Introduction to AI & Machine Learning JumpStart - TTML5503

Designed to get you quickly up and running with latest skills, tools and tech in essential AI and ML, demystifying the field of artificial intelligence without drowning you in mathematics.

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

Geared for technical professionals, our **Introduction to AI & Machine Learning JumpStart** course is a three-day, hands-on workshop style event designed to get you quickly up and running with latest skills, tools and tech in essential AI and ML, demystifying the field of artificial intelligence without drowning you in mathematics.

What You'll Learn

Overview

Geared for technical professionals, our **Introduction to AI & Machine Learning JumpStart** course is a three-day, hands-on workshop style event designed to get you quickly up and running with latest skills, tools and tech in essential AI and ML, demystifying the field of artificial intelligence without drowning you in mathematics.

The course is rich with hands-on activities, challenge labs, knowledge checks, valuable discussions and focused projects that can be done individually or in groups. Working in a hands-on learning environment, guided by our engaging AI expert, you'll explore AI and Machine Learning essentials, practical examples, tools and best practices. You'll learn how to integrate AI and machine learning principles into real-world projects, enabling you to innovate in areas like product development, customer experience

enhancement, and complex problem-solving. You'll explore the differences and applications of supervised, unsupervised, and reinforcement learning, laying the groundwork for exploration and utilization in diverse contexts. You'll learn how to employ AI and machine learning concepts for making informed, data-driven decisions that can have far-reaching impacts on various aspects of business and technology.

Throughout the course you'll gain expert guided experience using cutting-edge tools and algorithms through hands-on labs, ensuring that you can confidently apply these new skills and concepts in practical scenarios. You'll leave the event well-versed and ready to apply key AI and Machine Learning concepts in your work. Whether you'll be coding algorithms, classifying data, or optimizing machine learning models, you'll have the essentials skills needed to tackle any AI-related project.

Objectives

Working in a hands-on learnng environment led by our expert practitioner you'll explore:

- **Explore AI & Machine Learning Basics**: You'll start your journey by understanding what AI and Machine Learning are, distinguishing between them, and discovering how they're applied in various fields. You'll also get a good look at practical examples of Machine Learning.
- **Decode Types of Machine Learning**: You'll navigate through the different types of machine learning, including supervised, unsupervised, and reinforcement learning, and gain insight into their distinctive applications, and explore their practical application.
- **Master Data Prep:** You'll learn and apply critical methods for cleaning and simplifying data
- **Master Algorithms:** You'll explore popular machine learning algorithms, their applicability and limitations
- **Get Hands-On:** You'll learn how to code linear regression and logistic regression algorithms in Python and gain hands-on experience applying them in real-world scenarios in a machine learning environment working with various machine learning packages and tools.
- **Optimize Machine Learning Models**: You'll dig into the art of model optimization, learning how to prevent underfitting and overfitting to ensure your machine learning models are accurate and reliable.

- **Conquer Classification**: You'll uncover the secrets of the perceptron algorithm and logistic classifiers, learning how to classify data effectively and carry out sentiment analysis like a pro.
- **Responsible AI Development**: You'll gain insight into the ethical considerations and responsible practices in AI, ensuring that solutions are developed with a consciousness of privacy, bias, and societal implications.
- **Introduction to Generative AI & Prompt Engineering Basics**: Get a quick look at Generative AI and prompt engineering, understanding their significance, recent advancements, potential applications, and best practices for effective interaction and overcoming common challenges.

Audience

This introductory-level hands-on course is suited for a wide variety of technical learners who need an introduction to the core skills, concepts, tech, tools and skills related to AI programming and machine learning.

Suitable attendees might include:

- Developers aspiring to be a 'Data Scientist' or Machine Learning engineers
- Analytics Managers who are leading a team of analysts
- Business Analysts who want to understand data science techniques
- Information Architects who want to gain expertise in Machine Learning algorithms
- Analytics professionals who want to work in machine learning or artificial intelligence
- Graduates looking to build a career in Data Science and machine learning

Pre-Requisites

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

- Hands-on experience with Python as well as familiarity with Python Libraries (Pandas and Numpy, etc.).
- Basic Linux skills, including familiarity with command-line options such as ls, cd, cp, and su
- Basic Math and Problem-Solving Skills as well as understanding of Basic Data Structures

Take Before: Attending students should have incoming skills equivalent to those in the course(s) below, or should have attended these as a pre-requisite:

TTML5510	Machine Learning Essentials Boot Camp / Part 1: Preparing Your Data
TTPS4873	Fast Track to Python for Data Science and/or Machine Learning
TTPS4874	Applied Python for Data Science and Engineering

Agenda

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

What is AI and Machine Learning

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

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

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

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

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

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

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

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

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

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

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.

Introduction to Generative AI

- What is Generative AI
- Why is Generative AI important?
- Examples of how Generative AI works in the industry
- What does Generative AI do?
- Recent advancements in Generative AI
- Potential applications and limitations

Prompt Engineering Basics

- Quick start to prompt engineering
- How to interact with AI models
- Practical examples and exercises
- Best practices for crafting effective prompts
- Common challenges and how to address them

Bonus Content / Time Permitting

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

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

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

Follow On Courses

TTAI2300	Quick Start to Prompt Engineering for Software Developers
TTAI2305	Turbocharge Your Code! Generative AI Boot Camp for Developers
TTAI2335	Azure OpenAI Boot Camp for Developer
TTAI2360	Applied AI: Building Recommendation Systems with Python
TTAI2361	Applied AI : Quick Start to Building AI-Driven, Intelligent Web Applications
TTAI2820	Mastering AI Security Boot Camp
TTAI3012	Deep Learning Essentials Boot Camp
TTAI3020	Deep Learning with Vision Systems
TTAI3030	NLP Boot Camp / Hands-on Natural Language Processing
TTAI2363	Building Intelligent Web Applications with Azure OpenAI
TTDS6685	Working with Elasticsearch 7.0

Related Courses

TTML5506-S	Machine Learning Essentials for Scala Developers
TTML5517	MLOps Boot Camp | ML in Action: Deploy, Monitor, and Master
TTML5503	Introduction to AI & Machine Learning JumpStart
TTML5502	Exploring AI & Machine Learning for the Enterprise Overview (Light Hands-on)
TTML5504	Machine Learning Foundation: Working with Statistics, Algorithms and Neural Networks
TTML5506-P	Machine Learning Essentials with Python
TTML5510	Machine Learning Essentials Boot Camp / Part 1: Preparing Your Data
TTML5511	Machine Learning Boot Camp / Deep Dive Skills Workshop

All applicable course software, digital courseware files or course notes, labs, data sets and solutions, live coaching support channels, CodeCoach.AI anytime tutor access, and rich extended learning and post training resources are provided for you in our "easy access, single source, no install required" online **Learning Experience Platform (LXP),** remote lab and content environment. Access periods vary by course. We'll collaborate with you to ensure your team is set up and ready to go well in advance of the class. Please inquire about set up details and options for your specific course of interest.

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.