Python for AI and Machine Learning Applications Training Course

30 Nov - 04 Dec 2026

Amsterdam

5900 € (Per Person)

Ref: #AI1981_174476

Course Introduction / Overview:

This intensive training course provides a comprehensive journey into the world of Artificial Intelligence and Machine Learning using Python, the dominant language in the data science field. The curriculum is meticulously designed to bridge the gap between theoretical concepts and practical implementation, empowering participants to build intelligent systems that can learn from data. As detailed in the seminal work "Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig, the foundation of modern AI lies in robust algorithms and clean data, principles that are at the core of this program. Participants will explore the complete machine learning workflow, from data collection and preprocessing to model training, evaluation, and deployment. BIG BEN Training Center has developed this course to equip professionals with the in-demand skills needed to leverage powerful Python libraries like Scikit-learn, TensorFlow, and PyTorch. We move beyond basic syntax to focus on building real-world AI applications, tackling challenges in areas such as predictive analytics, natural language processing, and computer vision. This course is your launchpad for developing sophisticated AI and ML solutions that drive innovation and create tangible business value, making you a proficient practitioner in this transformative technology.

Target Audience / This training course is suitable for:

- Software Developers and Engineers seeking to specialize in AI.
- Data Analysts and Scientists aiming to deepen their Python programming skills.
- IT Professionals and System Architects designing intelligent systems.
- Business Analysts who want to understand the technical aspects of AI.
- Project Managers overseeing AI and Machine learning projects.
- Academic Researchers and students in computer science or related fields.
- Anyone with a foundational knowledge of programming interested in AI and ML.

Target Sectors and Industries:

- Technology and Software Development.
- Banking, Finance, and Insurance.
- Healthcare and Pharmaceuticals.
- Retail and E-commerce.
- Telecommunications and Media.
- Manufacturing and Automotive.
- Government Agencies and Public Sector Services.
- Energy and Utilities.

Target Organizations Departments:

- Information Technology (IT).
- Research and Development (R&D).
- Data Analytics and Business Intelligence.
- Software Engineering and Product Development.
- Innovation and Strategy Units.
- Operations and Logistics.
- Marketing and Customer Insights.

Course Offerings:

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

- Master Python programming fundamentals for data manipulation and analysis.
- Implement core machine learning algorithms for classification and regression.
- Utilize Python libraries such as NumPy, Pandas, and Scikit-learn effectively.
- Build, train, and evaluate deep learning models using TensorFlow or PyTorch.
- Develop applications in Natural Language Processing (NLP) and Computer Vision.
- Apply data preprocessing and feature engineering techniques to real-world datasets.
- Understand the principles of model deployment and the AI development lifecycle.
- Evaluate model performance using appropriate metrics and validation strategies.
- Recognize and address ethical considerations and biases in AI models.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be highly interactive, practical, and immersive, ensuring that participants gain tangible skills. This course emphasizes a hands-on, project-based learning approach where theoretical knowledge is immediately applied through extensive coding exercises and real-world case studies. Our expert instructors facilitate a dynamic learning environment that encourages active participation, collaborative problem-solving, and peer-to-peer knowledge sharing. The program incorporates a blend of instructor-led presentations, live coding demonstrations, and guided practical labs. Participants will work in teams on a capstone project, simulating a complete machine learning workflow from data ingestion to model deployment, which helps solidify their understanding and build a portfolio of work. Continuous feedback and personalized guidance are provided throughout the course to address individual learning needs and ensure all concepts are thoroughly mastered. This experiential learning model guarantees that participants not only understand the "what" and "why" of AI and machine learning but also master the "how" of building effective, intelligent solutions.

Course Agenda (Course Units):

Unit One: Python Foundations for Data Science

- Introduction to the AI and Machine Learning landscape.
- Setting up the Python development environment (Anaconda, Jupyter).
- Python programming fundamentals: data types, control flow, and functions.
- Introduction to NumPy for numerical computation and array manipulation.
- Data manipulation and analysis with the Pandas library.
- Data visualization techniques using Matplotlib and Seaborn.
- Reading and writing data from various file formats (CSV, Excel, JSON).

Unit Two: Core Machine Learning Concepts and Algorithms

- Understanding supervised, unsupervised, and reinforcement learning.
- The machine learning workflow: from problem framing to model deployment.
- Linear and Logistic Regression for predictive modeling.
- Implementing classification algorithms: K-Nearest Neighbors (KNN) and Support Vector Machines (SVM).
- Introduction to the Scikit-learn library for machine learning.
- Model evaluation metrics: accuracy, precision, recall, and F1-score.
- Techniques for model validation: cross-validation and hold-out methods.

Unit Three: Advanced Machine Learning Techniques

- Decision Trees and the fundamentals of ensemble methods.
- Implementing Random Forests and Gradient Boosting algorithms.
- Unsupervised learning: K-Means clustering for data segmentation.
- Dimensionality reduction with Principal Component Analysis (PCA).
- Handling imbalanced datasets and advanced feature engineering.
- Hyperparameter tuning and model optimization using Grid Search.
- Building a complete machine learning pipeline with Scikit-learn.

Unit Four: Deep Learning and Neural Networks with Python

- Introduction to neural networks and the concept of deep learning.
- Understanding neurons, activation functions, and network architecture.
- Building sequential models with TensorFlow and Kera's.
- The process of training a neural network: backpropagation and gradient descent.
- Techniques to prevent overfitting: regularization and dropout.
- Introduction to Convolutional Neural Networks (CNNs) for image data.
- Exploring Recurrent Neural Networks (RNNs) for sequence data.

Unit Five: Applied AI and Future Trends

- Introduction to Natural Language Processing (NLP) concepts.
- Building a text classification model for sentiment analysis.
- Fundamentals of Computer Vision and image processing.
- Developing an image classification model using a pre-trained CNN.
- Best practices for deploying machine learning models into production.
- Discussing AI ethics, fairness, and bias in model development.
- Final capstone project: developing an end-to-end AI application.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

As AI models become more integrated into decision-making processes, how can developers proactively address and mitigate inherent biases in training data to ensure equitable outcomes?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by focusing on the holistic and practical application of AI and machine learning, rather than isolated theoretical concepts. Unlike programs that may concentrate solely on algorithm theory, our curriculum is built around a project-based learning philosophy that mirrors real-world development cycles. Participants don't just learn about machine learning; they actively build, train, and evaluate models from day one. We emphasize the entire AI workflow, from the critical initial steps of data cleaning and feature engineering to the often-overlooked final stages of model deployment and ethical considerations. The curriculum is uniquely structured to build skills progressively, ensuring a solid foundation in Python and core ML concepts before advancing to complex deep learning topics like NLP and computer vision. This approach ensures that participants can connect the dots between different domains of AI. Furthermore, the course content is continuously updated to reflect the latest industry trends and library updates, providing skills that are immediately relevant and applicable in the modern tech landscape. The focus is on cultivating deep, practical expertise that empowers participants to solve complex problems and innovate within their organizations.