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► Introduction

▼ 1. Probability and Inference

Introduction to Probability (Week 1)

Exercises due Sep 22, 2016 at 02:30 IST



Probability Spaces and Events (Week 1)

Exercises due Sep 22, 2016 at 02:30 IST



Random Variables (Week 1)

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Jointly Distributed Random Variables (Week 2)

Exercises due Sep 29, 2016 at 02:30 IST



Conditioning on Events (Week 2)

Exercises due Sep 29, 2016 at 02:30 IST



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Homework Problem: Ice Cream Sales in Inferenceville

(10/10 points)

You have been hired to investigate a disturbing connection between ice cream sales and crime in Inferenceville. You are given a report that describes the joint distribution over random variable S , representing ice cream sales, and random variable C , representing crime. Each variable takes on a value of "low" or "high", which we'll represent with 0 and 1 respectively. The joint distribution (estimated from data) is as follows:

$p_{S,C}$		C	
		0	1
S	0	0.4	0.1
	1	0.25	0.25

Homework 1 (Week 2)Homework due Sep 29, 2016 at 02:30 IST **Inference with Bayes' Theorem for Random Variables (Week 3)**Exercises due Oct 06, 2016 at 02:30 IST **Independence Structure (Week 3)**Exercises due Oct 06, 2016 at 02:30 IST **Homework 2 (Week 3)**Homework due Oct 06, 2016 at 02:30 IST **Notation Summary (Up Through Week 3)****Mini-project 1: Movie Recommendations (Weeks 3 and 4)**Mini-projects due Oct 13, 2016 at 02:30 IST **Decisions and Expectations (Week 4)**Exercises due Oct 13, 2016 at 02:30 IST **Measuring Randomness (Week 4)**Exercises due Oct 13, 2016 at 02:30 IST 

- **(a)** Are random variables S and C independent?

☐ Yes☒ No 

- **(b)** After further investigation, you discover information about the temperature, represented by T . This random variable also takes on values 0 or 1 corresponding again to "low" and "high". You are able to obtain the conditional distribution $p_{S,C|T}(s, c | t)$, shown below.

$p_{S,C T}(\cdot; \cdot 0)$		C		$p_{S,C T}(\cdot; \cdot 1)$		C	
		0	1			0	1
S	0	0.72	0.08	S	0	0.08	0.12
	1	0.18	0.02		1	0.32	0.48

Are random variables S and C conditionally independent given T ?☒ Yes ☐ No

**Towards Infinity in Modeling
Uncertainty (Week 4)**Exercises due Oct 13, 2016 at
02:30 IST**Homework 3 (Week 4)**Homework due Oct 13, 2016 at
02:30 IST

- **(c)** Determine the distribution p_T from the tables above. Express your answer as a Python dictionary. The keys should be the Python integers 0 and 1.

{0:0.5,1:0.5}

*You have used 2 of 5 submissions*

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