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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 = 0.517976, std = 0.099076

Class 1, attribute 1, mean = 0.537917, std = 0.100906

Class 1, attribute 2, mean = 0.515179, std = 0.072891

Class 1, attribute 3, mean = 0.409048, std = 0.172638

Class 1, attribute 4, mean = 0.500000, std = 0.000000

Class 1, attribute 5, mean = 0.000000, std = 0.000000

Class 1, attribute 6, mean = 0.500179, std = 0.049527

Class 1, attribute 7, mean = 0.242679, std = 0.053635

Class 2, attribute 0, mean = 0.454898, std = 0.109475

Class 2, attribute 1, mean = 0.452551, std = 0.103058

Class 2, attribute 2, mean = 0.528129, std = 0.055600

Class 2, attribute 3, mean = 0.231259, std = 0.109551

Class 2, attribute 4, mean = 0.503401, std = 0.041099

Class 2, attribute 5, mean = 0.000000, std = 0.000000

Class 2, attribute 6, mean = 0.493299, std = 0.055116

Class 2, attribute 7, mean = 0.332041, std = 0.139515

Class 3, attribute 0, mean = 0.425895, std = 0.101364

Class 3, attribute 1, mean = 0.473158, std = 0.105823

Class 3, attribute 2, mean = 0.361579, std = 0.055693

Class 3, attribute 3, mean = 0.216000, std = 0.080268

Class 3, attribute 4, mean = 0.505263, std = 0.051028

Class 3, attribute 5, mean = 0.000000, std = 0.000000

Class 3, attribute 6, mean = 0.510211, std = 0.035923

Class 3, attribute 7, mean = 0.268526, std = 0.088864

Class 4, attribute 0, mean = 0.789677, std = 0.071819

Class 4, attribute 1, mean = 0.762258, std = 0.071152

Class 4, attribute 2, mean = 0.374516, std = 0.058023

Class 4, attribute 3, mean = 0.318387, std = 0.111416

Class 4, attribute 4, mean = 0.500000, std = 0.000000

Class 4, attribute 5, mean = 0.000000, std = 0.000000

Class 4, attribute 6, mean = 0.511290, std = 0.067094

Class 4, attribute 7, mean = 0.274516, std = 0.091822

Class 5, attribute 0, mean = 0.735294, std = 0.154258

Class 5, attribute 1, mean = 0.616765, std = 0.124988

Class 5, attribute 2, mean = 0.416765, std = 0.080685

Class 5, attribute 3, mean = 0.293235, std = 0.121067

Class 5, attribute 4, mean = 0.500000, std = 0.000000

Class 5, attribute 5, mean = 0.000000, std = 0.000000

Class 5, attribute 6, mean = 0.512059, std = 0.060087

Class 5, attribute 7, mean = 0.237647, std = 0.040516

Class 6, attribute 0, mean = 0.520000, std = 0.127882

Class 6, attribute 1, mean = 0.479231, std = 0.095954

Class 6, attribute 2, mean = 0.510000, std = 0.052477

Class 6, attribute 3, mean = 0.223077, std = 0.082311

Class 6, attribute 4, mean = 0.500000, std = 0.000000

Class 6, attribute 5, mean = 0.523846, std = 0.367414

Class 6, attribute 6, mean = 0.510769, std = 0.034298

Class 6, attribute 7, mean = 0.238462, std = 0.051268

Class 7, attribute 0, mean = 0.480127, std = 0.108301

Class 7, attribute 1, mean = 0.468038, std = 0.089820

Class 7, attribute 2, mean = 0.535316, std = 0.063805

Class 7, attribute 3, mean = 0.224051, std = 0.118110

Class 7, attribute 4, mean = 0.503165, std = 0.039652

Class 7, attribute 5, mean = 0.001582, std = 0.028083

Class 7, attribute 6, mean = 0.496867, std = 0.064822

Class 7, attribute 7, mean = 0.256076, std = 0.093059

Class 8, attribute 0, mean = 0.742381, std = 0.106900

Class 8, attribute 1, mean = 0.727619, std = 0.108404

Class 8, attribute 2, mean = 0.493333, std = 0.051671

Class 8, attribute 3, mean = 0.288571, std = 0.068333

Class 8, attribute 4, mean = 0.500000, std = 0.000000

Class 8, attribute 5, mean = 0.000000, std = 0.000000

Class 8, attribute 6, mean = 0.460476, std = 0.077550

Class 8, attribute 7, mean = 0.224286, std = 0.013299

Class 9, attribute 0, mean = 0.542667, std = 0.139689

Class 9, attribute 1, mean = 0.553333, std = 0.157931

Class 9, attribute 2, mean = 0.503333, std = 0.064876

Class 9, attribute 3, mean = 0.202000, std = 0.064415

Class 9, attribute 4, mean = 0.500000, std = 0.000000

Class 9, attribute 5, mean = 0.000000, std = 0.000000

Class 9, attribute 6, mean = 0.527333, std = 0.053225

Class 9, attribute 7, mean = 0.243333, std = 0.045995

Class 10, attribute 0, mean = 0.750000, std = 0.035590

Class 10, attribute 1, mean = 0.793333, std = 0.041096

Class 10, attribute 2, mean = 0.526667, std = 0.038586

Class 10, attribute 3, mean = 0.310000, std = 0.064807

Class 10, attribute 4, mean = 1.000000, std = 0.000000

Class 10, attribute 5, mean = 0.000000, std = 0.000000

Class 10, attribute 6, mean = 0.550000, std = 0.021602

Class 10, attribute 7, mean = 0.220000, std = 0.000000