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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » Machine Learning for Engineering and science applications (course)



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Course outline

About NPTEL ()

How to access the portal? ()

Prerequisites Assignment ()

Matlab and Learning Modules ()

Week 1 ()

Week 2 ()

Introduction to

Thank you for taking the Week 2: Assignment 2.

Week 2 : Assignment 2

Your last recorded submission was on 2024-02-07, 17:46 Due date: 2024-02-07, 23:59 IST. IST

1) A survey is conducted on a group of 1000 people. 600 people are female, 400 **1 point** people are male. 200 females and 100 males have a college degree. Let X be the random variable representing gender (1 for female, 0 for male) and Y the random variable representing education (1 for degree, 0 for no degree). Find the conditional probability P(X=1|Y=1).

0.67

0.5

0.33

0.60

For question 2-3, An insurance company classifies insured policyholders into accident-prone or non-accident-prone. Their current risk model works with the following probabilities. The probability that an accident-prone insured has an accident within a year is 0.4. The probability that a non-accident-prone insured has an accident within a year is 0.2.

2) If 30% of the population is accident-prone, what is the probability that a policyholder *1 point* will have an accident within a year?

0.35

0.14

0.26

 \bigcirc 0.22

3) Suppose now that the policyholder has had an accident within one year. What is the *1 point* probability that he or she is accident-prone?

0.37

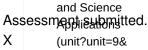
1 of 3 2/7/24, 22:54

Ass	Probability sessment submitted.	0.54	
X	Discrete and	0.26	
	Continuous Random	◎ 0.46	
	Variables (unit?unit=9& lesson=10)	For question 4-5, Suppose a factory has machines I, II, and III that produce iSung phones. The factory's record shows that Machines I, II and III produce, respectively, 2%, 1%, and 3% defective iSungs. Out of the total production, machines I, II, and III produce, respectively, 35%,	
	Conditional, Joint, Marginal Probabilities	25% and 40% of all iSungs. An iSung is selected at random from the factory.	
		4) What is probability that the iSung selected is defective?	1 point
	Sum Rule and Product Rule	◎ 0.0215	
	Bayes'	 0.0385 0.0165 0.0195 5) Given that the iSung is defective, what is the conditional probability that it was produced by machine III? 	
	Theorem		
	(unit?unit=9& lesson=11)		
	O Bayes' Theorem -		1 point
	Simple	0.463	
	Examples	⊙ 0.558	
	(unit?unit=9& lesson=12)	0.526	
	 Independence 	O 0.574	
	Conditional Independence	For Question 6-7, Given a random variable (X) with the following probability distribution:	
	Chain Rule Of	• (X = 1) with probability (0.2)	
	Probability	• (X = 2) with probability (0.3)	
	(unit?unit=9& lesson=13)	• (X = 3) with probability (0.5)	
	Expectation	6) Calculate the expectation of (X):	1 point
	(unit?unit=9&	O 1.50	
	lesson=16)	O 1.70	
	Variance	O 2	
	Covariance (unit?unit=9&	◎ 2.30	
	lesson=14)	7) Calculate the Variance of (X):	1 point
	Some	0.30	
	Relations for	0.47	
	Expectation	⊙ 0.61	
	and Covariance	0.90	
	(Slightly Advanced)	8) Given two random variables X and Y, with the joint distribution:	1 point
	(unit?unit=9&	• $P(X = 1, Y = 1) = 0.25,$	
	lesson=15)	• $P(X = 1, Y = 2) = 0.25,$	
	Week 2	• $P(X = 1, Y = 3) = 0.0,$	
	Feedback	• $P(X = 2, Y = 1) = 0.0,$	
	Form : Machine	• $P(X = 2, Y = 2) = 0.25,$	
	Learning for	• $P(X = 2, Y = 3) = 0.25,$	

2 of 3 2/7/24, 22:54

Calculate the covariance between X and Y:

Engineering



(unit?unit=9& lesson=146)

Quiz: Week 2: Assignment2(assessment?

Week 3 ()

name=207)

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Problem Solving Session -Jan 2024 ()

- 0.15
- 0.25
- 0.5
- 0.25
- 9) A company is analyzing the relationship between the number of advertisements (X) *1 point* and the number of products sold (Y) for two different products over 4 weeks. The joint distribution for the number of advertisements and products sold is given by:
- (P(X = 5, Y = 100) = 0.25)
- (P(X = 10, Y = 200) = 0.25)
- (P(X = 5, Y = 200) = 0.25)
- (P(X = 10, Y = 100) = 0.25)

Calculate the covariance between the number of advertisements and the number of products sold to determine the relationship between these two variables.

- 0.5
- 01
- 0
- 0.75
- 10) An email system correctly identifies 98% of spam emails (true positive) and correctly **1 point** identifies 97% of non-spam emails (true negative). If 20% of emails received are spam, what is the probability that an email identified as spam is actually spam?
 - 0.9419
 - 0.9703
 - 0.9821
 - 0.9642

You may submit any number of times before the due date. The final submission will be considered for grading.

Submit Answers

3 of 3