

Unit 6 - Week 4

Course outline

How to access the portal

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Week 4

- ☐ Lecture 18: Bayesian Learning
- ☐ Lecture 19: Naive Bayes
- ☐ Lecture 20: Bayesian Network
- ☐ Lecture 21: Python Exercise on Naive Bayes
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Quiz : Assignment 4

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Assignment Solution

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Assignment 4

The due date for submitting this assignment has passed.
 As per our records you have not submitted this assignment.

Due on 2019-08-28, 23:59 IST.

1) Answer Questions 1-4 with the data provided below:

2 points

A spam filtering system has a probability of 0.95 to classify correctly a mail as spam and 0.10 probability of giving false positives. It is estimated that 0.5% of the mails are actual spam mails.

Suppose that the system is now given a new mail to be classified as spam/ not-spam, what is the probability that the mail will be classified as spam?

- a. 0.89575
- b. 0.10425
- c. 0.00475
- d. 0.0995

- ☐ a
- ☐ b
- ☐ c
- ☐ d

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 b

2) Find the probability that, given a mail classified as spam by the system, the mail actually being spam.

2 points

- a. 0.04556
- b. 0.95444
- c. 0.00475
- d. 0.99525

- ☐ a
- ☐ b
- ☐ c
- ☐ d

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 a

3) Given that a mail is classified as not spam, the probability of the mail actually being not spam

2 points

- a. 0.10425
- b. 0.89575
- c. 0.003
- d. 0.997

- ☐ a
- ☐ b
- ☐ c
- ☐ d

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 d

4) Find the probability that the mail is misclassified:

2 points

- a. 0.90025
- b. 0.09975
- c. 0.8955
- d. 0.1045

- ☐ a
- ☐ b
- ☐ c
- ☐ d

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 b

5) What is the naive assumption in a Naive Bayes Classifier?

2 points

- a. All the classes are independent of each other
- b. All the features of a class are independent of each other
- c. The most probable feature for a class is the most important feature to be considered for classification
- d. All the features of a class are conditionally dependent on each other.

- ☐ a
- ☐ b
- ☐ c
- ☐ d

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 b

6) Answer Questions 6 – 7 with the data provided below:

2 points

Consider the following dataset. a,b,c are the features and K is the class(1/0):

a	b	c	K
1	0	1	1
1	1	1	1
0	1	1	0
1	1	0	0
1	0	1	0
0	0	0	1

Classify the test instance given below into class 1/0 using a Naive Bayes Classifier.

a	b	c	K
0	0	1	?

- a. 0
- b. 1

- ☐ a
- ☐ b

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 b

7) Find $P(K=0 | a=1, b=1)$.

2 points

- a. $\frac{1}{3}$
- b. $\frac{2}{3}$
- c. $\frac{1}{9}$
- d. $\frac{8}{9}$

- ☐ a
- ☐ b
- ☐ c
- ☐ d

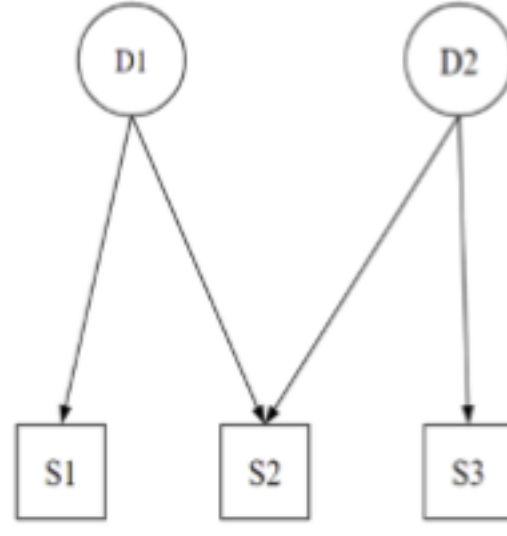
No, the answer is incorrect.
 Score: 0

Accepted Answers:
 b

8) Answer Questions 8-10 with the data given below:

2 points

A patient goes to a doctor with symptoms S1, S2 and S3. The doctor suspects disease D1 and D2 and constructs a Bayesian network for the relation among the disease and symptoms as the following:



What is the joint probability distribution in terms of conditional probabilities?

- a. $P(D1) * P(D2|D1) * P(S1|D1) * P(S2|D1) * P(S3|D2)$
- b. $P(D1) * P(D2) * P(S1|D1) * P(S2|D1) * P(S3|D1, D2)$
- c. $P(D1) * P(D2) * P(S1|D2) * P(S2|D2) * P(S3|D2)$
- d. $P(D1) * P(D2) * P(S1|D1) * P(S2|D1, D2) * P(S3|D2)$

- ☐ a
- ☐ b
- ☐ c
- ☐ d

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 d

9) Suppose $P(D1) = 0.4$, $P(D2)=0.7$, $P(S1|D1)=0.3$ and $P(S1|D1')=0.6$. Find $P(S1)$

2 points

- a. 0.12
- b. 0.48
- c. 0.36
- d. 0.60

- ☐ a
- ☐ b
- ☐ c
- ☐ d

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 b

10) What is the Markov blanket of variable, S3

2 points

- a. D1
- b. D2
- c. D1 and D2
- d. None

- ☐ a
- ☐ b
- ☐ c
- ☐ d

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 b