

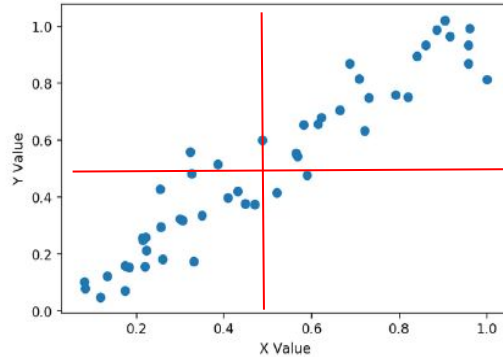
Pearson Correlation

Covariance

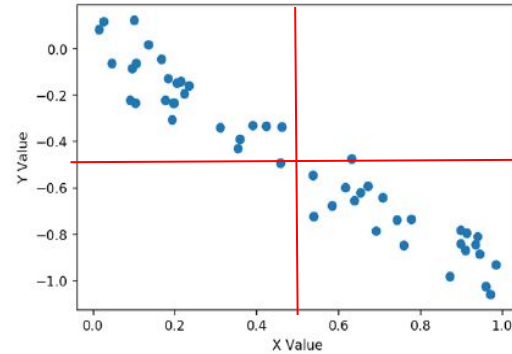
$$\text{Cov}(X,Y) = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{N}$$

Covariance

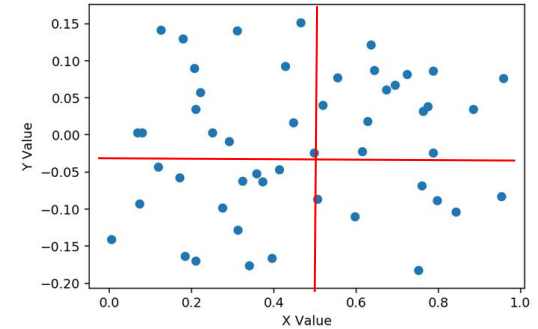
$$\text{Cov}(X,Y) = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{N}$$



Positive Covariance



Negative Covariance



Zero Covariance

Pearson Correlation

$$\text{Correlation} = \frac{\text{Cov}(x, y)}{\sigma x * \sigma y}$$

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Pearson Correlation:

- Covariance divided by the product of standard deviation of the two variables

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- Covariance divided by the product of standard deviation of the two variables
- Value between +1 and -1
- Strength of Linear Relationship

Pearson Correlation

$$r_{xy} = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

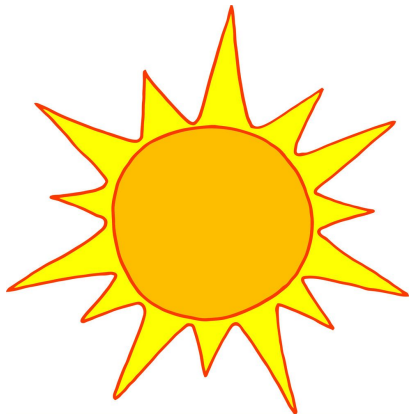
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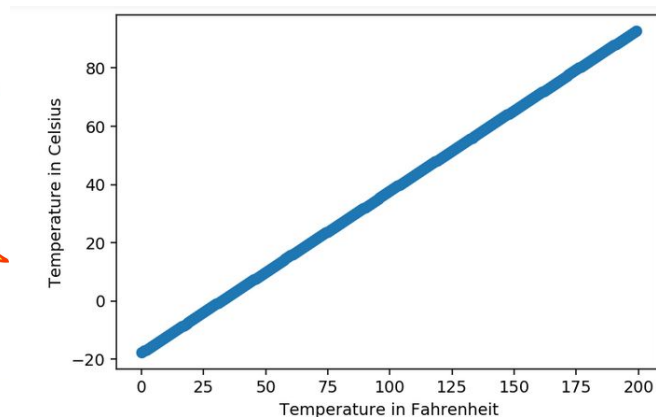
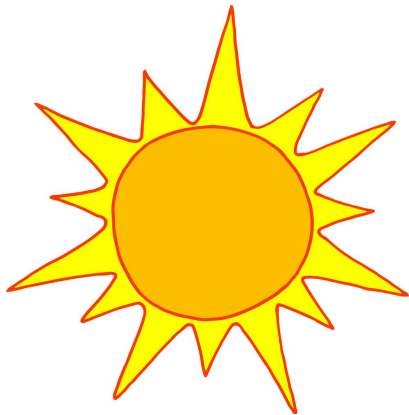
Ex. Relation between Temperature in Celsius and Fahrenheit.



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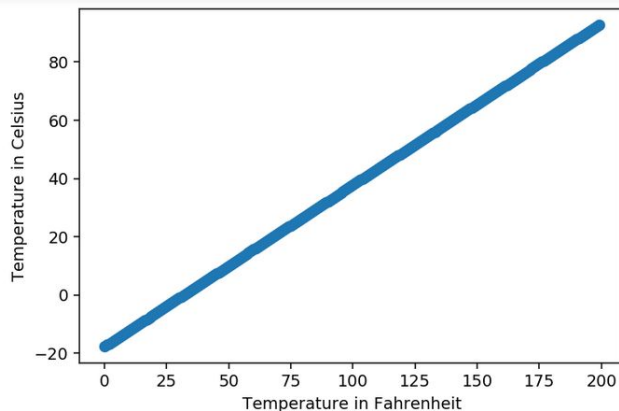
Pearson Correlation = 1.0

Pearson Correlation

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Ex. Relation between Temperature in Celsius and Fahrenheit.

$$F = \frac{9}{5}C + 32$$



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Pearson Correlation

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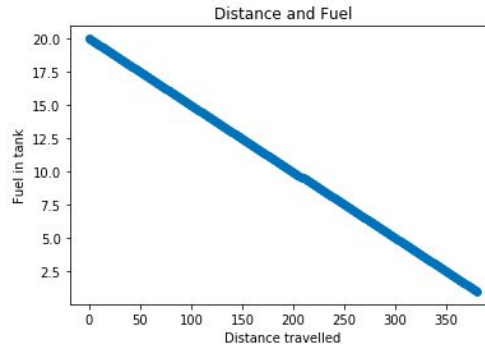
Ex. Relation between Distance travelled and Fuel remained ?



Pearson Correlation

$$r_{xy} = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

Ex. Relation between Distance travelled and Fuel remained ?

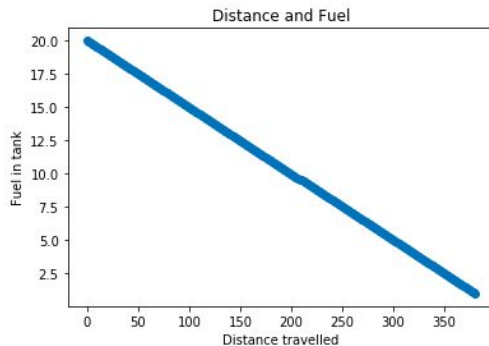


Pearson Correlation = -1.0

Pearson Correlation

$$r_{xy} = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

Ex. Relation between Distance travelled and Fuel remained ?



Pearson Correlation = -1.0

Fuel_remained = Fuel_Initial $-$ Mileage * Distance

Pearson Correlation

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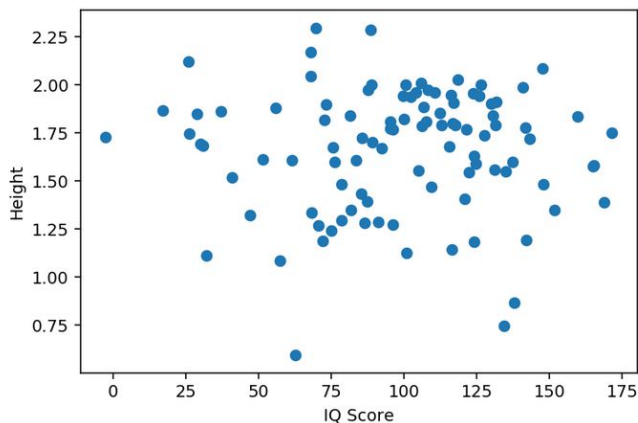
Ex. Relation between Height and IQ Score ?



Pearson Correlation

$$r_{xy} = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

Ex. Relation between Height and IQ Score ?



Pearson Correlation = 0

Pearson Correlation

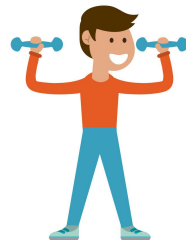
Rain and Umbrella Sell



Employee investing hour in work and Paycheck

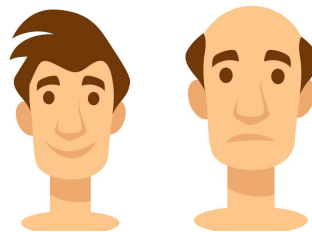


Exercise and Muscle Power



Pearson Correlation

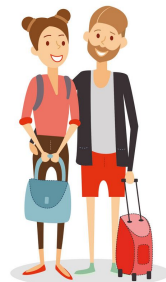
Age and Hair



More time in mall and account balance



Crime and Tourism



Thank You!