

AI1103 ASSIGNMENT 3

NAME:RONGALA ARUN SIDDARDHA, ROLLNO:AI20BTECH11019

Download the python code from

[https://github.com/ArunSiddardha/Assignment3/
assignment3.py](https://github.com/ArunSiddardha/Assignment3/assignment3.py)

and latex-tikz code from

[https://github.com/ArunSiddardha/Assignment3/
Assignment3.tex](https://github.com/ArunSiddardha/Assignment3/Assignment3.tex)

1 PROBLEM GATE 1997 CS Q1

The probability that it will rain today is 0.5. The probability that it will rain tomorrow is 0.6. The probability that it will rain either today or tomorrow is 0.7 What is the probability that it will rain today and tomorrow?

2 SOLUTION

Let X be two random variable taking two values 0 and 1(Bernoulli random variable).

X=1 iff it rains on first day and X=0 iff it doesnt rain on first day.

Let Y be another random variable taking two values 0 and 1(Bernoulli random variable).

X=1 iff it rains on second day and X=0 iff it doesnt rain on second day.

Given that

Probability that it will rain today

$$\Pr(X = 1) = \frac{1}{2} \quad (2.0.1)$$

Probability that it will rain tomorrow

$$\Pr(Y = 1) = \frac{3}{5} \quad (2.0.2)$$

Probability that it will either today or tomorrow

$$\Pr(A \cup B) = \Pr(X = 1) + \Pr(Y = 1) - \Pr(X = 1, Y = 1) = \frac{7}{10} \quad (2.0.3)$$

we have to find the probability that it will rain today and tomorrow which is

$$\Pr(A \cap B) = \Pr(X = 1, Y = 1) \quad (2.0.4)$$

from eq(2.0.3)

$$\Pr(X = 1, Y = 1) = \Pr(X = 1) + \Pr(Y = 1) - \Pr(A \cup B) \quad (2.0.5)$$

Substituting the values gives

$$\Pr(X = 1, Y = 1) = 0.5 + 0.6 - 0.7 = 0.4 \quad (2.0.6)$$

So, therefore the probability that it will rain today or tomorrow is 0.4.