Meaning of Correlation Coefficient

Notes

- 1. The author accepts no responsibility for the topicality, correctness, completeness, or quality of the information provided.

- 2. This pdf is part of a YouTube tutorial: https://youtu.be/hjC3grc598o

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X=Brand Attitude	Y=Purchase Intention
3	4.5
4	4
1	2.5
2	3

Correlation Coefficient

$$r = 0.85$$

Regression Coefficient

$$Y = 2 + 0.6\,X$$

Observation:

(1) Correlation coefficient (0.85) is different from regression coefficient (0.6).

(2) However, they share the same direction sign (both positive).

Correlation Coefficient

$$r = 0.85$$

1. Conceptual

- It indicates the strength of the relationship between X and Y.
- *r* is in the range of [-1, 1]. The greater of |*r*| is, the stronger the relationship between X and Y.

2. Quantitative

- First, you need square it and get a number called r squared.

$$r^2 = 0.72$$

- Then, 0.72 means that X (brand attitude) can explain 72% variance of Y (purchase intention).

Regression Coefficient

$$Y = 2 + 0.6\,X$$

1. Conceptual

- It indicates the strength of the relationship between X and Y.
- b_1 can be any numbers in the range of [-∞, + ∞]. The greater of | b_1 | is, the stronger the relationship between X and Y.

2. Quantitative

- b_1 is the change of Y when X changes by 1 unit.

$$Y = 2 + 0.6 * 2 = 3.2$$

$$Y = 2 + 0.6 * 3 = 3.8$$

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Correlation Coefficient

$$r = 0.85$$

Regression Coefficient

$$Y = 2 + 0.6\,X$$

Question: For the same X and Y, why is correlation coefficient (0.85) different from regression coefficient (0.6)?

X=Brand Attitude	Y=Purchase Intention
3	4.5
4	4
1	2.5
2	3

Correlation Coefficient

$$r = 0.85$$

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \bar{y})^2}}$$

$$r = \frac{3}{\sqrt{5}\sqrt{2.5}} = 0.85$$

Regression Coefficient

$$Y = 2 + 0.6\,X$$

$$b_1 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

$$b_1 = \frac{3}{5} = 0.6$$