Skewness of a Distribution

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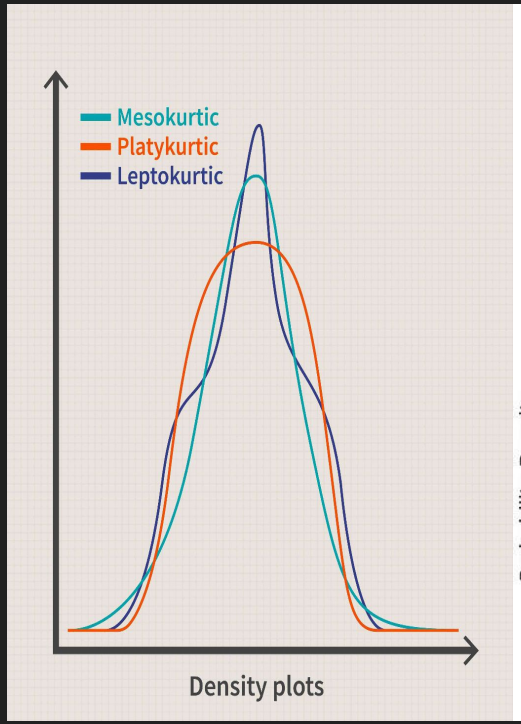
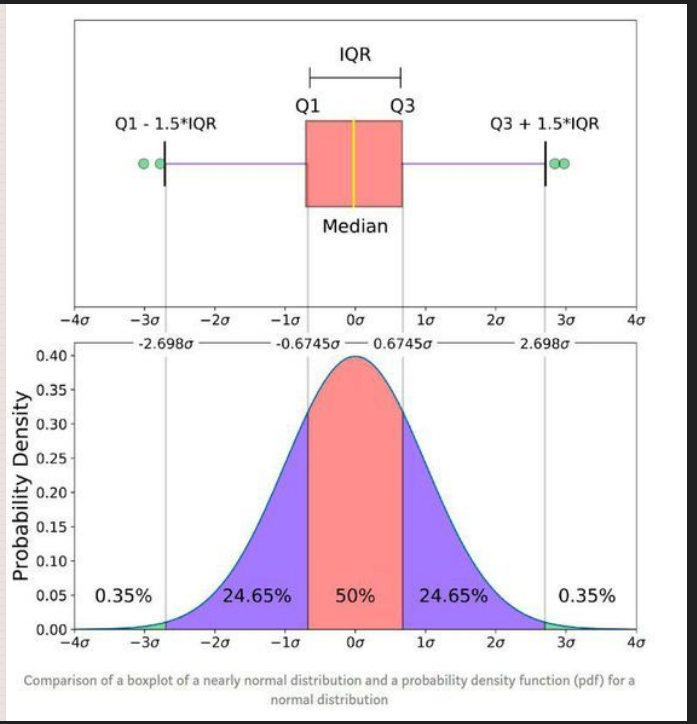
The three methods useful to measure the shape of data

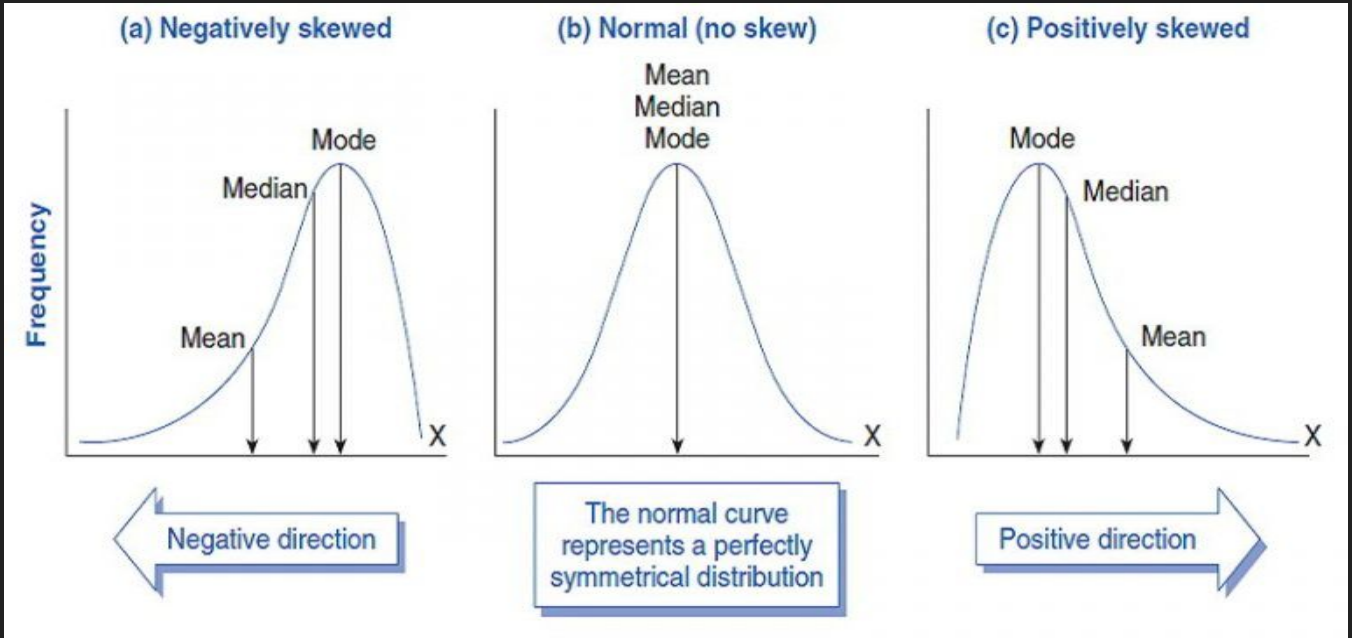
1) Skewness
2) Kurtosis
3) Box and Whisker plots





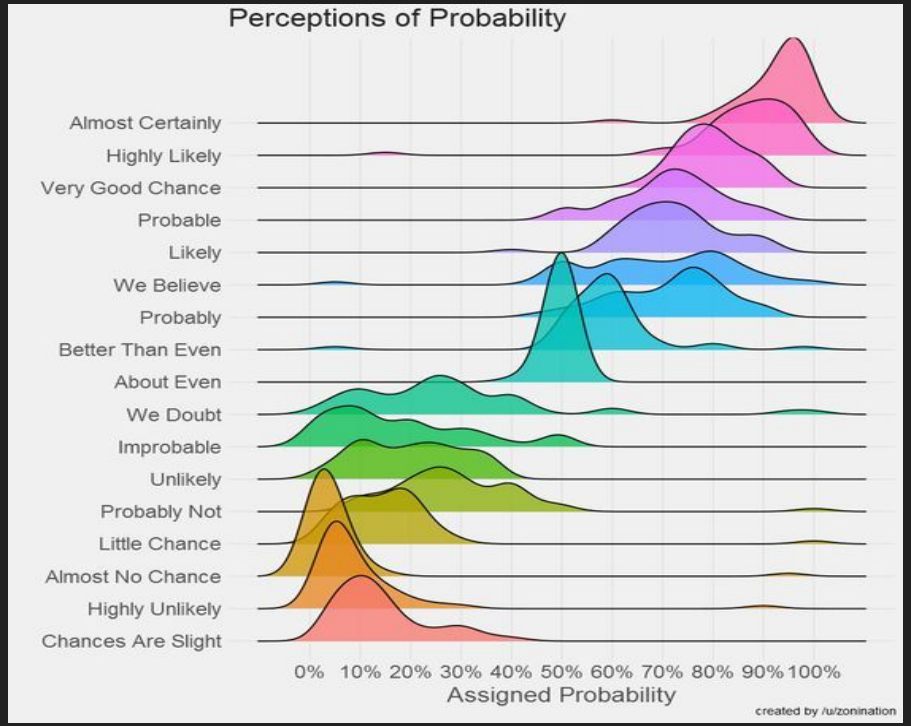
Skewness

Skewness is a measurement of the distortion of symmetrical distribution or asymmetry in a data set. Skewness is demonstrated on a bell curve when data points are not distributed symmetrically to the left and right sides of the median on a bell curve.



Applications of Skewed Distribution

1. Cricket Score
2. Exam Results
3. Average Income Distribution
4. Human Life Cycle
5. Real Estate Prices
6. Retirement Age
8. Movie Ticket Sales



Kurtosis

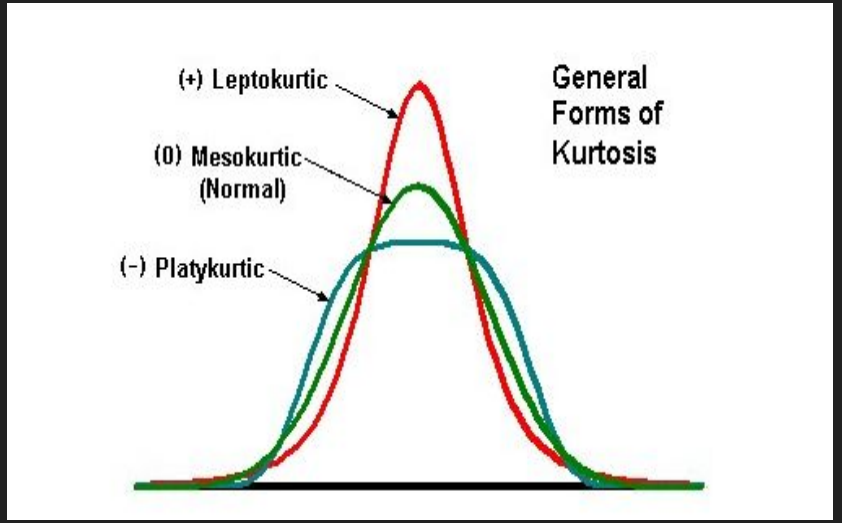
Kurtosis is a measure of the tailedness of a distribution. Tailedness is how often outliers occur. Excess kurtosis is the tailedness of a distribution relative to a normal distribution.

Different types of Kurtosis

Mesokurtic - Excess Kurtosis

Leptokurtic – Positive Excess Kurtosis

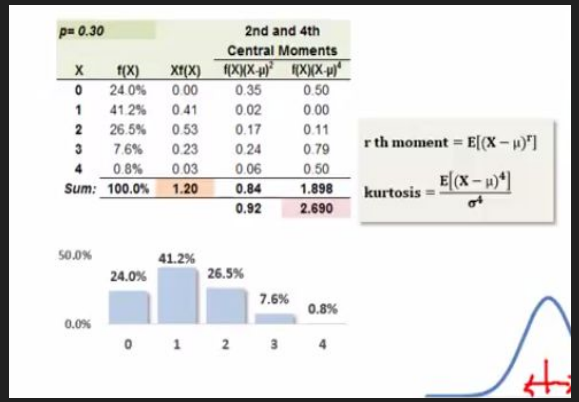
Platykurtic – Negative Excess Kurtosis



Real life applications

- In finance, risk and insurance are examples of needing to focus on the tail of the distribution and not assuming normality.

- Kurtosis helps in determining whether resource used within an ecological guild is truly neutral or which it differs among species.



p= 0.30

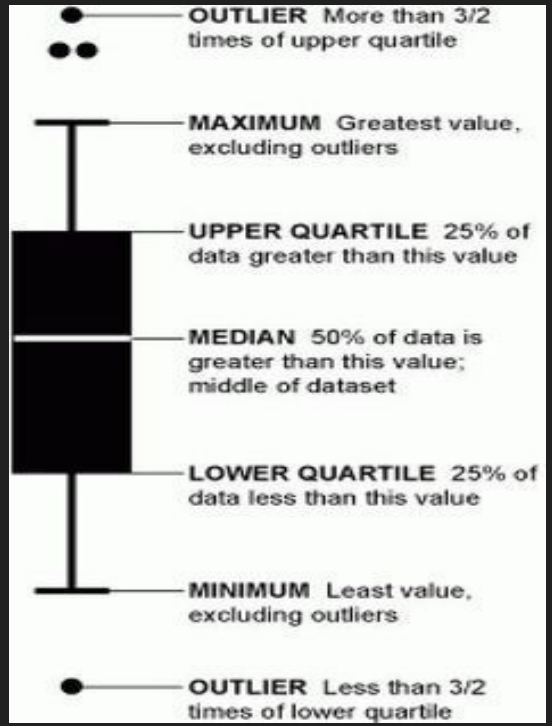
X	f(X)	Xf(X)	2nd and 4th Central Moments $f(X)(X-\mu)^2$	$f(X)(X-\mu)^4$
0	24.0%	0.00	0.35	0.50
1	41.2%	0.41	0.02	0.00
2	26.5%	0.53	0.17	0.11
3	7.6%	0.23	0.24	0.79
4	0.8%	0.03	0.06	0.50
Sum:	100.0%	1.20	0.84	1.898
			0.92	2.690

$$\text{r th moment} = E[(X-\mu)^r]$$

$$\text{kurtosis} = \frac{E[(X-\mu)^4]}{\sigma^4}$$

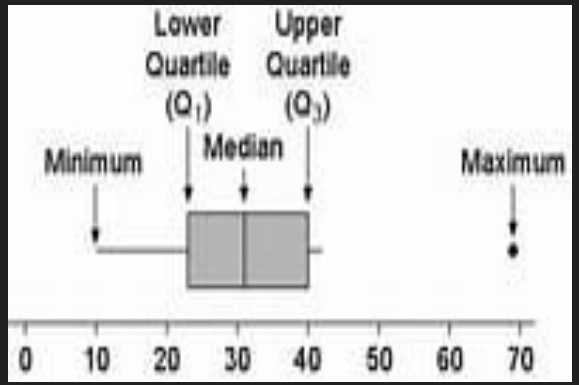
Box and Whisker plot

A box and whisker plot is a graphical representation of a dataset's distribution. It displays key statistical information in a compact form, allowing you to quickly understand the central tendency, spread, and presence of outliers within the data.



Box and whisker plots are used for various purposes, including:

- Comparing Distributions
- Detecting Outliers
- Summarizing Data

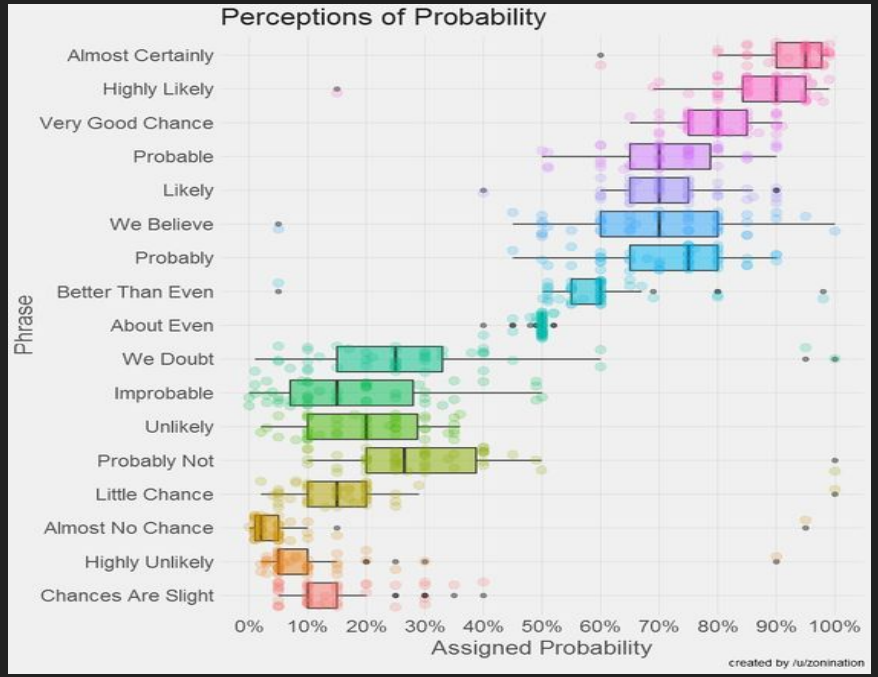


Box and whisker plots find applications in various fields:

I. Education and Test Scores

II. Financial Analysis

III. Healthcare and Medical Data



Thank You