Information Theory 2023
Programming Assignment 2

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Due on Mar 13, 11.59pm

Submission Link

Please submit on Google Classrooms.

Submission Format

You must submit a single python script file with .py extension. The name of the file must be "Serial_num.py" where 'num' is your serial number. For instance, if your serial number is 7, then your submission will be "Serial_7.py".

The file submitted must contain the definition of a python function by the name `lrt`. This function must be callable as follows.

```
# import the function from your submission "Serial_7.py"
from Serial_7 import lrt

# threshold for likelihood ratio test
T = 0.75

# computing type-I and type-II error rates
alpha, beta = lrt(T)
```

If there is an error when your function is called as above, I will not be able to debug your submission, and no marks will be awarded.

Problem Description

The function call `lrt(T)` must return the values of α and β of the deterministic likelihood ratio test on the following hypothesis testing problem. Here $X = (X_1, X_2, X_3)$. The two hypotheses are

$$H_1 : X_1, X_2, X_3 \text{ are iid with distribution } P_1$$
$$H_2 : X_1, X_2, X_3 \text{ are iid with distribution } P_2$$

The two distributions are defined over the set $\{1, 2, 3\}$ and are as follows

$$P_1(1) = 0.5, P_1(2) = 0.35, P_1(3) = 0.15$$
$$P_2(1) = 0.2, P_2(2) = 0.3, P_2(3) = 0.5.$$

Evaluation

The maximum marks for this assignment is 10. Each student must work individually, and submit a file on their own.