

Assessment sub
X

(https://swayam.gov.in)



(https://swayam.gov.in/nc_details/NPTEL)

sourav.ganguly1429@gmail.com ✓

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



Click to register
for Certification
exam

(https://examform.nptel.ac.in

/2024_01

/exam_form

/dashboard)

If already
registered, click
to check your
payment status

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 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 $P(X=1|Y=1)$. **1 point**

- ☒ 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 will have an accident within a year? **1 point**

- ☐ 0.35
☐ 0.14
☒ 0.26
☐ 0.22

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

- ☐ 0.37

Assessment submitted.
X

Probability

Theory

Discrete and
Continuous
Random
Variables(unit?unit=9&
lesson=10)

☐ Conditional,
Joint, Marginal
Probabilities
Sum Rule and
Product Rule
Bayes'
Theorem
(unit?unit=9&
lesson=11)

☐ Bayes'
Theorem -
Simple
Examples
(unit?unit=9&
lesson=12)

☐ Independence
Conditional
Independence
Chain Rule Of
Probability
(unit?unit=9&
lesson=13)

☐ Expectation
(unit?unit=9&
lesson=16)

☐ Variance
Covariance
(unit?unit=9&
lesson=14)

☐ Some
Relations for
Expectation
and
Covariance
(Slightly
Advanced)
(unit?unit=9&
lesson=15)

☐ Week 2
Feedback
Form :
Machine
Learning for
Engineering

☐ 0.54☐ 0.26☒ 0.46

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%, 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

☒ 0.0215☐ 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?

1 point

☐ 0.463☒ 0.558☐ 0.526☐ 0.574

For Question 6-7, Given a random variable (X) with the following probability distribution:

- (X = 1) with probability (0.2)
- (X = 2) with probability (0.3)
- (X = 3) with probability (0.5)

6) Calculate the expectation of (X):

1 point

☐ 1.50☐ 1.70☐ 2☒ 2.30

7) Calculate the Variance of (X):

1 point

☐ 0.30☐ 0.47☒ 0.61☐ 0.90

8) Given two random variables X and Y, with the joint distribution:

1 point

- $P(X = 1, Y = 1) = 0.25$,
- $P(X = 1, Y = 2) = 0.25$,
- $P(X = 1, Y = 3) = 0.0$,
- $P(X = 2, Y = 1) = 0.0$,
- $P(X = 2, Y = 2) = 0.25$,
- $P(X = 2, Y = 3) = 0.25$,

Calculate the covariance between X and Y:

and Science
Applications
Assessment submitted.
X (unit?unit=9&
lesson=146)

● Quiz: Week 2
: Assignment
2
(assessment?
name=207)

Week 3 ()

DOWNLOAD
VIDEOS ()

Text
Transcripts ()

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
☐ 1
☒ 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