

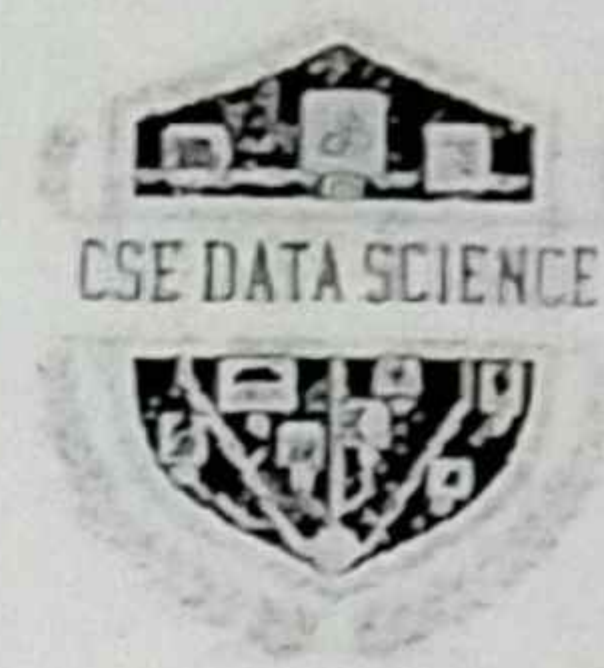


PARSHWANATH CHARITABLE TRUST'S

A.P. SHAH INSTITUTE OF TECHNOLOGY

Department of Computer Science and Engineering

Data Science



Semester :



Subject Statistics for AIDS

Academic Year: 20 23 20 24

- * Which city is the hottest city? F
- * If $\text{temp} < 25^\circ$ is warm. List the warm cities? DE.
- * What is the difference in temperature between hottest and coldest city? $50 - 10 = 40$.

EXPECTED VALUE:

When the categories can be associated with a numeric value, this gives an average value based on a category's probability of occurrence.

A special type of categorical data is data in which the categories represent or can be mapped to discrete values on the same scale.

The expected value is calculated as follows:

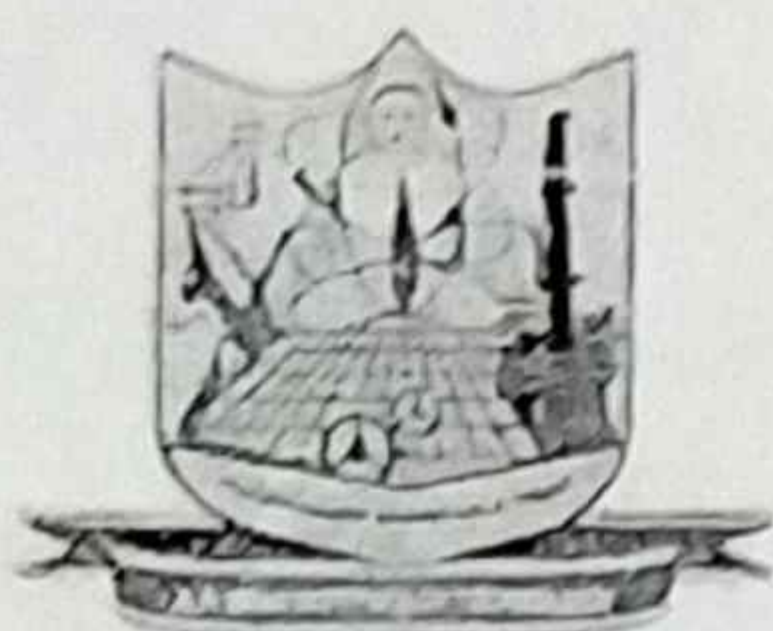
- * Multiply each outcome by its probability of occurring.

- * Sum these values.

Example:

Lisa plays a game in which there are only two outcomes. The cost to play the game is \$100. If she wins, she receives \$500. The probability of winning is 20%. What is the expected value for winning a single game or average?

$$E(X) = X_1 P_1 + X_2 P_2$$



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$$E(X) = X_1 P_1 + X_2 P_2$$

$$E(X) = 500(0.2) + (-100)(0.8)$$

$$E(X) = 100 - 80$$

$$E(X) = \$20$$

Outcomes	Wins	Loss
Value	\$500	-\$100
Probability	20%	80%
	0.2	0.8

The expected value for winning
a single game on average } = \$20.

The expected value for winning
10 games on average } = 10 × \$20 = \$200.

Example 2:

Company XYZ generates a profit of \$40 for each laptop they sell. The company loses \$500 for every laptop that is returned due to some defect. If 3 out of every 100 laptops that they produce is defective, what is the expected value of profit per laptop?

$$E(X) = X_1 P_1 + X_2 P_2$$

$$E(X) = 40(0.97) + (-500)(0.03)$$

$$= 38.8 - 15$$

$$= \$23.8$$

Outcomes	Win	Lose
Value	\$40	-\$500
Probability	97%	3%
	0.97	0.03

The expected value of profit per laptop = \$23.8

The expected value of profit for 10 laptop = 10 × \$23.8 = 238