DA Assignment - 1

2019120008

Q1)

Attribute	Ontime	Late	Very Late	Cancelled
Day:				
Weekday	9/14 = 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	0.63	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

Case 1

Class : on time

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

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

Case 2

Class : Late

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

$= 0.0125$

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 the case 2 value is high,

∴ The instance will be categorized under class late

Q2

χ^2 test

degree of freedom : $(r-1)\ (c-1)$

Now,

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

$$\chi^2 = \frac{[250 - 90]^2}{90} + \frac{[50 - 210]^2}{210} + \frac{[200 - 260]^2}{360} + \frac{[1000 - 840]^2}{840}$$

$$\chi^2 = 507.93$$

Degree of freedom = 1

$\therefore$ χ^2 value needed = 2.706

but 507.93 > 2.706

$\therefore$ Null Hypothesis of independence is rejected with a confidence level of 0.1.