Student Number: 20053722 Name: Bryan Hoang

1. (2 marks) This week we will experiment with the k-Nearest-Neighbour predictor. It has two basic parameters: how many neighbours to consider (i.e., the k), and whether or not close neighbours should have greater influence on the prediction result.

   Try to classify the type of wine varying these parameters to see how well you can do.

   Answer:

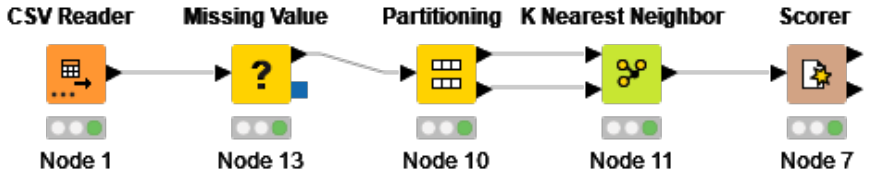

Figure 1: KNIME workflow used

Kind of wine \ Class [kNN]	Type1	Type2	Type3
Type1	11	0	1
Type2	0	11	3
Type3	0	2	8

Correct classified: 30 Wrong classified: 6

Accuracy: 83.333 % Error: 16.667 %

Cohen's kappa (κ) 0.749

Figure 2: Confusion matrix of "7nn" predictor

2. (2 marks) This technique also allows you to output the probabilities associated with each prediction. Have a look at these and see whether most predictions are clear cut, or whether some are quite difficult.

   Answer:

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S Class [kNN]	D P (Kind of wine=Type1)	D P (Kind of wine=Type2)	D P (Kind of wine=Type3)
Type1	1	0	0
Type1	1	0	0
Type1	1	0	0
Type3	0.328	0.089	0.583
Type1	1	0	0
Type1	1	0	0
Type1	0.64	0.263	0.097
Type1	1	0	0
Type1	1	0	0
Type1	1	0	0
Type1	0.731	0.269	0
Type1	1	0	0
Type2	0	0.932	0.068
Type3	0	0.385	0.615
Type2	0	0.582	0.418
Type3	0	0.201	0.799
Type2	0	0.903	0.097
Type2	0	1	0
Type3	0	0.322	0.678
Type2	0	0.887	0.113
Type2	0	0.846	0.154
Type2	0	1	0
Type2	0	0.83	0.17
Type2	0	1	0
Type2	0	0.638	0.362
Type2	0	0.689	0.311
Type3	0	0.292	0.708
Type3	0	0.367	0.633
Type3	0	0.416	0.584
Type3	0.388	0.17	0.442
Type3	0	0.405	0.595
Type2	0	1	0
Type2	0.153	0.585	0.262
Type3	0	0.343	0.657
Type3	0.23	0.384	0.386
Type3	0.223	0.159	0.618

Figure 3: Class probabilities of "7nn" predictor