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Programming in python for Artificial Intelligence

3-day highly intensive crash course

FA-0144 · 3-day

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

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Introduction

This is a highly intensive 3-day program tailored for individuals who have a strong foundation in Python and have completed courses on "Python for Data Science" and "Machine Learning with Python." This course is designed to fast-track your understanding and skills in Artificial Intelligence (AI) with a focus on deep learning, neural networks, and the application of these concepts using Python. By integrating hands-on projects with theoretical insights, the course aims to equip participants with the ability to apply AI techniques to solve complex problems.

Learning outcomes

Upon completing this course, participants will:

- Understand the key concepts and applications of Artificial Intelligence.
- Be proficient in using TensorFlow and PyTorch for deep learning projects.
- Implement and train Convolutional Neural Networks (CNNs) for image recognition tasks.
- Understand and apply deep learning models to natural language processing (NLP) problems.
- Build and evaluate a recommendation engine using AI techniques.
- Gain insights into the latest AI trends and future directions.

Prerequisites

- Solid understanding of Python programming.
- Basic familiarity with machine learning concepts and algorithms.
- Good grasp of mathematics (linear algebra, statistics, calculus)

- An enthusiasm for learning about advanced AI techniques and their applications.

Training outline

1. Quick Recap of Python for AI

- Python Libraries Overview: TensorFlow, PyTorch, Keras
- Python Advanced Features Relevant to AI (List comprehensions, Generators, Decorators)

2. Foundations of Deep Learning

- Introduction to Deep Learning and Neural Networks
- Understanding Neural Network Architectures
- Activation Functions, Loss Functions, and Optimizers
- Backpropagation and Gradient Descent

3. Deep Learning Frameworks

TensorFlow and Keras

- Setting Up TensorFlow
- Building and Training Models with Keras
- TensorFlow 2.x Features and Ecosystem

PyTorch

- Setting Up PyTorch
- Tensors in PyTorch
- Building and Training Models in PyTorch
- Autograd Mechanism

4. Convolutional Neural Networks (CNN) for Image Processing

- Introduction to CNNs and Their Architecture
- Implementing CNNs with TensorFlow and Keras
- Implementing CNNs with PyTorch
- Applications of CNNs (Image Classification, Object Detection)

5. Natural Language Processing (NLP) with Deep Learning

- NLP Basics and Text Preprocessing
- Word Embeddings and Word2Vec
- Recurrent Neural Networks (RNN) and LSTM for NLP
- Implementing NLP Projects with TensorFlow and PyTorch

6. Building a Recommendation Engine

- Overview of Recommendation Systems
- Collaborative Filtering Techniques
- Content-Based Filtering Techniques
- Implementing a Recommendation System

7. Current Trends and Future of AI

- Overview of Advanced Topics in AI (Generative Adversarial Networks, Reinforcement Learning)
- Ethical Considerations and Challenges in AI
- Future Directions in AI Research and Applications

This crash course is a condensed exploration into the realm of AI, blending practical skills in TensorFlow and PyTorch with a solid theoretical foundation. Designed for rapid learning, it moves from a quick Python recap to advanced AI applications, ensuring you leave with the ability to tackle real-world AI challenges.

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