AI1103 ASSIGNMENT 3

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Download the python code from

https://github.com/ArunSiddardha/Assignment3/
assignment3.py

and latex-tikz code from

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 if it rains on first day and X=0 if it doesn't rain on first day.

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

X=1 if it rains on second day and X=0 if it doesn't rain on second day.

Given that
Probability that it will rain today

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

Probability that it will rain tomorrow

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

Probability that it will either today or tomorrow

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

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

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

from (2.0.3)

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

Substituting the values gives

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

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