

# Regression Algorithms Assignment

K.N.Toosi University of Technology  
Introduction to Data Mining

Fall 2024

## Part I

# Practical Assignment: Linear Regression

## Task

The objective of this assignment is to provide hands-on experience with fitting a linear regression model using given data points in Figure 1. Students are asked to assess their model's accuracy using  $MSE$  and solve for parameters  $\alpha$  and  $\beta$ .

## Data Points

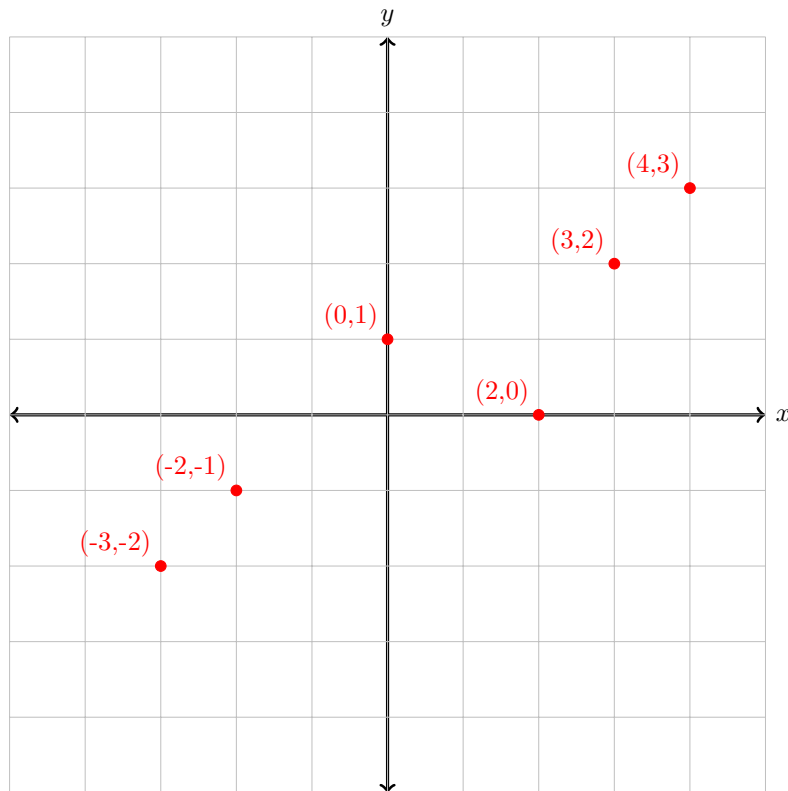


Figure 1: Linear Regression Data Points

## Part II

# Practical Assignment: Polynomial Regression

## Task

The goal of this assignment is to fit a 3rd degree polynomial function to the given set of data points in Figure 2 and report the resulting polynomial coefficients.

## Data Points

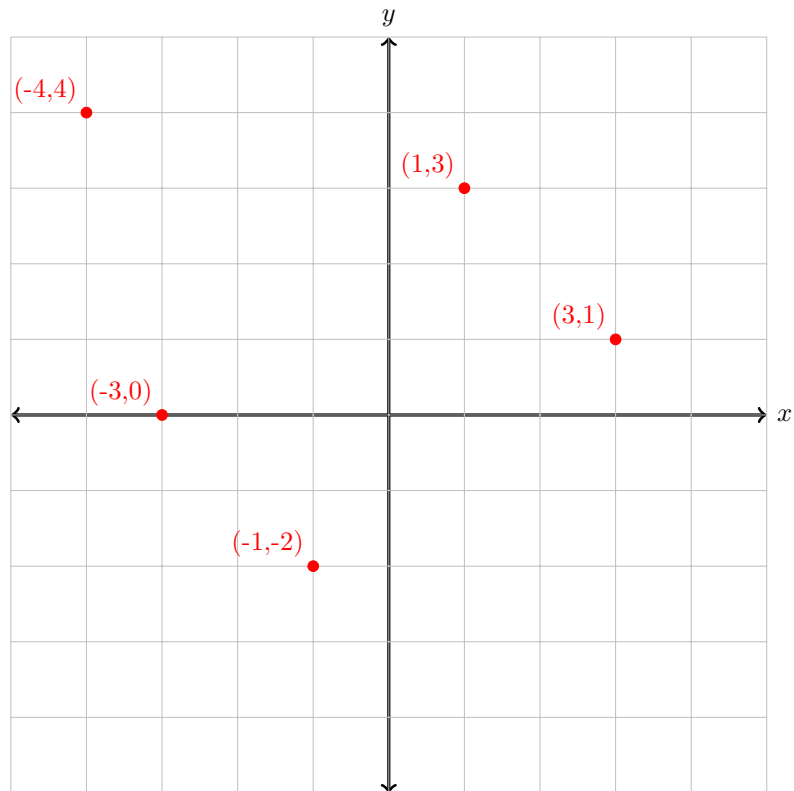


Figure 2: Polynomial Regression Data Points

## Part III

# Implementation Assignment

## Dataset

x	y (Label)
-4.5	0
-4	0
-3.5	0
-3	0
-2.5	0
-2	1
-1.5	1
-1	1
-0.5	1
20	1

Table 1: Binary Classification Dataset

## Task

This assignment aims to compare the flexibility and accuracy of logistic regression and linear regression in binary classification. You'll fit both models to the given dataset in Table 1 using scikit-learn algorithms, visualize their decision boundaries, and analyze where linear regression falls short compared to logistic regression. Both models use a 0.5 threshold, and accuracy is measured by the number of correctly classified points.

## Note

Any attempt to use AI tools for generating the code is strictly prohibited. Students will be asked to present and explain their code during a class session.