Lecture Notes for KorbitAI

Emulie Chhor

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Introduction

- 1. Data Science Basics Path
- 2. Probability Basics Path
- 3. Linear Regression Path
- 4. Classification Path
- 5. CART Decision Trees Path
- 6. Data Preprocessing Path
- 7. Foundational ML Theory Path
- 8. Unsupervised Learning Path
- 9. Machine Learning Overview Path
- 10. Introduction to Neural Networks Path
- 11. Training Neural Netowrks Path
- 12. Convolutional and Recurrent Neural Networks Path

1 Data Science Basics Path

- 1. Descriptive Statistics
- 2. Introduction to Graphs
- 3. What is a Dataset
- 4. Exploratory Data Analysis

2 Probability Basics Path

2.1 Overview

- 1. Discrete vs Continuous Random Variable
- 2. Expected Value vs Sample Mean
- 3. Variance and Standard Deviation
- 4. Binomial Distribution
- 5. Normal Distribution

3 Linear Regression Path

3.1 Overview

- 1. Regression
- 2. Correlation
- 3. Linear Regression
- 4. Interpolation vs Extrapolation
- 5. Evaluation Metrics
- 6. Linear Regression with Categorical Features
- 7. Conditions for Linear Regression
- 8. Handling Outliers in Linear Regression

4 Classification Path

- 1. Classification
- 2. Binary Classification
- 3. Logistic Regression Basics
- 4. Sigmoid Function
- 5. Evaluation Metrics (classification)
- 6. Binary Classification for Imbalanced Classes
- 7. Naive Bayes Classifier
- 8. K-nearest Neighbors

5 CART Decision Trees Path

5.1 Overview

- 1. Introduction to Decision Trees
- 2. CART Decision Tree Splits
- 3. Decision Tree Selection Criteria
- 4. Introduction to Random Forests

6 Data Preprocessing Path

6.1 Overview

- 1. Overview of Data Preprocessing
- 2. Data Cleaning
- 3. Handling Outliers
- 4. Feature Engineering
- 5. One-Hot Encoding
- 6. Feature Importance
- 7. Feature Selection
- 8. Feature Scaling
- 9. Dimensionality Reduction
- 10. Principal Component Analysis

7 Foundational ML Theory Path

- 1. Cost and Loss Functions
- 2. Splitting Data
- 3. Cross Validation
- 4. Parameters vs Hyperparameters
- 5. Hyperparameters Tuning
- 6. Overview of Regularization
- 7. L1 vs L2 regularization

8 Unsupervised Learning Path

8.1 Overview

- 1. Unsupervised Learning
- 2. Clustering
- 3. K-Means Clustering

9 Machine Learning Overview Path

9.1 Overview

- 1. Supervised Learning
- 2. Linear Approximators
- 3. Generalized Linear Approximators
- 4. Overfitting and Underfitting
- 5. Bias and Variance: Cross-Validation
- 6. Bias-Variance Decomposition
- 7. Overview of Logistic Regression
- 8. Gradient Descent
- 9. Regulatization for Logistic Regression
- 10. Lecture Summary: Intro to ML

10 Introduction to Neural Networks Path

- 1. The Rise of Deep Learning
- 2. An Artificial Neuron
- 3. Example: 'OR' Neuron Using Sigmoid Activation
- 4. Example: Neuron with Rectified Linear Function
- 5. One-Layer Neural Network
- 6. Example: 'XOR' Neural Network
- 7. Deep Training Neural Networks
- 8. Lecture Summary: Introduction to Training Neural Networks

11 Training Neural Netowrks Path

11.1 Overview

- 1. Stochastic Gradient Descent
- 2. The Backpropagation Algorithm
- 3. Optimization Difficulties
- 4. Optimization Algorithms
- 5. Visualizing how a Neural Network is Trainied
- 6. Example: Data Preprocessing
- 7. Overview of Model Selection
- 8. Lecture Summary: Training Neural Netorks

12 Convolutional and Recurrent Neural Networks Path

12.1 Overview

- 1. Object Detection Task
- 2. Overview of Convolutional Training Neural Networks
- 3. Convolutional Training Neural Networks: Convolutional Layers
- 4. Convolutional Training Neural Networks: Pooling Layers
- 5. Convolutional Training Neural Networks: Complete Object Detection Model
- 6. Sentiment Classification Task
- 7. Reccurent Neural Networks
- 8. Deep Reccurent Neural Networks
- 9. Lecture Summary: Convolutional and Reccurent Training Neural Networks

13 Ressources

- KorbitAI