

Machine Learning Essentials for Scala Developers - TTML5506-S

Explore Machine Learning Foundation, Unsupervised vs Supervised Learning, Generative AI in Scala, Neural Networks, Deep Learning & More

Duration: 3 Days

Skill Level: Intermediate

Available Format: Instructor-Led Online; Instructor-Led, Onsite In Person ; Blended; On Public Schedule

Discover the power of machine learning with Scala, a versatile and high-performance programming language perfect for handling large-scale data processing and analysis. Put your Scala skills to work learning how to build intelligent applications and solve complex problems across various domains—without the need for deep mathematical expertise.

What You'll Learn

Overview

Discover the power of machine learning with Scala, a versatile and high-performance programming language perfect for handling large-scale data processing and analysis. Put your Scala skills to work learning how to build intelligent applications and solve complex problems across various domains - without the need for deep mathematical expertise.

Machine Learning Essentials for Scala Developers is a three-day course designed to provide a solid introduction to the world of machine learning using the Scala language. Throughout the hands-on course, you'll explore a range of machine learning algorithms and techniques, from supervised and unsupervised learning to neural networks and deep learning, all specifically crafted for Scala developers.

Our expert trainer will guide you through real-world, focused hands-on labs designed to help you apply the knowledge you gain in real-world scenarios, giving you the confidence to tackle machine learning challenges in your own projects.

You'll dive into innovative tools and libraries such as Breeze, Saddle, DeepLearning.scala, GPT-Scala (and Generative AI with Scala), and TensorFlow-Scala. These cutting-edge resources will enable you to build and deploy machine learning models for a wide range of projects, including data analysis, natural language processing, image recognition and more.

Upon completing this course, you'll have the skills required to tackle complex projects and confidently develop intelligent applications. You'll be able to drive business outcomes, optimize processes, and contribute to innovative projects that leverage the power of data-driven insights and predictions.

Objectives

Working in a hands-on learning environment led by our expert instructor you'll:

- Grasp the fundamentals of machine learning and its various categories, empowering you to make informed decisions about which techniques to apply in different situations.
- Master the use of Scala-specific tools and libraries, such as Breeze, Saddle, and DeepLearning.scala, allowing you to efficiently process, analyze, and visualize data for machine learning projects.
- Develop a strong understanding of supervised and unsupervised learning algorithms, enabling you to confidently choose the right approach for your data and effectively build predictive models.
- Gain hands-on experience with neural networks and deep learning, equipping you with the know-how to create advanced applications in areas like natural language processing and image recognition.
- Explore the world of generative AI and learn how to utilize GPT-Scala for creative text generation tasks, broadening your skill set and making you a more versatile developer.
- Conquer the realm of scalable machine learning with Scala, learning the secrets to tackling large-scale data processing and analysis challenges with ease.

- Sharpen your skills in model evaluation, validation, and optimization, ensuring that your machine learning models perform reliably and effectively in any situation.

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 geared for **experienced Scala developers** who are new to the world of machine learning and are eager to expand their skillset. Professionals such as data engineers, data scientists, and software engineers who want to harness the power of machine learning in their Scala-based projects will greatly benefit from attending. Additionally, team leads and technical managers who oversee Scala development projects and want to integrate machine learning capabilities into their workflows can gain valuable insights from this course.

Pre-Requisites

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

- **TTSCCL2104** Fast Track to Scala for OO / Java Developers (4 days)

TTSCCL2104 Fast Track to Scala Programming for OO / Java Developers

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.

Introduction to Machine Learning and Scala

- Learning Outcome: Understand the fundamentals of machine learning and Scala's role in this domain.
- What is Machine Learning?
- Machine Learning with Scala: Advantages and Use Cases
- Lab: Setting up your environment (OPTIONAL)

Supervised Learning in Scala

- Learn the basics of supervised learning and how to apply it using Scala.
- Supervised Learning: Regression and Classification
- Linear Regression in Scala
- Logistic Regression in Scala
- Lab: Linear Regression Model

Unsupervised Learning in Scala

- Understand unsupervised learning and how to apply it using Scala.
- Unsupervised Learning: Clustering and Dimensionality Reduction
- K-means Clustering in Scala
- Principal Component Analysis in Scala
- Lab: K-means Clustering: Apply K-means clustering to a dataset in Scala using Breeze.

Neural Networks and Deep Learning in Scala

- Learning Outcome: Learn the basics of neural networks and deep learning with a focus on implementing them in Scala.
- Introduction to Neural Networks
- Feedforward Neural Networks in Scala
- Deep Learning and Convolutional Neural Networks
- Lab: Feedforward Neural Network: Build a simple feedforward neural network in Scala using DeepLearning.scala.

Introduction to Generative AI and GPT in Scala

- Gain a basic understanding of generative AI and GPT, and how to utilize GPT-Scala for natural language tasks.
- Generative AI: Overview and Use Cases
- Introduction to GPT (Generative Pre-trained Transformer)
- GPT-Scala: A Library for GPT in Scala
- Lab: Text Generation with GPT-Scala

Reinforcement Learning in Scala

- Understand the basics of reinforcement learning and its implementation in Scala.
- Introduction to Reinforcement Learning
- Q-learning and Value Iteration
- Reinforcement Learning with Scala
- Lab: Q-learning in Scala: Implement a simple Q-learning algorithm in Scala to solve a gridworld problem.

Time Series Analysis using Scala

- Learn time series analysis techniques and how to apply them in Scala.
- Introduction to Time Series Analysis
- Autoregressive Integrated Moving Average (ARIMA) Models
- Time Series Analysis in Scala
- Lab: Time Series Forecasting: Perform time series forecasting using Scala with an ARIMA model.

Natural Language Processing (NLP) with Scala

- Gain an understanding of natural language processing techniques and their application in Scala.
- Introduction to NLP: Techniques and Applications
- Text Processing and Feature Extraction
- NLP Libraries and Tools for Scala
- Lab: Text Classification in Scala: Description: Implement a text classification model in Scala using Breeze and Saddle.

Image Processing and Computer Vision with Scala

- Learn image processing techniques and computer vision concepts with a focus on implementing them in Scala.
- Introduction to Image Processing and Computer Vision
- Feature Extraction and Image Classification
- Image Processing Libraries for Scala
- Lab: Image Classification in Scala.

Model Evaluation and Validation

- Understand the importance of model evaluation and validation, and how to apply these concepts using Scala.
- Model Evaluation Metrics
- Cross-Validation Techniques
- Model Selection and Tuning in Scala
- Lab: Model Evaluation in Scala

Scalable Machine Learning with Scala

- Learn how to handle large-scale machine learning problems using Scala.
- Challenges of Large-Scale Machine Learning
- Data Partitioning and Parallelization
- Distributed Machine Learning with Scala
- Lab: Parallelized Machine Learning: Implement a parallelized version of a machine learning algorithm in Scala.

Machine Learning Deployment and Production

- Understand the process of deploying machine learning models into production using Scala.
- Deployment Challenges and Best Practices
- Model Serialization and Deserialization
- Monitoring and Updating Models in Production
- Lab: Model Deployment with Scala

Addendum: Next Steps in Machine Learning with Scala

Bonus Chapters / Time Permitting

Ensemble Learning Techniques in Scala

- Discover ensemble learning techniques and their implementation in Scala.
- Introduction to Ensemble Learning
- Bagging and Boosting Techniques
- Implementing Ensemble Models in Scala
- Lab: Implementing a Random Forest model

Feature Engineering for Machine Learning in Scala

- Learn advanced feature engineering techniques to improve machine learning model performance in Scala.
- Importance of Feature Engineering in Machine Learning
- Feature Scaling and Normalization Techniques
- Handling Missing Data and Categorical Features
- Lab: Feature Selection and Transformation

Advanced Optimization Techniques for Machine Learning

- Understand advanced optimization techniques for machine learning models and their application in Scala.
- Gradient Descent and Variants
- Regularization Techniques (L1 and L2)
- Hyperparameter Tuning Strategies
- Lab: Hyperparameter Tuning with Grid Search (

Related Courses

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| TTML5506-S | Machine Learning Essentials for Scala Developers |
| TTML5503 | Introduction to AI & Machine Learning JumpStart |
| TTSC2104 | Fast Track to Scala Programming for OO / Java Developers |

All applicable course software, digital courseware files or course notes, labs, data sets and solutions, live coaching support channels and rich extended learning and post training resources are provided for you in our “easy access, no install required” high-speed **SkillJourneys™ Learning Experience Platform (LXP)**, remote lab and content environment. Course materials, software, resources and post-training platform access periods vary by course.

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.