*** Applied Machine Learning Fundamentals ***
Mathematical Foundations

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SAP SE

November 6, 2019

Find all slides on GitHub

Lecture Overview

Unit I	Machine Learning Introduction
Unit II	**Mathematical Foundations**
Unit III	Bayesian Decision Theory
Unit IV	Probability Density Estimation
Unit V	Regression
Unit VI	Classification I
Unit VII	Evaluation
Unit VIII	Classification II
Unit IX	Clustering
Unit X	Dimensionality Reduction

Agenda November 6, 2019

Section:

Introduction

Introduction

Section:

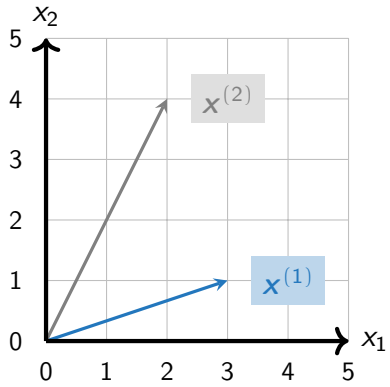
Linear Algebra

What is a Vector?

$$\boldsymbol{a} = \begin{bmatrix} a_1 \\ a_2 \end{bmatrix}$$

$$\boldsymbol{x}^{(1)} = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$$

$$\boldsymbol{x}^{(2)} = \begin{bmatrix} 2 \\ 4 \end{bmatrix}$$



Multiplication by a Scalar

$$c\boldsymbol{a} = c \begin{bmatrix} a_1 \\ a_2 \end{bmatrix} = \begin{bmatrix} ca_1 \\ ca_2 \end{bmatrix}$$

$$2\boldsymbol{x}^{(1)} = 2 \begin{bmatrix} 3 \\ 1 \end{bmatrix} = \begin{bmatrix} 6 \\ 2 \end{bmatrix}$$

Addition of Vectors

$$\boldsymbol{a} + \boldsymbol{b} = \begin{bmatrix} a_1 \\ a_2 \end{bmatrix} + \begin{bmatrix} b_1 \\ b_2 \end{bmatrix} = \begin{bmatrix} a_1 + b_1 \\ a_2 + b_2 \end{bmatrix}$$

$$\boldsymbol{x}^{(1)} + \boldsymbol{x}^{(2)} = \begin{bmatrix} 3 \\ 1 \end{bmatrix} + \begin{bmatrix} 2 \\ 4 \end{bmatrix} = \begin{bmatrix} 5 \\ 5 \end{bmatrix}$$

Linear Combination of Vectors

$$\boldsymbol{u} = c_1 \boldsymbol{v}^{(1)} + c_2 \boldsymbol{v}^{(2)} + \cdots + c_n \boldsymbol{v}^{(n)}$$

Section:

Statistics

Section:

Optimization

Section:

Wrap-Up

Summary

Self-Test Questions

1.

What's next...?

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Recommended Literature and further Reading

Thank you very much for the attention!

Topic: *** Applied Machine Learning Fundamentals *** Mathematical Foundations
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Do you have any questions?