SLIIT UNI
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IT2120 - Probability and Statistics

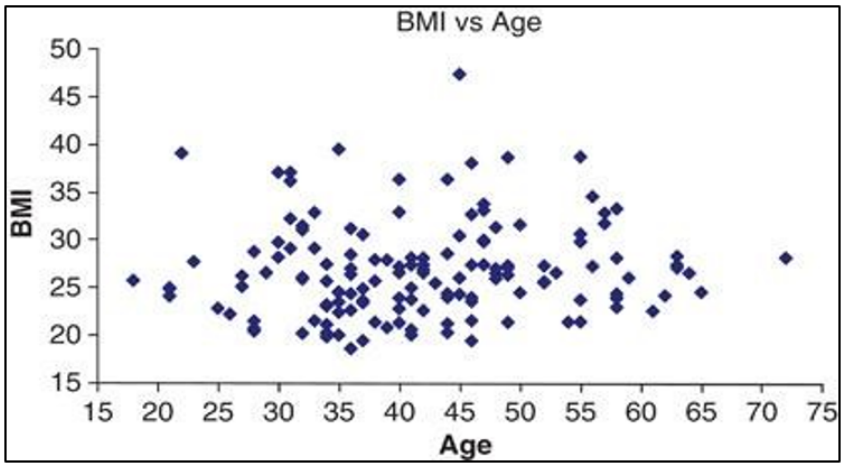
Department of Information Technology, Faculty of Computing

Year 2 semester 1 (2025)

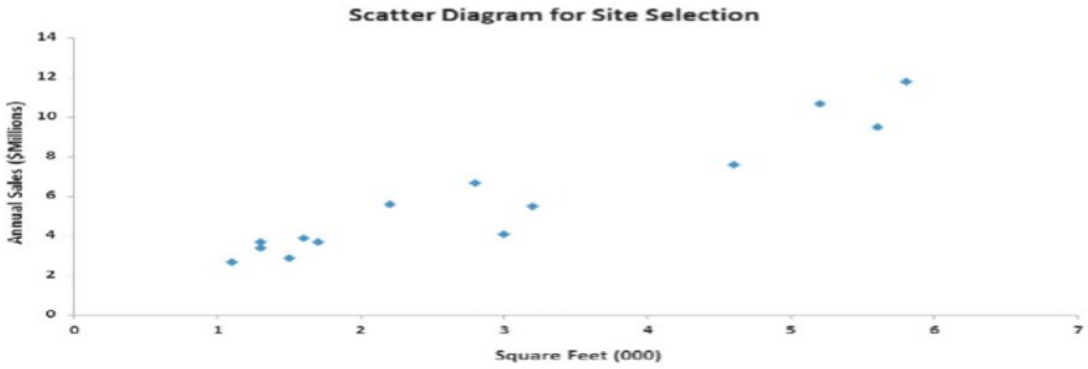
Tutorial 10

1. A small study is conducted involving 17 infants to investigate the association between gestational age at birth (in weeks) and birth weight (in grams). Here, researcher is interested in identifying whether birth weight of an infant has an effect from gestational age.
    i. What is the dependent variable (response variable) & independent variable (predictor variable)?
    ii. You have given the scatter plot of gestational age and birth weight. Identify whether there is any relationship between gestational age and birth weight.

2. Identify the type of relationship.



3. The objective of the director of planning of Sunflowers Apparel Ltd., is to forecast annual sales for all new stores, based on store size. To examine the relationship between the store size in square feet and its annual sales, data were collected from a sample of 14 stores. Figure below displays the scatter plot for the data.



R outputs of the regression model are shown below

Regression Model

Coefficients

Intercept	Square feet
0.9645	1.6699

Analysis of Variance Table

Response: Annual Sales

	df	Sum Sq	Mean Sq	F value	Pr(>F)
Square feet	A	105.7476	E	G	0.000 ***
Residuals	B	11.2067	F		
Total	C	D			

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

i. What can be concluded using the scatterplot?

ii. Find values marked A, B, C, D, E, F and G in the ANOVA table (Show workings).

iii. State the estimated regression equation in the form of $\hat{y} = b_0 + b_1 x$ and state how much more sales are expected if they increase the store size by 1,000 square feet.

iv. The following information is given.

$$\sum X = 40.9$$
$$\sum Y = 81.8$$
$$\sum XY = 302.30$$

Standard deviations are $S_x = 1.71$ and $S_y = 2.98$

Where X is the square feet and Y is the annual sales

Calculate the Pearson's linear coefficient of correlation between the two variables.

v. Calculate coefficient of determination and interpret it.

vi. Use the regression equation to predict annual sales, if the store size is 10,000 square feet.