Machine Learning Essentials with Python - TTML5506-P

Explore Core Skills, Unsupervised vs Supervised Learning, Data Wrangling, Neural Networks, Generative AI, GPT & More

Duration: 3 Days
Skill Level: Intermediate
Available Format: Instructor-Led Online; Instructor-Led, Onsite In Person ; Blended; On Public Schedule

Dive into the fascinating world of AI and Machine Learning with our three-day, comprehensive course, "Machine Learning Essentials with Python". This course, perfect for basic Python developers, equips you with the skills to leverage Python for intelligent applications like data analysis, predictive modeling, automation, and chatbots, transforming your project capabilities.

What You'll Learn

Overview

Dive into the fascinating world of AI and Machine Learning with our three-day, comprehensive course, "Machine Learning Essentials with Python". This course, perfect for basic Python developers, equips you with the skills to leverage Python for intelligent applications like data analysis, predictive modeling, automation, and chatbots, transforming your project capabilities. Participants will get hands-on experience with popular machine learning algorithms, exploring their potential applications and limitations.

Our highly-experienced instructors will share their practical expertise, guiding you through learning these new skills and empowering you to confidently apply them in your job or role. Throughout the course you'll explore learning and using Supervised and

Unsupervised Learning techniques, Data Wrangling and Preprocessing, Ensemble Learning, and Model Evaluation and Validation. Hands-on labs replicating real-world scenarios form a core part of the learning experience, ensuring you acquire practical, applicable skills. Each hands-on lab will provide you with practical experience using innovative skills with cutting edge tools, applied in a practical and meaningful way.

If time permits, you'll also explore innovative technologies such as Generative AI with GPT-4, as well as practical AI integration into applications, highlighting the tools and technologies transforming the AI landscape. By the end of the course, you will not only have gained a deep understanding of AI and Machine Learning concepts but also the ability to apply these in your work context, leading to more complex and impactful projects.

Objectives

This course combines engaging instructor-led presentations and useful demonstrations with valuable hands-on labs and engaging group activities. Throughout the course you'll learn how to:

- Master the Python Programming for Data Science: Gain an in-depth understanding of Python's role in data science and AI, including proficiency in using key Python data science libraries like Pandas, NumPy, and Matplotlib.
- Understand the Fundamentals of AI and Machine Learning: Develop a strong grasp of AI and Machine Learning concepts, their applications, and how to differentiate between AI, Machine Learning, and Deep Learning.
- Dive into Supervised and Unsupervised Learning Techniques: Acquire hands-on skills to conduct Regression Analysis, Binary Classification, and k-means Clustering - key methods in Supervised and Unsupervised Learning.
- Apply Data Wrangling and Preprocessing Techniques: Learn to handle missing data, outliers, and categorical data effectively and perform feature scaling and normalization - crucial steps in Machine Learning projects.
- Create and Evaluate Machine Learning Models: Get a grip on the lifecycle of AI projects, including model creation, evaluation, validation, and the application of Ensemble Learning techniques.
- Understand and implement crucial data preprocessing techniques in Python: Attendees will acquire the ability to handle missing data, outliers, and categorical data, essential for creating reliable machine learning models.

- Develop competency in creating and interpreting data visualizations: Students will learn how to leverage Python's powerful libraries such as Matplotlib and Seaborn to create compelling visualizations and extract meaningful insights from data.
- Construct a machine learning pipeline for real-world applications: Participants will gain the practical know-how to carry a machine learning project from initial data collection through to final model deployment, using Python.
- (Optional / Bonus Topics): Implement AI into Real-World Applications: By the end of the course, you'll be able to build applications that integrate AI functionalities, using popular Python frameworks and modern AI technologies, like GPT-4.

If your team requires different topics, additional skills or a custom approach, our team will collaborate with you to adjust the course to focus on your specific learning objectives and goals.

Audience

This course is ideally suited for Python developers, data analysts, and aspiring data scientists looking to expand their skills into AI and Machine Learning. It is also highly beneficial for product managers and business leaders aiming to acquire a hands-on understanding of AI's impact on product development and business strategy.

Pre-Requisites

To ensure a smooth learning experience and maximize the benefits of attending this course, you should have the following prerequisite skills:

- Basic Understanding of Python as well as familiarity with Python Libraries (Pandas and Numpy, etc.)
- Basic Math and Problem-Solving Skills
- Understanding of Basic Data Structures

Take Before: Students should have practical skills equivalent to or should have attended the following course(s) as a pre-requisite:

- **TTPS4873**: Fast Track to Python Programming for Data Science (3 days)

TTPS4873	Fast Track to Python for Data Science and/or Machine Learning
TTPS4874	Applied Python for Data Science and Engineering
TTPS4876	Next-Level (Intermediate) Python for Data Science and /or Machine Learning
TTPS4878	Hands-On Data Analysis with Panda
TTPS4883	Forecasting, Behavioral Analysis, and What-If Scenarios with Python

Agenda

Please note that this list of topics is based on our standard course offering, evolved from typical industry uses and trends. We'll work with you to tune this course and level of coverage to target the skills you need most. Topics, agenda and labs are subject to change, and may adjust during live delivery based on audience skill level, interests and participation.

Python for Data Science Quick Refresher

- Review and application of Python basics
- Relevance of Python in Data Science
- Exploring Python data science libraries: Pandas, NumPy, Matplotlib
- Introduction to Jupyter Notebook, Anaconda
- Lab: Solving basic data science problems using Python

Introduction to AI and Machine Learning

- Understanding the foundations and significance of AI and Machine Learning
- Differentiating between AI, Machine Learning, and Deep Learning
- Overview of the business applications of AI and Machine Learning
- Exploring types of Machine Learning: Supervised, Unsupervised, Reinforcement
- Deep dive into common Machine Learning algorithms
- Introduction to TensorFlow and PyTorch
- Lab: Exploring Python libraries for Machine Learning

Supervised Learning: Regression and Classification

- Understanding Simple Linear, Multiple Regression, and Binary Classification
- Understanding the business context in Binary Classification
- Lab: Conducting Regression Analysis and Classification using Python

Unsupervised Learning: Introduction to Clustering

- Understanding the concept of Clustering in Unsupervised Learning
- Diving deep into k-means clustering algorithm
- Lab: Implementing k-means Clustering

Data Wrangling and Preprocessing Techniques

- Understanding the importance of data wrangling and preprocessing in Machine Learning
- Techniques for handling missing data, outliers, and categorical data
- Feature scaling and normalization techniques
- Lab: Applying data preprocessing techniques on a dataset

Practical Machine Learning Project Walkthrough

- Gaining insights into the lifecycle of AI projects in the industry
- Common challenges in implementing AI projects and solutions
- Step-by-step walkthrough of a real-life AI project from end-to-end
- Lab: Implementing a small-scale machine learning project

Model Evaluation and Validation

- Understanding model assessment metrics for both Regression and Classification
- Learning to split data for model training and testing
- Lab: Evaluating model performance on test data

Introduction to Ensemble Learning

- Learning the concept of Ensemble Learning and its importance

- Understanding simple methods for Ensemble Learning
- Lab: Implementing simple Ensemble Learning techniques

Explainable AI and Ethical Considerations in AI

- Understanding the importance of interpretability in Machine Learning
- Exploring techniques for making AI transparent
- Discussing ethical considerations in AI and ML
- Lab: Visualizing Feature Importance in a model

Introduction to Neural Networks

- Grasping the basics of Neural Networks
- Learning about Feedforward and Backpropagation processes
- Lab: Building a basic Neural Network with Python

Data Visualization Techniques with Python

- Understanding the importance of data visualization in Machine Learning
- Exploring Python libraries for data visualization: Matplotlib, Seaborn
- Lab: Visualizing datasets using various plots

Machine Learning Pipeline and Model Deployment

- Understanding the concept of ML pipeline: Data collection, Preprocessing, Modeling, Evaluation, Deployment
- Lab: Creating a simple Machine Learning pipeline

Bonus Chapters / Time Permitting (or Day Four)

Bonus Chapter: Exploring Generative AI with GPT-4

- Understand Generative AI and how it powers GPT-4, using Python for interacting with these models
- Learn about the evolution of GPT models, and the specific advancements of GPT-4 in handling complex Python programming tasks
- Understand the potential applications of GPT-4 and how to implement them using Python
- Discuss the ethical considerations and Python coding practices for using powerful models like GPT-4 responsibly
- Lab: Creating a conversational bot using GPT-4 with Python

Bonus Chapter: Basics of Integrating AI into Applications

- Understand the concept of AI integration into simple applications
- Learn about the role of APIs in leveraging AI capabilities in applications
- Explore how Python can be used to connect applications to AI functionalities
- Discuss various simple AI plugins and extensions that can be integrated using Python
- Lab: Building a basic application integrating a pre-trained AI model
- Lab: Integrating a GPT-4 powered feature into a basic Python application

Bonus Chapter: Integrating AI into Web Applications

- Understand the concept of AI integration into web applications
- Learn about the Flask and Django frameworks for Python web development
- Discuss the role of APIs in leveraging AI capabilities in web applications
- Explore various AI plugins and extensions for web development
- Lab: Integrating a GPT-4 powered chatbot into a web application

Follow On Courses

TTAI3012	Deep Learning Essentials Boot Camp

Related Courses

TTML5503	Introduction to AI & Machine Learning JumpStart
TTPS4879	Hands-On Predictive Analytics with Python

TTML5504	Machine Learning Foundation: Working with Statistics, Algorithms and Neural Networks

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For More Information

Please contact us or call 844-475-4559 toll free for more information about our training services (instructor-led, self-paced or blended), coaching and mentoring services, public course enrollment or questions, partner programs, courseware licensing options and more.