



INFERENCE STATISTICS

INTRODUCTION

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TOPIC OUTLINE

Inferential Statistics

Distribution

Histogram

Normal Distribution



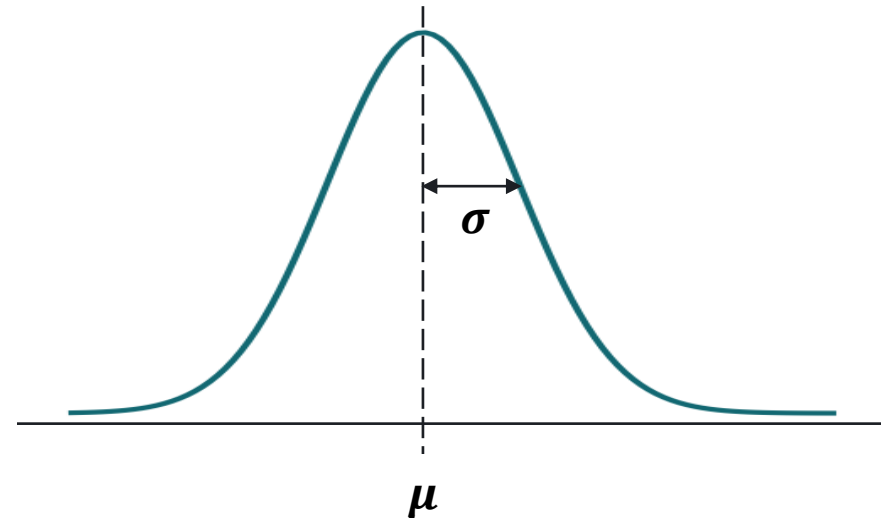
DISTRIBUTION



INFERENCEAL STATISTICS

Inferential statistics is a branch of statistics that analyzes and interprets data to make conclusions beyond the observed dataset. It focuses on drawing meaningful inferences about a population based on a sample using techniques such as hypothesis testing, confidence intervals, and regression analysis.

Normal Distribution



DISTRIBUTION

Distribution or the probability distribution describes the probabilities or frequencies of different outcomes in an experiment or observed data.

Rolling one die



| Outcome | Probability |
|--------------|-------------|
| 1 | 1/6 or 0.17 |
| 2 | 1/6 or 0.17 |
| 3 | 1/6 or 0.17 |
| 4 | 1/6 or 0.17 |
| 5 | 1/6 or 0.17 |
| 6 | 1/6 or 0.17 |
| 7 (all else) | 0 |

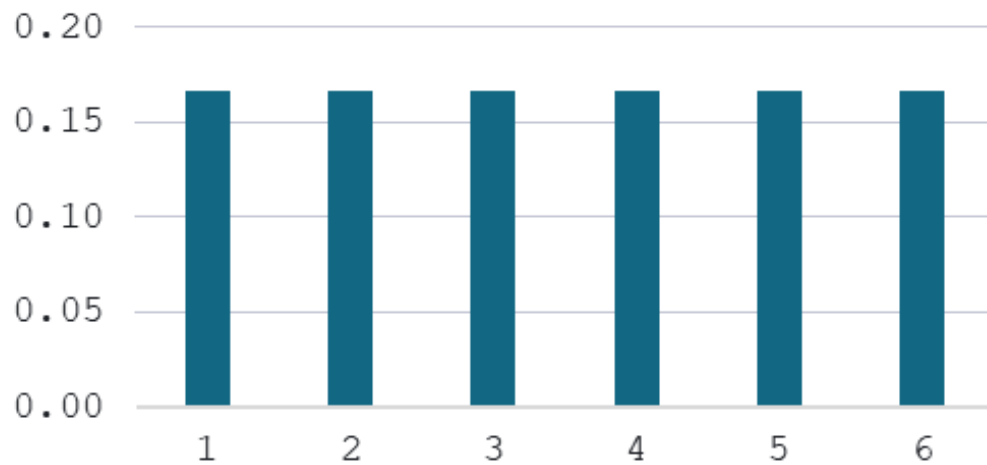
Sum of probabilities = 1 or 100%



UNIFORM DISTRIBUTION

Discrete data

One die distribution



Rolling one die



| Outcome | Probability |
|--------------|-------------|
| 1 | 1/6 or 0.17 |
| 2 | 1/6 or 0.17 |
| 3 | 1/6 or 0.17 |
| 4 | 1/6 or 0.17 |
| 5 | 1/6 or 0.17 |
| 6 | 1/6 or 0.17 |
| 7 (all else) | 0 |

Sum of probabilities = 1 or 100%



DISTRIBUTION

36 possible outcomes

| | | | | | |
|--------|--------|--------|--------|--------|--------|
| (1, 1) | (2, 1) | (3, 1) | (4, 1) | (5, 1) | (6, 1) |
| (1, 2) | (2, 2) | (3, 2) | (4, 2) | (5, 2) | (6, 2) |
| (1, 3) | (2, 3) | (3, 3) | (4, 3) | (5, 3) | (6, 3) |
| (1, 4) | (2, 4) | (3, 4) | (4, 4) | (5, 4) | (6, 4) |
| (1, 5) | (2, 5) | (3, 5) | (4, 5) | (5, 5) | (6, 5) |
| (1, 6) | (2, 6) | (3, 6) | (4, 6) | (5, 6) | (6, 6) |

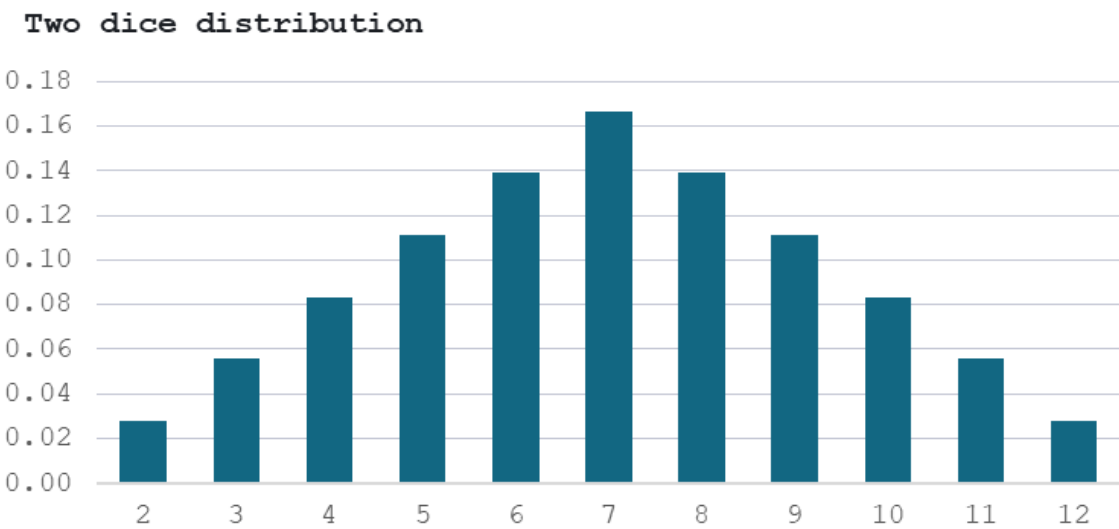
Rolling two dice

| Sum | Probability |
|----------|-------------|
| 2 | 0.03 |
| 3 | 0.06 |
| 4 | 0.08 |
| 5 | 0.11 |
| 6 | 0.14 |
| 7 | 0.17 |
| 8 | 0.14 |
| 9 | 0.11 |
| 10 | 0.08 |
| 11 | 0.06 |
| 12 | 0.03 |
| All else | 0 |



DISTRIBUTION

Discrete data



Rolling two dice

| Sum | Probability |
|----------|-------------|
| 2 | 0.03 |
| 3 | 0.06 |
| 4 | 0.08 |
| 5 | 0.11 |
| 6 | 0.14 |
| 7 | 0.17 |
| 8 | 0.14 |
| 9 | 0.11 |
| 10 | 0.08 |
| 11 | 0.06 |
| 12 | 0.03 |
| All else | 0 |

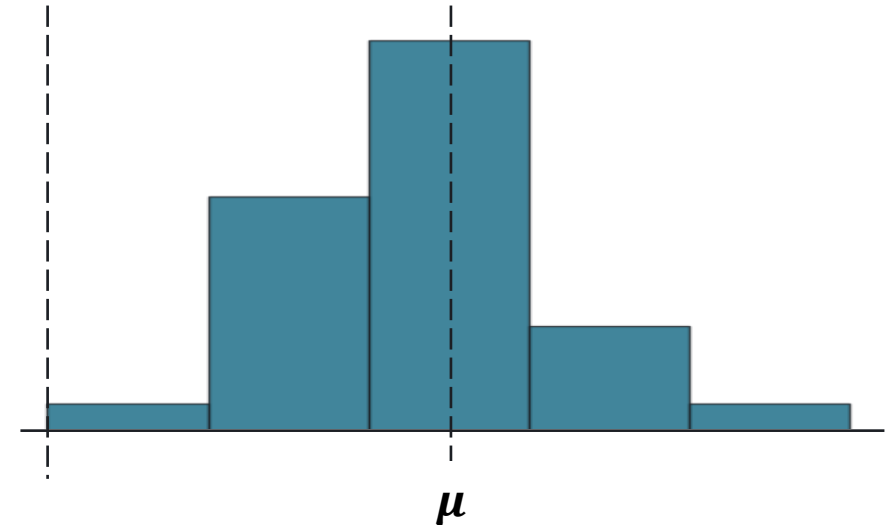


HISTOGRAM

Histograms are used to visualize the shape, spread, and central tendency of data, making them a useful tool for assessing whether a dataset follows a normal distribution or deviates from it.

Histogram

Frequency



NORMAL DISTRIBUTION



NORMAL DISTRIBUTION

A normal distribution is a probability distribution where the values of a random variable are distributed symmetrically. Also known as Gaussian distribution or bell curve because of its shape.



Johann Carl Friedrich Gauss



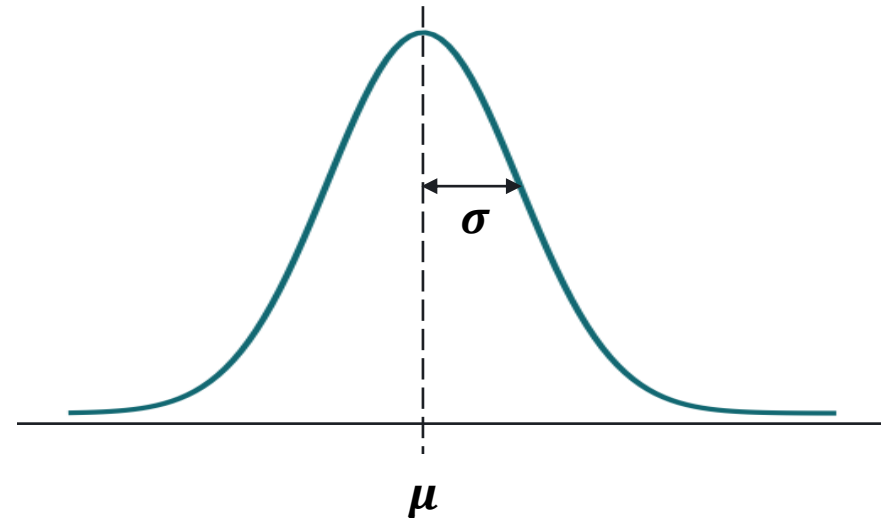
NORMAL DISTRIBUTION

A normal distribution is a probability distribution where the values of a random variable are distributed symmetrically. Also known as Gaussian distribution or bell curve because of its shape.

Denoted by:

$$N(\mu, \sigma^2)$$

Bell Curve



mean = median = mode



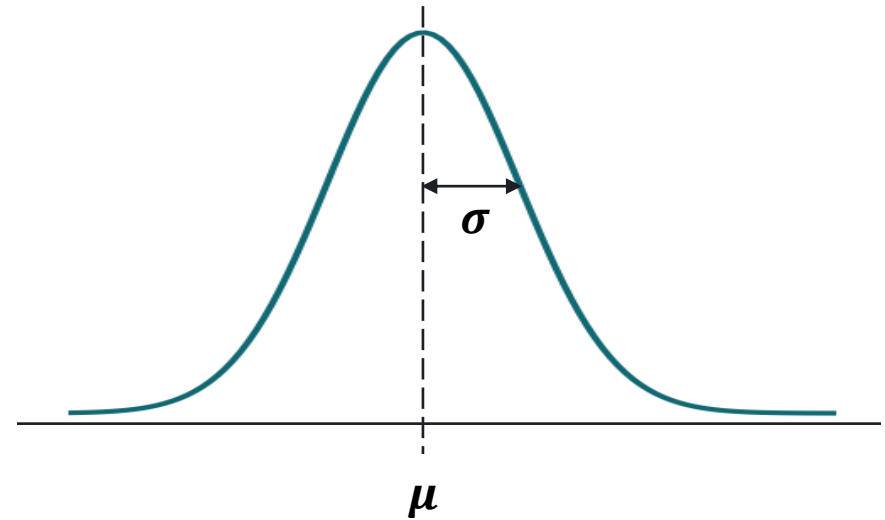
NORMAL DISTRIBUTION

Bell Curve

A normal distribution is a probability distribution where the values of a random variable are distributed symmetrically. Also known as Gaussian distribution or bell curve because of its shape.

Formula:

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$



mean = median = mode



LABORATORY

