

# Australia Next Day Rain Prediction

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## 1 Introduction

## 2 Methods and Analysis

Figure 1 shows

Figure 2 shows seasonal

Separation. Figure 3 example

Not well separated Figure 4

Table 1: Results of Kolmogorov-Smirnov test on Conditional Distributions (RainTomorrow = 0 vs. RainTomorrow = 1)

NumericVariable	D
MinTemp	0.09
MaxTemp	0.14
Rainfall	0.34
Evaporation	0.14
Sunshine	0.47
WindGustSpeed	0.23
WindSpeed9am	0.08
WindSpeed3pm	0.08
Humidity9am	0.29
Humidity3pm	0.46
Pressure9am	0.26
Pressure3pm	0.23
Cloud9am	0.34
Cloud3pm	0.41
Temp9am	0.04
Temp3pm	0.17



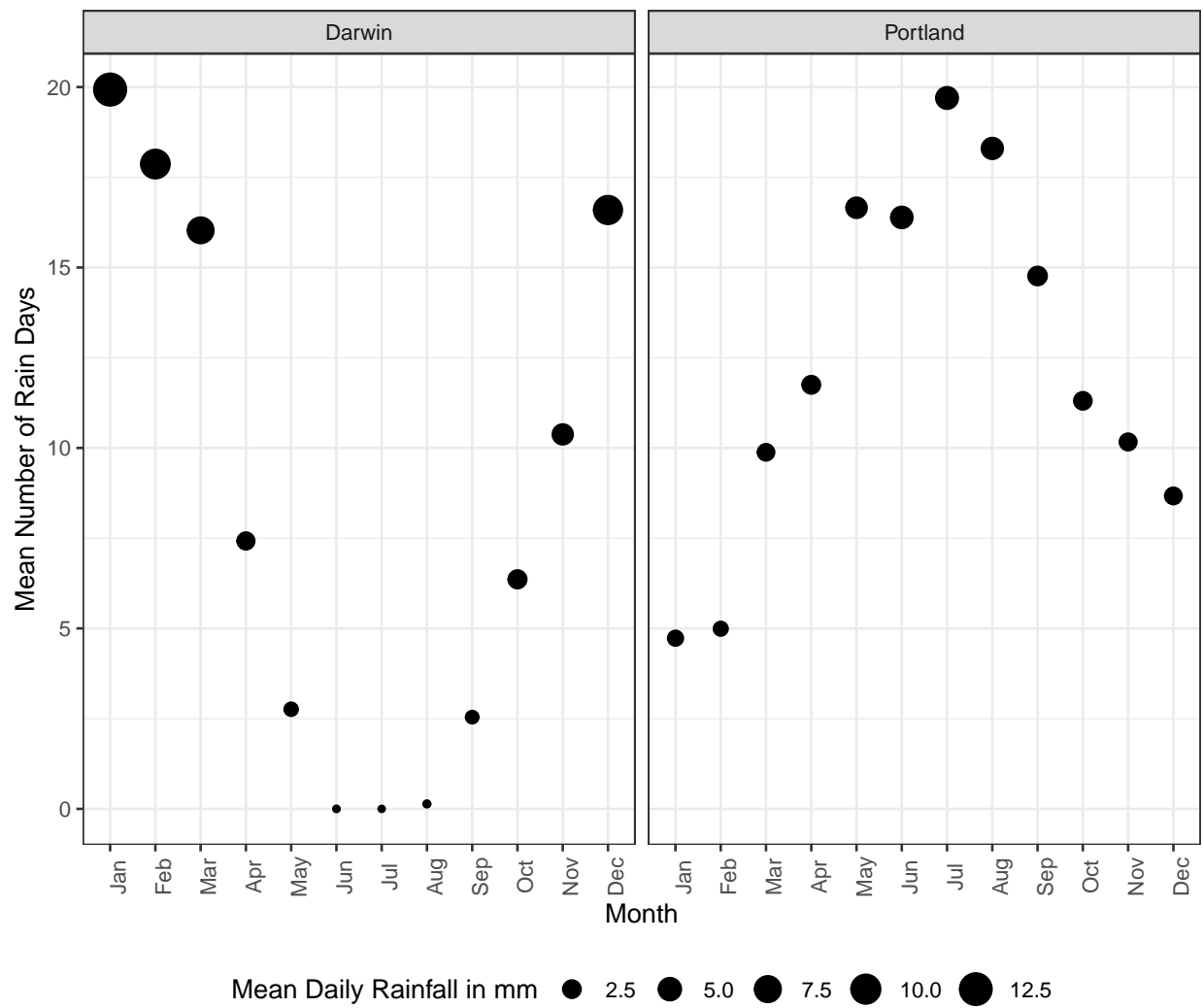


Figure 2: Monthly Rainfall Patterns by Location

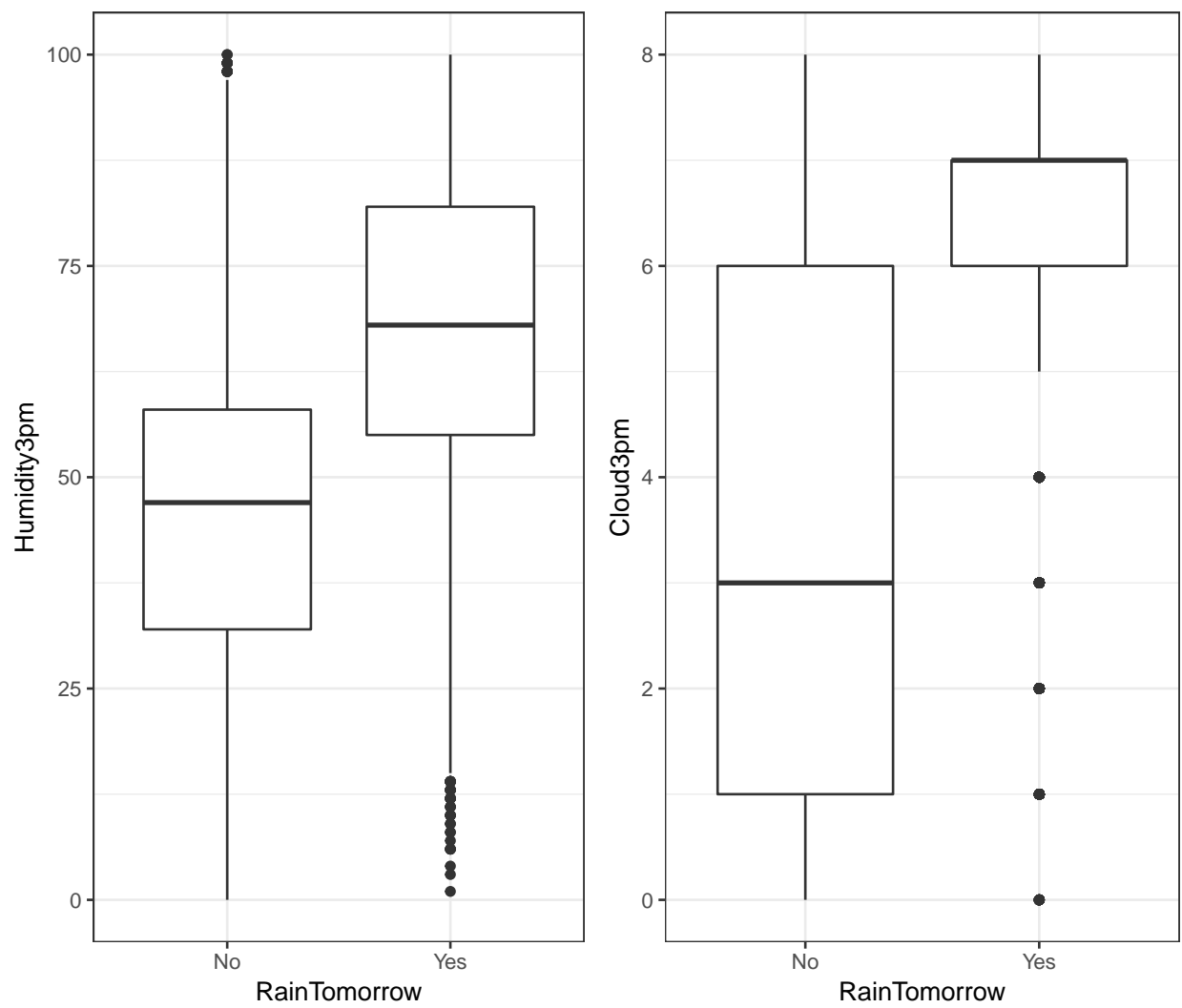


Figure 3: Examples of Some Well Separated Cases

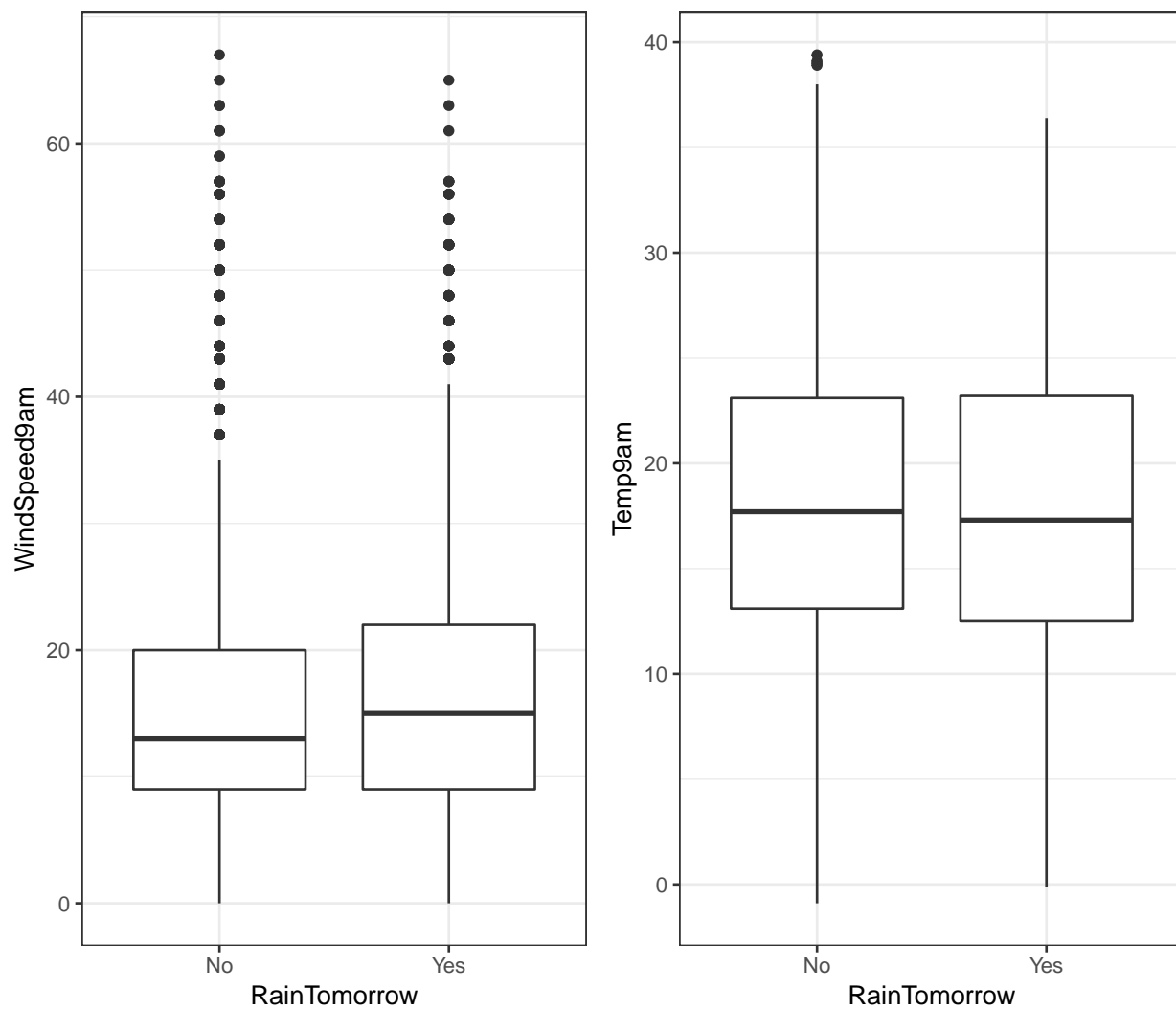


Figure 4: Examples of Some **NOT** Well Separated Cases

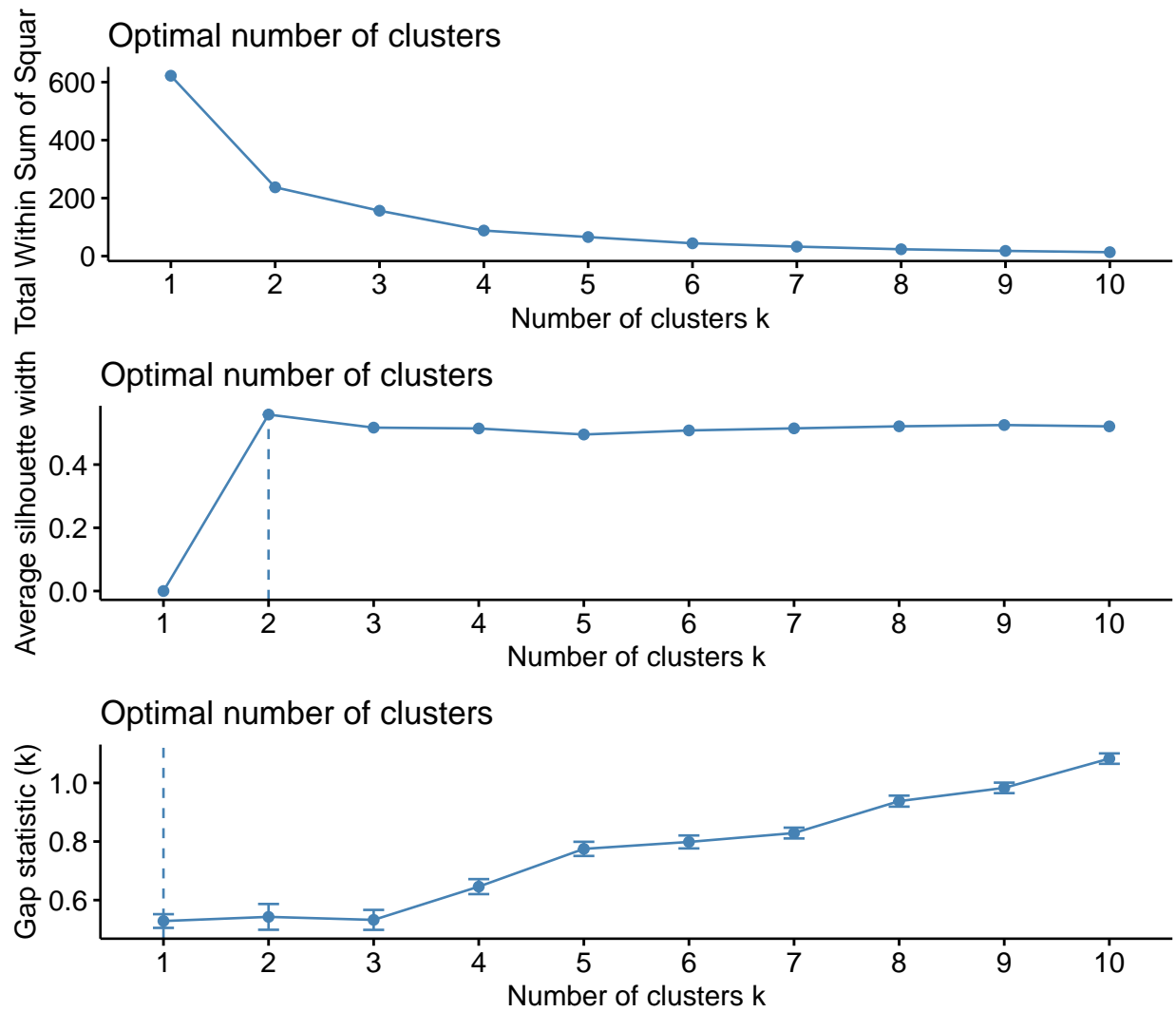


Figure 5: Finding Optimal Number for Location - Month Clustering

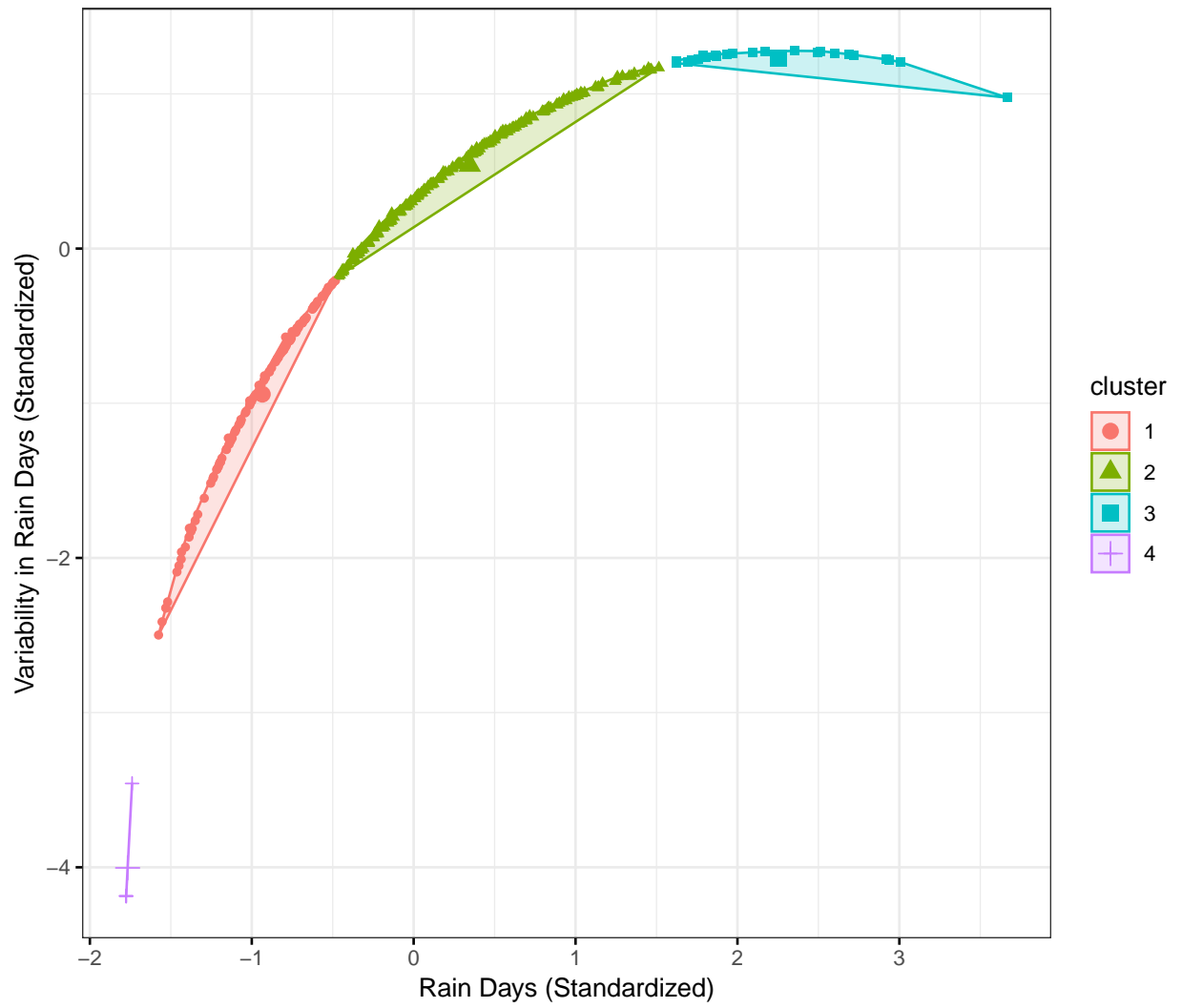


Figure 6: Number of Rain Days and Variability in Rain Days accross Clusters

Table 2: Location-Month Clusters

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AliceSprings	1	1	1	1	1	1	1	1	1	1	1	2
Brisbane	2	2	2	2	2	2	1	1	1	1	2	2
Cairns	3	3	3	2	2	2	2	1	1	2	2	2
Canberra	1	2	1	2	1	2	1	2	2	2	2	2
Cobar	1	2	1	1	2	2	1	4	1	1	1	1
CoffsHarbour	2	2	3	2	2	2	2	1	2	2	2	3
Darwin	3	3	3	2	1	4	4	4	1	2	2	3
Hobart	2	1	2	2	2	2	2	2	2	2	2	2
Melbourne	1	1	2	2	2	2	2	2	2	2	2	2
MelbourneAirport	1	1	2	2	2	2	2	2	2	2	2	2
Mildura	1	1	1	1	1	1	1	1	1	1	1	1
Moree	2	1	1	1	1	1	1	1	1	1	1	2
MountGambier	1	1	2	2	3	3	3	3	2	2	2	2
NorfolkIsland	2	2	2	2	2	3	3	2	2	2	2	2
Nuriootpa	1	1	1	2	2	2	2	2	2	1	1	2
Perth	1	1	1	1	2	2	3	2	2	1	1	1
PerthAirport	1	1	1	1	2	2	2	2	2	1	1	1
Portland	1	2	2	2	3	3	3	3	3	2	2	2
Sale	1	2	2	2	2	2	2	2	2	2	2	2
Sydney	2	2	2	2	1	2	2	2	2	1	2	2
SydneyAirport	2	2	2	2	2	2	2	2	2	2	2	2
Townsville	2	3	2	1	1	1	1	1	1	1	2	2
WaggaWagga	1	2	1	1	2	2	2	2	1	1	1	2
Watsonia	1	1	2	2	2	2	2	2	2	2	2	2
Williamtown	2	2	2	2	2	3	2	1	2	2	2	2
Woomera	1	1	1	1	1	1	1	1	1	1	1	1

Table 3: Conditional Probabilities No Rain Tomorrow vs. Rain Tomorrow Given WindGust Direction (Location = Cobar)

	E	ENE	ESE	N	NE	NNE	NNW	NW	S	SE	SSE	SSW	SW	W	WNW	WSW	Total
No	0.86	0.9	0.85	0.95	0.59	0.67	0.86	0.88	0.94	0.93	0.92	0.98	0.93	1	0.89	0.92	0.88
Yes	0.14	0.1	0.15	0.05	0.41	0.33	0.14	0.12	0.06	0.07	0.08	0.02	0.07	0	0.11	0.08	0.12
Total	1.00	1.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	1.00	1.00	1.00

### 3 Results

### 4 Conclusion



Table 4: Probabilites of Rain Tomorrow Conditioned on rainDir9am

	RainTomorrow=0	RainTomorrow=1	Total
rainDirGust=0	0.87	0.13	1
rainDirGust=1	0.68	0.32	1
Total	0.78	0.22	1

Table 5: Probabilites of Rain Tomorrow Conditioned on rainDir3pm

	RainTomorrow=0	RainTomorrow=1	Total
rainDir9am=0	0.86	0.14	1
rainDir9am=1	0.69	0.31	1
Total	0.78	0.22	1

Table 6: Probabilites of Rain Tomorrow Conditioned on rainDirGust

	RainTomorrow=0	RainTomorrow=1	Total
rainDir3pm=0	0.86	0.14	1
rainDir3pm=1	0.67	0.33	1
Total	0.78	0.22	1