

Lecture 13: Linear Regression via Least Squares

Professor Ilias Bilonis

What is supervised learning?

Supervised Learning

You are given n observations consisting of:

$$\mathbf{x}_{1:n} = \{\mathbf{x}_1, \dots, \mathbf{x}_n\}$$

(inputs, features, ...)

$$\mathbf{y}_{1:n} = \{y_1, \dots, y_n\}$$

(outputs, targets, labels, ...)

Problem: Use the data to learn the map between \mathbf{x} and \mathbf{y}

Regression

You are given n observations consisting of:

$$\mathbf{x}_{1:n} = \{\mathbf{x}_1, \dots, \mathbf{x}_n\}$$

(inputs, features, ...)

$$\mathbf{y}_{1:n} = \{y_1, \dots, y_n\}$$

(outputs, targets, labels, ...)

Continuous outputs



Problem: Use the data to learn the map between x and y

Classification

You are given n observations consisting of:

$$\mathbf{x}_{1:n} = \{\mathbf{x}_1, \dots, \mathbf{x}_n\}$$

(inputs, features, ...)

$$\mathbf{y}_{1:n} = \{y_1, \dots, y_n\}$$

(outputs, targets, labels, ...)

Discrete outputs



Problem: Use the data to learn the map between x and y