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CSE 4309

Assignment 1

**Task 1**

**Part A**

A = Sensor reading is greater than 80

P(Maine) = 0.05

P(A | Maine) = 0.2

P(A | Sahara) = 0.9

P(A) = P(A|Maine) \* P(Maine) + P(A|Sahara) \* P(Sahara) = (0.2)(0.05) + (0.9)(0.98) = 0.865

P(A’) = 1- 0.865 = 0.135

P(Maine | A’) = P(Maine) \* P(A’ | Maine) / P(A’) = (0.05) (0.8) / 0.135

**P(Maine | A’) = 0.296**

**Part B**

P(A’) = P(A’|Maine) \* P(Maine) + P(A’|Sahara) \* P(Sahara)

P(A’) = (0.8)(0.296) + (0.1)(0.704) = 0.307

**Part C**

P(A’)3 = (0.307) \* (0.307) \* (0.307) = 0.289

**Task 2**

P is possibly a probability function. Because we do not know P(C) and P(D), we cannot tell if it is valid. If P(C) + P(D) = 0.1, it is valid; otherwise, it is not valid.

**Task 3**

Definitely not a density function.

**Task 4**

Class 1, attribute 0, mean = 0.52, std = 0.10

Class 1, attribute 1, mean = 0.54, std = 0.10

Class 1, attribute 2, mean = 0.52, std = 0.07

Class 1, attribute 3, mean = 0.41, std = 0.17

Class 1, attribute 4, mean = 0.50, std = 0.00

Class 1, attribute 5, mean = 0.00, std = 0.00

Class 1, attribute 6, mean = 0.50, std = 0.05

Class 1, attribute 7, mean = 0.24, std = 0.05

Class 2, attribute 0, mean = 0.45, std = 0.11

Class 2, attribute 1, mean = 0.45, std = 0.10

Class 2, attribute 2, mean = 0.53, std = 0.06

Class 2, attribute 3, mean = 0.23, std = 0.11

Class 2, attribute 4, mean = 0.50, std = 0.04

Class 2, attribute 5, mean = 0.00, std = 0.00

Class 2, attribute 6, mean = 0.49, std = 0.06

Class 2, attribute 7, mean = 0.33, std = 0.14

Class 3, attribute 0, mean = 0.43, std = 0.10

Class 3, attribute 1, mean = 0.47, std = 0.11

Class 3, attribute 2, mean = 0.36, std = 0.06

Class 3, attribute 3, mean = 0.22, std = 0.08

Class 3, attribute 4, mean = 0.51, std = 0.05

Class 3, attribute 5, mean = 0.00, std = 0.00

Class 3, attribute 6, mean = 0.51, std = 0.04

Class 3, attribute 7, mean = 0.27, std = 0.09

Class 4, attribute 0, mean = 0.79, std = 0.07

Class 4, attribute 1, mean = 0.76, std = 0.07

Class 4, attribute 2, mean = 0.37, std = 0.06

Class 4, attribute 3, mean = 0.32, std = 0.11

Class 4, attribute 4, mean = 0.50, std = 0.00

Class 4, attribute 5, mean = 0.00, std = 0.00

Class 4, attribute 6, mean = 0.51, std = 0.07

Class 4, attribute 7, mean = 0.27, std = 0.09

Class 5, attribute 0, mean = 0.74, std = 0.15

Class 5, attribute 1, mean = 0.62, std = 0.12

Class 5, attribute 2, mean = 0.42, std = 0.08

Class 5, attribute 3, mean = 0.29, std = 0.12

Class 5, attribute 4, mean = 0.50, std = 0.00

Class 5, attribute 5, mean = 0.00, std = 0.00

Class 5, attribute 6, mean = 0.51, std = 0.06

Class 5, attribute 7, mean = 0.24, std = 0.04

Class 6, attribute 0, mean = 0.52, std = 0.13

Class 6, attribute 1, mean = 0.48, std = 0.10

Class 6, attribute 2, mean = 0.51, std = 0.05

Class 6, attribute 3, mean = 0.22, std = 0.08

Class 6, attribute 4, mean = 0.50, std = 0.00

Class 6, attribute 5, mean = 0.52, std = 0.37

Class 6, attribute 6, mean = 0.51, std = 0.03

Class 6, attribute 7, mean = 0.24, std = 0.05

Class 7, attribute 0, mean = 0.48, std = 0.11

Class 7, attribute 1, mean = 0.47, std = 0.09

Class 7, attribute 2, mean = 0.54, std = 0.06

Class 7, attribute 3, mean = 0.22, std = 0.12

Class 7, attribute 4, mean = 0.50, std = 0.04

Class 7, attribute 5, mean = 0.00, std = 0.03

Class 7, attribute 6, mean = 0.50, std = 0.06

Class 7, attribute 7, mean = 0.26, std = 0.09

Class 8, attribute 0, mean = 0.74, std = 0.11

Class 8, attribute 1, mean = 0.73, std = 0.11

Class 8, attribute 2, mean = 0.49, std = 0.05

Class 8, attribute 3, mean = 0.29, std = 0.07

Class 8, attribute 4, mean = 0.50, std = 0.00

Class 8, attribute 5, mean = 0.00, std = 0.00

Class 8, attribute 6, mean = 0.46, std = 0.08

Class 8, attribute 7, mean = 0.22, std = 0.01

Class 9, attribute 0, mean = 0.54, std = 0.14

Class 9, attribute 1, mean = 0.55, std = 0.16

Class 9, attribute 2, mean = 0.50, std = 0.06

Class 9, attribute 3, mean = 0.20, std = 0.06

Class 9, attribute 4, mean = 0.50, std = 0.00

Class 9, attribute 5, mean = 0.00, std = 0.00

Class 9, attribute 6, mean = 0.53, std = 0.05

Class 9, attribute 7, mean = 0.24, std = 0.05

Class 10, attribute 0, mean = 0.75, std = 0.04

Class 10, attribute 1, mean = 0.79, std = 0.04

Class 10, attribute 2, mean = 0.53, std = 0.04

Class 10, attribute 3, mean = 0.31, std = 0.06

Class 10, attribute 4, mean = 1.00, std = 0.00

Class 10, attribute 5, mean = 0.00, std = 0.00

Class 10, attribute 6, mean = 0.55, std = 0.02

Class 10, attribute 7, mean = 0.22, std = 0.00

Classification Accuracy = 0.4504