AI1103-Assignment 6

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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 $p(x)$ is the probability density. The standard deviation of x is

x	1	2	3
$p(x)$	0.3	0.6	0.1

Solution

The mean of the distribution ($\overline{x}$) is given as

$$\overline{x} = \sum_{i=1}^{3} p_i x_i \tag{0.0.1}$$
$$= (0.3 \times 1) + (0.6 \times 2) + (0.1 \times 3) \tag{0.0.2}$$
$$= 0.3 + 1.2 + 0.3 \tag{0.0.3}$$
$$= 1.8 \tag{0.0.4}$$

We know that variance(σ^2) is

$$\sigma^2 = \sum_{i=1}^{3} p_i x_i^2 - (\overline{x})^2 \tag{0.0.5}$$
$$= (0.3 \times 1^2) + (0.6 \times 2^2) + (0.1 \times 3^2) - 1.8^2 \tag{0.0.6}$$
$$= (0.3) + (2.4) + (0.9) - 3.24 \tag{0.0.7}$$
$$= 0.36 \tag{0.0.8}$$

We know that standard deviation (σ) is

$$\sigma = \sqrt{\sigma^2} \tag{0.0.9}$$
$$\sigma = \sqrt{0.36} \tag{0.0.10}$$
$$= 0.6 \tag{0.0.11}$$