Simple Linear Regression (SLR) fits a linear model to a single response variable Y as a function of a predictor X in the data.

SLR has the form

$Y = \beta_0 + \beta_1 X + e$, where e is random error assumed to be normally distributed with 0 mean and a common variance σ^2: $e \sim N(0, var=\sigma^{2)}$

One should always verify that the errors (residuals) are normally distributed; one common statistical test for normality is the Shapiro Test; a graphical verification of normality is the Q-Q plot.

Watch the video lecture SLR and MLR V.mp4.

6_3 Testing Hypotheses Involving Population Proportion V.pptx

one and two sample t-tests and CIs.mp4

testing normality of 2 samples.txt

SLR and MLR V.mp4

8a1 Correlation and Simple Linear Regression V.pptx

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A. The datafile eCommerce Sales vs Ad Costs.csv has 25 observations on Ad.cost and eCommerce.Sales.

(a) Fit a straight line model to eCommerce.Sales as a function of Ad.cost.

(b) Find R^2 (R-square) of the fitted line; this is referred to as the % of variability in Y as explained by X.

(c) Calculate correlation coefficient r between eCommerce.Sales and Ad.cost, and calculate r^2; Are R^2 and r^2 equal?

(d) Draw a scatter plot of the data., along with the fitted line, without the SE (standard error) of the fitted line, and with the SE of the fitted line.

B. Do the same for the data file Auto Price vs Age.csv (use Age as the predictor and Price as the response variable).