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DA assignment - 1

Q1. Calculating posterior and prior probabilities

Attribute	on time	Late	very late	Cancelled
Day:				
Weekday	9/14	1/2	3/3	0/1
Saturday	2/14	1/2	0/3	1/1
Sunday	1/14	0/2	0/3	0/1
Holiday	2/14	0/2	0/3	0/1
Fog:				
None	5/14	0/2	0/3	0/1
High	4/14	1/2	1/3	1/1
Normal	5/14	1/2	2/3	0/1
Rain:				
None	5/14	1/2	1/3	0/1
Slight	8/14	0/2	0/3	0/1
heavy	1/14	1/2	2/3	1/1
Season				
Spring	4/14	0/2	0/3	0/1
Summer	2/14	0/2	0/3	0/1
Autumn	2/14	0/2	1/3	0/1
Winter	2/14	2/2	2/3	0/1
Prior Probability	14/20	2/20	3/20	1/20

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Instance: Weekday, Winter, High, None ??

Case 1: Class : Late

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

$= 0.0125$

Case 2: Class = on time

$= 0.7 \times 0.64 \times 0.14 \times 0.29 \times 0.36$

$= 6.547 \times 10^{-3} = 0.006547$

Case 3: Class = Very late

$= 0.15 \times 1 \times 0.6 \times 0.33 \times 0.33$

$= 0.0109$

Case 4: Class = Cancelled

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

$= 0$

∴ Case 3 is strong

∴ The instance will be categorized under class Late

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Q2. Using x^2 (chi-square) calculation

degree of freedom = 1

By using formula

$$x^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} \frac{(a_{ij} - e_{ij})^2}{e_{ij}}$$

$$\therefore x^2 = \frac{[250-90]^2}{90} + \frac{[50-210]^2}{210} + \frac{[200-360]^2}{360} + \frac{[1000-840]^2}{840}$$

$$= 507.93$$

Chi square value is large as compared to 2.706

(For 1 degree of freedom x^2 value is rejected. the hypothesis

Hence, the gender and prefered reading are strongly correlated

We can reject the null hypothesis