King Mongkut's University of Technology Thonburi
Faculty of Engineering, Department of Computer Engineering
CPE 342 Machine Learning, 1/2024

Assignment 1: Training models

Due: 21 August 2024. Please submit your report in PDF to LEB2

OLS Regression

You are provided with a dataset containing the information about a small business's monthly advertising expenditure and corresponding sales. The dataset includes the following variables:

- Advertising Budget (X): The amount spent on advertising (in thousands of dollars).
- Sales (Y): The number of units sold (in thousands).

The data is as follows:

Month	Advertising Budget (X)	Sales (Y)
1	3.0	6.0
2	5.0	9.0
3	2.0	4.0
4	7.0	10.0
5	8.0	12.0
6	1.0	3.0
7	4.0	7.0
8	6.0	8.0
9	9.0	13.0
10	10.0	15.0

Tasks:

1. Implement OLS Regression:
    a. Use the data provided to fit a simple linear regression model using the OLS method.
    b. Compute the regression coefficients (intercept and slope).
    c. Write down the equation of the fitted line.
2. Interpret the Results:
    a. Explain the meaning of the slope and intercept in the context of this problem.
    b. Predict the sales if the advertising budget is $12,000.
3. Model Evaluation:
    a. Calculate the R-squared value to determine the goodness of fit for your model.
    b. Provide a brief interpretation of the R-squared value obtained.