

DA Assignment 1.

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Q1

Attribute	On time	Late	very late	Cancelled
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Day:-

Weekday	0.64	0.5	1	0
Saturday	0.14	0.5	0	1
Sunday	0.07	0	0	0
Holiday	0.14	0	0	0

Season:-

Winter	0.14	1	0.67	0
Autumn	0.14	0	0.33	0
Summer	0.43	0	0	0
Spring	0.29	0	0	0

Fog:-

Normal	0.36	0.5	0.67	0
High	0.29	0.5	0.33	1
None	0.36	0	0	0

Rain:-

None	0.36	0.5	0.33	0
Slight	0.07	0	0	0
Heavy	0.07	0.5	0.67	1

Prior Probability	0.70	0.1	0.15	0.05
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Case 1

class : Late

$$= 0.1 \times 0.5 \times 1 \times 0.5 \times 0.5$$

$$= 0.0125$$

Case 2

class : on time

$$= 0.7 \times 0.64 \times 0.14 \times 0.29 \times 0.31$$

$$= 6.547 \times 10^{-3}$$

Case 3

class : very late

$$= 0.15 \times 1 \times 0.67 \times 0.33 \times 0.33$$

$$= 0.0109$$

Case 4

class : cancelled

$$= 0.05 \times 0.0 \times 0.0 \times 1 \times 0$$

$$= 0$$

As case 1 is high \therefore Instance will be categorized under class Late.

Q2.

 χ^2 testDegree of freedom :- $(2-1)(2-1)$

$$\text{Now, } \chi^2 = \sum_{i=1}^m \sum_{j=1}^n \frac{(q_{ij} - e_{ij})^2}{e_{ij}}$$

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

$$\chi^2 = 507.93$$

Degree of freedom = 1

 $\therefore \chi^2$ value needed = 2.706but ~~50~~ 507.93 > 2.706

\therefore Null hypothesis of independence is rejected with a confidence level of 0.1