Faysal Aziz

Python and AI

The Ultimate Data Science Course in 5 days

FA-0378 · 5 days

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

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Introduction

Welcome to the exciting world of data science! In today's data-driven era, the ability to analyze and interpret vast amounts of information is more important than ever. Data science merges statistics, programming, and domain knowledge to unlock insights and drive decisions that can transform businesses and industries.

Python, a versatile and powerful programming language, has become the go-to tool for data scientists. Paired with Google Colab, a cloud-based Jupyter notebook environment, you have a potent combination for tackling data challenges head-on. This course will take you on a journey from the basics of data science all the way to advanced topics like reinforcement learning, providing you with hands-on experience and practical skills you can apply immediately.

Our trainer brings a wealth of knowledge and experience to the table, with over 30 years of programming expertise and more than a decade working in the field of artificial intelligence. Under their guidance, you'll gain a deep understanding of data science methodologies and learn how to harness the power of Python to solve real-world problems.

Get ready to dive into an engaging and transformative learning experience that will equip you with the tools and techniques to excel in the dynamic field of data science.

Learning outcomes

By the end of this training course, participants will be able to:

- Understand the fundamentals of data science and its applications.
- Perform data manipulation and visualization using Python libraries.
- Implement basic and advanced machine learning algorithms.
- Apply deep learning techniques for complex data analysis.
- Understand and implement reinforcement learning algorithms.

- Use Google Colab effectively for data science projects.

Prerequisites

Participants should have:

- Basic knowledge of programming (preferably in Python).
- Understanding of basic mathematics and statistics.
- Access to a Google account for using Google Colab.
- Curiosity and willingness to learn new concepts.

Training outline

1. Module 1: Introduction to Data Science and Python

What is Data Science?

1. Definition and key components
2. Applications and use cases

Introduction to Python for Data Science

1. Overview of Python and its ecosystem
2. Setting up Google Colab

Python Basics

1. Variables, data types, and operations
2. Control structures: loops and conditionals
3. Functions and modules

Working with Data in Python

1. Introduction to NumPy
2. Handling arrays and matrices
3. Basic operations with NumPy

2. Module 2: Data Manipulation and Visualization

Data Manipulation with Pandas

1. Introduction to Pandas
2. DataFrames and Series
3. Reading and writing data
4. Data cleaning and preprocessing

Data Visualization

1. Introduction to Matplotlib and Seaborn
2. Creating basic plots (line, bar, scatter)
3. Advanced visualizations (heatmaps, pair plots)
4. Customizing plots and visual aesthetics

3. Module 3: Introduction to Machine Learning

Overview of Machine Learning

1. Definition and types of machine learning
2. Supervised vs. unsupervised learning

Supervised Learning

Linear regression

1. Theory and implementation
2. Hands-on example with a dataset

Classification algorithms

1. Logistic regression
2. Decision trees
3. Hands-on examples with datasets

Model Evaluation

1. Metrics for regression and classification
2. Cross-validation techniques
3. Hyperparameter tuning

Collaborative Filtering

1. User-based Collaborative filtering
2. Item-based Collaborative filtering
3. Recommendation Engine
4. Building a Recommendation engine like Netflix

4. Module 4: Advanced Machine Learning and Introduction to Deep Learning

Unsupervised Learning

Clustering algorithms

1. K-means clustering
2. Hierarchical clustering

3. Hands-on examples with datasets

Dimensionality reduction

1. PCA (Principal Component Analysis)
2. t-SNE (t-distributed Stochastic Neighbor Embedding)

Introduction to Deep Learning

1. Overview of neural networks
2. Deep learning frameworks: TensorFlow and Keras
3. Building and training a simple neural network
4. Hands-on example with image data

5. Module 5: Reinforcement Learning

Introduction to Reinforcement Learning

1. Key concepts: agents, environments, rewards, and actions
2. Difference between reinforcement learning and other types of learning

Fundamental Algorithms

1. Q-learning
2. Deep Q-Networks (DQN)
3. Hands-on example with a simple environment

Advanced Topics

1. Policy gradients
2. Actor-Critic methods
3. Hands-on project: Implementing a reinforcement learning algorithm in a complex environment

6. Hands-On Labs and Projects

- Data manipulation and visualization with Pandas and Matplotlib
- Building and evaluating machine learning models
- Developing a machine learning pipeline from data preprocessing to model evaluation
- Implementing a neural network for image classification
- Applying reinforcement learning to solve a real-world problem

This course is designed to be a fully hands-on, practical experience because we believe that learning by doing is the best way to truly understand and master new concepts. Throughout the five days, you will engage in a series of labs and projects that will allow you to apply the theories and techniques discussed in real-world scenarios.

By the end of this course, you will have not only learned the fundamentals of data science, machine learning, and reinforcement learning but also gained invaluable practical experience that you can take with you into your professional life. Our approach ensures that you can confidently tackle data challenges and develop innovative solutions using Python and Google Colab.

We are committed to making this learning journey as interactive and engaging as possible, with our trainer, who has over 30 years of programming experience and more than a decade in AI, guiding you every step of the way. Get ready to transform your skills and knowledge in data science through this immersive, hands-on course.

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