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Deep learning using python

3-day intensive course with Tensorflow and pyTorch

FA-0161 · 3-day

Software Development · DevOps, Cloud & Infrastructure · Data & Analytics

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Introduction

"Deep Learning with Python" is a focused 3-day course designed for individuals who have completed foundational courses in Python for Data Science and Machine Learning with Python. This advanced course delves into the depths of deep learning methodologies, utilizing powerful frameworks such as TensorFlow and PyTorch. Participants will explore the architecture of deep neural networks, convolutional neural networks (CNNs), recurrent neural networks (RNNs), and more. By applying these technologies to real-world datasets, learners will develop a solid understanding of how to harness the capabilities of deep learning to solve complex problems.

Learning outcomes

Upon completing this course, participants will be able to:

- Understand the fundamental concepts and architectures of deep learning.
- Implement deep neural networks using TensorFlow and PyTorch.
- Build and train convolutional neural networks (CNNs) for image recognition tasks.
- Utilize recurrent neural networks (RNNs) for sequential data analysis and natural language processing (NLP).
- Apply transfer learning and fine-tuning techniques to improve model performance.
- Optimize deep learning models for better accuracy and efficiency.
- Deploy deep learning models for real-world applications.

Prerequisites

- Proficiency in Python programming and a good understanding of machine learning concepts.

- Familiarity with machine learning libraries such as Scikit-learn.
- Basic knowledge of TensorFlow or PyTorch is helpful but not required.
- Completion of the "Python for Data Science" and "Machine Learning with Python" courses or equivalent knowledge.

Training outline

1. Introduction to Deep Learning and TensorFlow

Deep Learning Foundations

1. Overview of Deep Learning and Its Impact
2. Neural Networks: Concepts and Architecture

Getting Started with TensorFlow

1. TensorFlow Basics: Tensors, Operations, Graphs, Sessions
2. Building Your First Neural Network in TensorFlow
3. Implementing a Simple Image Classification Model

Deep Neural Networks (DNNs)

1. Understanding Layers and Architectures
2. Activation Functions, Loss Functions, and Optimizers
3. Training and Evaluating Deep Neural Networks

2. Advanced Deep Learning Models with PyTorch

Introduction to PyTorch

1. PyTorch Basics: Tensors and Autograd
2. Building Neural Networks with PyTorch
3. Implementing a Character-Level RNN for Text Generation

Convolutional Neural Networks (CNNs)

1. CNN Architectures and Their Applications in Image Processing
2. Implementing a CNN in PyTorch for Image Recognition

Recurrent Neural Networks (RNNs) and LSTM

1. Understanding RNNs and Long Short-Term Memory (LSTM) Networks
2. Applications of RNNs in Sequential Data Analysis and NLP
3. Building and Training an LSTM Network for Sentiment Analysis

3. Advanced Topics and Applications

Transfer Learning and Fine-Tuning

1. Leveraging Pre-trained Models for Your Own Projects
2. Fine-Tuning Techniques to Improve Model Performance

Model Optimization and Deployment

1. Techniques for Optimizing Deep Learning Models
2. Deploying Deep Learning Models in Production Environments

Project Work and Case Studies

1. Hands-on Project: Applying Deep Learning to a Real-World Dataset
2. Discussion on Advanced Deep Learning Research and Applications
3. Review and Feedback on Project Work

This course is carefully crafted to build on your existing knowledge of Python, data science, and machine learning, guiding you through the advanced realm of deep learning. Through comprehensive lectures, hands-on exercises, and collaborative project work, you'll gain the skills necessary to implement and innovate with deep learning technologies in Python, leveraging TensorFlow and PyTorch to their fullest potential.

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