.0125}$$

$$V(very\ late) = \frac{3}{20} \times \frac{3}{3} \times \frac{2}{3} \times \frac{1}{3} \times \frac{1}{3} = \underline{0.0111}$$

$$V(cancelled) = \frac{1}{20} \times \frac{1}{1} \times 0 = \underline{0}$$

Since $V_{NB}(late)$ is greatest
The instance will be categorised
under late