Assignment

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1. mean, $\bar{x} = \frac{34.61 + 34.57 + 34.40 + 34.63 + 34.63 + 34.51 + 34.49 + 34.61 + 34.52 + 34.55 + 34.58 + 34.53 + 34.44 + 34.49 + 34.40}{15}$

$= \frac{517.95}{15} = 34.53 \text{ MPa}$

Standard deviation

$\sigma = \sqrt{\frac{\Sigma (x - \bar{x})}{n}}$

$= \frac{\sqrt{(34.61 - 34.53)^2 + (34.57 - 34.53)^2 + \ldots}}{15}$

$= \frac{\sqrt{0.0838}}{15} = \sqrt{0.005586}$

$= 0.07474 \text{ MPa}$

2.	x (Academic excellence)	y (Activities)	z	Distance	Rank classification
	8	6	outstanding	3.16	3
	5	6	good	1	1
	7	3	good	4.47	4
	6	9	outstanding	2.23	2
	5	7	?	?	?

k=3

distance : $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

(1) : $\sqrt{(5-6)^2+(7-6)^2} = \sqrt{9+1} = \sqrt{10} = 3.1$

(2) : $\sqrt{(5-5)^2+(7-6)^2} = \sqrt{1} = 1$

(3) : $\sqrt{(5-7)^2+(7-3)^2} = \sqrt{2^2+4^2} = \sqrt{4+16} = \sqrt{20}$

(4) : $\sqrt{(5-6)^2+(7-9)^2} = 1^2+2^2 = \sqrt{1+4} = \sqrt{5} = 2.23$

outstanding

3. b the example

f_1 : Swim

f_2 : Fly

f_3 : crawl

labels

c_1 : "Animal"

c_2 : Bird

c_3 : fish

test instance is (slow, rarely, No)

so we have

x_1 = "slow", x_2 = Rarely

x_3 = "No"

class	swim (f_1)	fly (f_2)	crawl (f_3)	this
	fast	slow	No	long short really No yes
Animal (c_1)	2 2	1 0	0 1	4 2 3 5
Bird (c_2)	1 0	3 1	2 0	1 1 3 4
Fish (c_3)	1 2	0 0	0 0	3 0 3 3
Total	4 4	4 1	2 1	8 4 8 12

$P(C_1) = 5/12$

$P(C_2) = 4/12$

$P(C_3) = 3/12$

$P(ST_1 = \text{slow} | C_1)$ = No. of records with ST = slow & class label C_1 / No. of records class C_1

$= 2/5$

$q_1 = 0.02$

$q_2 = 0$

$q_3 = 0$

$\max\{q_1, q_2, q_3\} = 0.05$

class label is assigned

class	color	type	origin					
	Red	Yellow	sport	SUV	Domestic			
yes	3/5	2/5	4/5	1/5	2/5	3/5		
NO	2/5	3/5	2/5	3/5	3/5	2/5		

$$q_1 = P(x_1|c_1)\,p(x_2|c_1)\,p(x_3|c_1)P(c_1)$$

probability of

yes $= 3/5 \times 1/5 \times 2/5 \times 1/2 = 0.024$

$e_{2,3}$ $= 2/5 \times 3/5 \times 3/5 \times 1/2 = 0$

(probability of NO)

The prediction of whether a red domestic SUV car is being stolen car or not is NO

data is predicted as NO