

Hands-On Introduction to Artificial Intelligence, AI Programming & Machine Learning (TTML5503)

Category: AI | **Vendor:** Trivera Tech

Duration: 24.00 hours (3 days)

19.5 CPD Hours

Rating: ★ 4.6 (5,878 reviews)

Course Information

Delivery Format: Instructor Led - Online

Course Overview

This hands-on, foundational course explores the fast-changing field of artificial intelligence (AI) programming, logic, search, machine learning, and natural language understanding. You will learn current AI / ML methods, tools, and techniques, their application to computational problems, and their contribution to understanding intelligence. You will leave this course with a practical understanding of core skills, methods and algorithms, and be prepared for continued learning in next-level, more advanced follow on courses that dive deeper into specific skillsets or tools.

About This Course

This hands-on, foundational course explores the fast-changing field of artificial intelligence (AI) programming, logic, search, machine learning, and natural language understanding. You will learn current AI / ML methods, tools, and techniques, their application to computational problems, and their contribution to understanding intelligence. You will leave this course with a practical understanding of core skills, methods and algorithms, and be prepared for continued learning in next-level, more advanced follow on courses that dive deeper into specific skillsets or tools.

Who Should Attend

Students attending this class should have a grounding in Enterprise computing. Students attending this course should be familiar with Enterprise IT, have a general (high-level) understanding of systems architecture, as well as some knowledge of the business drivers that might be able to take advantage of applying AI.

Prerequisites & Entry Requirements

General Prerequisites:

Pre-Requisites: Students should have attended or have incoming skills equivalent to those in this course:

- Basic Understanding of Python as well as familiarity with Python Libraries (Pandas and Numpy, etc.). Attendees without Python background may view labs as follow along exercises or team with others to complete them.
- Basic Linux skills, including familiarity with command-line options such as ls, cd, cp, and su
- Basic Math and Problem-Solving Skills
- Understanding of Basic Data Structures

Learning Outcomes

Upon successful completion of this course, participants will be able to:

This “skills-centric” course is about 50% hands-on lab and 50% lecture, with extensive practical exercises designed to reinforce fundamental skills, concepts and best practices taught throughout the course. Throughout the course students will learn about and explore popular machine learning algorithms, their applicability and limitations; practical application of these methods in a machine learning environment; and practical use cases and limitations of algorithms.

Working in a hands-on lab environment led by our expert instructor, attendees will explore:

Getting Started with Python & Jupyter

Statistics and Probability Refresher, and Python Practice

Matplotlib and Advanced Probability Concepts

Algorithm Overview

Predictive Models

Applied Machine Learning

Recommender Systems

Dealing with Data in the Real World

Machine Learning on Big Data (with Apache Spark)

Testing and Experimental Design

GUIs and REST: Build a UI & REST API for your Models

Detailed Course Outline

Getting Started

- Installing a Python Data Science Environment
- Using and understanding IPython (Jupyter) Notebooks
- Python basics - Part 1
- Understanding Python code
- Importing modules
- Python basics - Part 2
- Running Python scripts

Statistics and Probability Refresher, and Python Practice

- Types of data
- Mean, median, and mode
- Using mean, and mode in Python
- Standard deviation and variance
- Probability density function and probability mass function
- Types of data distributions
- Percentiles and moments

Matplotlib and Advanced Probability Concepts

- A crash course in Matplotlib
- Covariance and correlation
- Conditional probability
- Bayes' theore

Algorithm Overview

- Data Prep
- Linear Algorithms
- Non-Linear Algorithms
- Ensembles

Predictive Models

- Linear regression
- Polynomial regression
- Multivariate regression and predicting car prices
- Multi-level models

Applied Machine Learning with Python

- Machine learning and train/test
- Using train/test to prevent overfitting of a polynomial regression
- Bayesian methods - Concepts
- Implementing a spam classifier with Naïve Bayes
- K-Means clustering

Recommender Systems

- What are recommender systems
- Item-based collaborative filtering
- How item-based collaborative filtering works
- Finding movie similarities
- Improving the results of movie similarities
- Making movie recommendations to people
- Improving the recommendation results

More Applied Machine Learning Techniques

- K-nearest neighbors - concepts
- Using KNN to predict a rating for a movie
- Dimensionality reduction and principal component analysis
- A PCA example with the Iris dataset
- Data warehousing overview
- Reinforcement learning

Dealing with Data in the Real World

- Bias/variance trade-off
- K-fold cross-validation to avoid overfitting
- Data cleaning and normalization
- Cleaning web log data
- Normalizing numerical data
- Detecting outliers

Apache Spark - Machine Learning on Big Data

- Installing Spark
- Spark introduction
- Spark and Resilient Distributed Datasets (RDD)
- Introducing MLlib
- Decision Trees in Spark with MLlib
- K-Means Clustering in Spark
- TF-IDF
- Searching Wikipedia with Spark MLlib
- Using the Spark 2.0 DataFrame API for MLlib

Testing and Experimental Design

- A/B testing concepts
- T-test and p-value
- Measuring t-statistics and p-values using Python
- Determining how long to run an experiment for
- A/B test gotchas

GUIs and REST

- Build a UI for your Models
- Build a REST API for your Models

What the Future Holds, 1. What is AI and Machine Learning

- ¢ Is machine learning difficult
- ¢ What is artificial intelligence
- ¢ Difference between AI and machine learning
- ¢ Machine learning examples

2. Types of Machine Learning

- ¢ Three different types of machine learning: supervised, unsupervised, and reinforcement learning
- ¢ Difference between labeled and unlabeled data
- ¢ The difference between regression and classification, and how they are used

3. Linear Regression

- ¢ Fitting a line through a set of data points

- ‡ Coding the linear regression algorithm in Python
- ‡ Using Turi Create to build a linear regression model to predict housing prices in a real dataset
- ‡ What is polynomial regression
- ‡ Fitting a more complex curve to nonlinear data
- ‡ Examples of linear regression

4. Optimizing the Training Process

- ‡ What is underfitting and overfitting
- ‡ Solutions for avoiding overfitting
- ‡ Testing the model complexity graph, and regularization
- ‡ Calculating the complexity of the model
- ‡ Picking the best model in terms of performance and complexity

5. The perceptron Algorithm

- ‡ What is classification
- ‡ Sentiment analysis
- ‡ How to draw a line that separates points of two colors
- ‡ What is a perceptron
- ‡ Coding the perceptron algorithm in Python and Turi Create

6. Logistic Classifiers

- ‡ Hard assignments and Soft assignments
- ‡ The sigmoid function
- ‡ Discrete perceptrons vs. Continuous perceptrons
- ‡ Logistic regression algorithm for classifying data
- ‡ Coding the logistic regression algorithm in Python

7. Measuring Classification Models

- ‡ Types of errors a model can make
- ‡ The confusion matrix
- ‡ what are accuracy, recall, precision, F-score, sensitivity, and specificity
- ‡ what is the ROC curve

8. The Naive Bayes Model

- ‡ What is Bayes theorem
- ‡ Dependent and independent events
- ‡ The prior and posterior probabilities
- ‡ Calculating conditional probabilities
- ‡ using the naive Bayes model
- ‡ Coding the naive Bayes algorithm in Python

9. Decision Trees

- ‡ What is a decision tree
- ‡ Using decision trees for classification and regression
- ‡ Building an app-recommendation system using users' information
- ‡ Accuracy, Gini index, and entropy
- ‡ Using Scikit-Learn to train a decision tree

10. Neural Networks

- ‡ What is a neural network
- ‡ Architecture of a neural network: nodes, layers, depth, and activation functions
- ‡ Training neural networks
- ‡ Potential problems in training neural networks
- ‡ Techniques to improve neural network training
- ‡ Using neural networks as regression models

11. Responsible AI: Navigating the Grey Areas

- ‡ Understanding Ethical Implications in AI
- ‡ Grasp the moral complexities in recommendation systems.
- ‡ Bias and Fairness in Recommenders
- ‡ Dissect potential biases in AI-driven recommendations.

12. Introduction to Generative AI

- ‡ Understanding Generative AI
- ‡ How Generative AI fits into the broader AI and Machine Learning landscape

- ¢ Differences between generative and discriminative models
- ¢ Introduction to Generative Adversarial Networks (GANs)
- ¢ Understanding the concept of latent space in generative models
- ¢ Basic structure and components of GANs: generator and discriminator

13. OPTIONAL: Applications of Generative AI in Business

- ¢ Improving customer experience: Using generative AI for personalized content creation, such as emails, ads, and product descriptions
- ¢ Product development: Using GANs for generating new ideas for products, fashion designs, and more
- ¢ Data augmentation: How generative models can create additional training data for other machine learning models, improving their performance
- ¢ Content creation: Using AI for generating realistic images, music, text, and more
- ¢ Risk management: Using generative AI to simulate different business scenarios and outcomes
- ¢ Healthcare: Generating synthetic medical data for research while preserving patient privacy

Bonus Content / Time Permitting

14. Bonus: Support vector machine and the Kernel methods

- ¢ What a support vector machine
- ¢ Which of the linear classifiers for a dataset has the best boundary
- ¢ Using the kernel method to build nonlinear classifiers
- ¢ Coding support vector machines and the kernel method in Scikit-Learn

15. Bonus: Ensemble learning

- ¢ What ensemble learning is
- ¢ Using bagging to combine classifiers
- ¢ Using boosting to combine classifiers
- ¢ Ensemble methods: random forests, AdaBoost, gradient boosting, and XGBoost

16. Bonus: Real-World Example: Data Engineering and ML

- ¢ Cleaning up and preprocessing data to make it readable by our model
- ¢ Using Scikit-Learn to train and evaluate several models

- ‡ Using grid search to select good hyperparameters for our model
- ‡ Using k-fold cross-validation to be able to use our data for training and validation simultaneously

Additional Course Details

Nexus Humans Hands-On Introduction to Artificial Intelligence, AI Programming & Machine Learning (TTML5503) training program is a workshop that presents an invigorating mix of sessions, lessons, and masterclasses meticulously crafted to propel your learning expedition forward.

This immersive bootcamp-style experience boasts interactive lectures, hands-on labs, and collaborative hackathons, all strategically designed to fortify fundamental concepts.

Guided by seasoned coaches, each session offers priceless insights and practical skills crucial for honing your expertise. Whether you're stepping into the realm of professional skills or a seasoned professional, this comprehensive course ensures you're equipped with the knowledge and prowess necessary for success.

While we feel this is the best course for the Hands-On Introduction to Artificial Intelligence, AI Programming & Machine Learning (TTML5503) course and one of our Top 10 we encourage you to read the course outline to make sure it is the right content for you.

Additionally, private sessions, closed classes or dedicated events are available both live online and at our training centres in Dublin and London, as well as at your offices anywhere in the UK, Ireland or across EMEA.

Frequently Asked Questions

Q: What delivery options are available for Hands-On Introduction to Artificial Intelligence, AI Programming & Machine Learning (TTML5503)?

We offer multiple delivery formats:

- Live Instructor-Led Classroom Online (Virtual/Live Online)
 - Traditional Instructor-Led Classroom Training (ILT)
 - On-site delivery at your offices anywhere in United Kingdom
 - Private dedicated courses customized for your team
-

Q: How many CPD hours does this course provide?

The 3-day Hands-On Introduction to Artificial Intelligence, AI Programming & Machine Learning (TTML5503) course provides up to 19.5 CPD hours of structured learning. CPD certificates can be provided upon request.

Q: What is the duration of the Hands-On Introduction to Artificial Intelligence, AI Programming & Machine Learning (TTML5503) training?

The training takes place over 3 day(s), with each day lasting approximately 24.00 hours including breaks for lunch and refreshments.

Q: Do you provide corporate training for Hands-On Introduction to Artificial Intelligence, AI Programming & Machine Learning (TTML5503)?

Yes, we provide corporate training, dedicated training, and closed classes for Hands-On Introduction to Artificial Intelligence, AI Programming & Machine Learning (TTML5503). Training can take place anywhere in United Kingdom including London, Manchester, Birmingham, Edinburgh, or live online allowing teams from across United Kingdom or internationally to attend.

Q: What related terms do people search for?

Popular related searches include: AI; Machine Learning

Q: Why choose Nexus Human for Hands-On Introduction to Artificial Intelligence, AI Programming & Machine Learning (TTML5503)?

Nexus Human is recognized as one of the leading training providers. Our trainers have won multiple awards including:

- Small Firms Best Trainer Award
- National Training Partner of the Year (Ireland) - Multiple Years
- Global Top 30 Instructor Awards (2012, 2019, 2021)
- Tech Excellence Award Nominations
- Learning Performance Institute (LPI) External Training Provider Sponsor 2024

Q: Are there any discount codes available?

Yes! Use discount code **PENPAL5** when booking your Hands-On Introduction to Artificial Intelligence, AI Programming & Machine Learning (TTML5503) training. Please note that only one discount code can be used per booking and cannot be combined with other special offers.

Nexus Human

Professional Training & Development

 Email: info@nexushuman.com

 Website: www.nexushuman.com

 Phone: +353 1 XXX XXXX (Ireland) | +44 20 XXXX XXXX (UK)