AI1103-Assignment 6

Name: Vanga Aravind Shounik, Roll Number: CS20BTECH11055

Download all python codes from

https://github.com/AravindShounik/AI1103/blob/
    main/Assignment−6/Codes/assignment−6.py

and latex-tikz codes from

https://github.com/AravindShounik/AI1103/blob/
    main/Assignment−6/assignment−6.tex

QUESTION GATE 2014 ME-SET1, Q.28 (ME SECTION)

In the following table, X is a discrete random variable and $p(X = x)$ is the probability density. The standard deviation of X is

X	1	2	3
$p_X(k)$	0.3	0.6	0.1

SOLUTION

The mean of the distribution (μ) is given as

$$\mu = \sum_{k=1}^{3} p_X(k)X_k \qquad (0.0.1)$$

$$= (0.3 \times 1) + (0.6 \times 2) + (0.1 \times 3) \qquad (0.0.2)$$

$$= 0.3 + 1.2 + 0.3 \qquad (0.0.3)$$

$$= 1.8 \qquad (0.0.4)$$

We know that variance(σ^2) is

$$\sigma^2 = E(X^2) - (\mu)^2 \qquad (0.0.5)$$

$$= \sum_{k=1}^{3} p_X(k)X_k^2 - (\mu)^2 \qquad (0.0.6)$$

$$= (0.3 \times 1^2) + (0.6 \times 2^2) + (0.1 \times 3^2) - 1.8^2 \qquad (0.0.7)$$

$$= (0.3) + (2.4) + (0.9) - 3.24 \qquad (0.0.8)$$

$$= 0.36 \qquad (0.0.9)$$

We know that standard deviation (σ) is

$$\sigma = \sqrt{\sigma^2} \qquad (0.0.10)$$

$$\sigma = \sqrt{0.36} \qquad (0.0.11)$$

$$= 0.6 \qquad (0.0.12)$$