

Homework 5 G

November 2, 2021

Jose Carlos Munoz

12.a)

1-nearest for 5.0 are 4.9|+

	+	-
Amount	1	0

The maximum amount is for +. So it is classified as a +
3-nearest for 5.0 are 4.9|+, 5.2|-, 5.3|-

	+	-
Amount	1	2

The maximum amount is for -. So it is classified as a -
5-nearest for 5.0 are 4.9|+, 5.2|-, 5.3|-, 5.5|+, 4.6|+

	+	-
Amount	3	2

The maximum amount is for +. So it is classified as a +
9-nearest for 5.0 are 4.9|+, 5.2|-, 5.3|-, 5.5|+, 4.6|+, 4.5|+, 3.0|-, 7.0|-, 0.5|-

	+	-
Amount	4	5

The maximum amount is for -. So it is classified as a -
12.b)

1-nearest for 5.0 are 4.9|+

$$\begin{aligned}\Sigma_+ &= (5 - 4.9)^{-2} \\ &= 100 \\ \Sigma_- &= 0\end{aligned}$$

The maximum value is for +. So it is classified as a +
3-nearest for 5.0 are 4.9|+, 5.2|-, 5.3|-

$$\begin{aligned}\Sigma_+ &= (5 - 4.9)^{-2} \\ &= 100 \\ \Sigma_- &= (5 - 5.2)^{-2} + (5 - 5.3)^{-2} \\ &= 36.11\end{aligned}$$

The maximum amount is for +. So it is classified as a +
5-nearest for 5.0 are 4.9|+, 5.2|-, 5.3|-, 5.5|+, 4.6|+

$$\begin{aligned}\Sigma_+ &= (5 - 4.9)^{-2} + (5 - 5.5)^{-2} + (5 - 4.6)^{-2} \\ &= 110.25 \\ \Sigma_- &= (5 - 5.2)^{-2} + (5 - 5.3)^{-2} \\ &= 36.11\end{aligned}$$

The maximum amount is for +. So it is classified as a +
9-nearest for 5.0 are 4.9|+, 5.2|-, 5.3|-, 5.5|+, 4.6|+, 4.5|+, 3.0|-, 7.0|-, 0.5|-

$$\begin{aligned}\Sigma_+ &= (5 - 4.9)^{-2} + (5 - 5.5)^{-2} + (5 - 4.6)^{-2} + (5 - 4.5)^{-2} \\ &= 114.25 \\ \Sigma_- &= (5 - 5.2)^{-2} + (5 - 5.3)^{-2} + (5 - 3.0)^{-2} + (5 - 7.0)^{-2} + (5 - 0.5)^{-2} \\ &= 36.7\end{aligned}$$

The maximum amount is for +. So it is classified as a +

13)

We first make a table for the Home Owner and Marriage Attributes

Class	S	M	D	(Marriage Status)
Yes	2	0	1	
No	2	4	1	

Class	Y	N	(Home Owner)
Yes	0	3	
No	3	4	

we use this equation to find the distance from each of the values

$$D(V_1, V_2) = \Sigma \left| \frac{n_{i1}}{n_1} - \frac{n_{i2}}{n_2} \right| \quad (1)$$

We First do the Marital Status Attribute

$$\begin{aligned}d(\text{Single, Married}) &= \left| \frac{2}{4} - \frac{0}{4} \right| + \left| \frac{2}{4} - \frac{4}{4} \right| \\ &= \frac{1}{2} + \frac{1}{2} \\ &= 1 \\ d(\text{Single, Divorced}) &= \left| \frac{2}{4} - \frac{1}{2} \right| + \left| \frac{2}{4} - \frac{1}{2} \right| \\ &= 0 + 0 \\ &= 0 \\ d(\text{Divorced, Married}) &= \left| \frac{1}{2} - \frac{0}{4} \right| + \left| \frac{1}{2} - \frac{4}{4} \right| \\ &= \frac{1}{2} + \frac{1}{2} \\ &= 1\end{aligned}$$

Then we do for the Home Owner Attribute

$$\begin{aligned}d(\text{Yes, No}) &= \left| \frac{0}{3} - \frac{3}{7} \right| + \left| \frac{3}{3} - \frac{4}{7} \right| \\ &= \frac{3}{7} + \frac{3}{7} \\ &= \frac{6}{7}\end{aligned}$$