

**Introduction to Data Science and Machine Learning with Amazon SageMaker**

**Course Number:** DATA-140
**Duration:** 2 days

**Overview**

Accelebrate's Introduction to Data Science and Machine Learning (ML) with Amazon SageMaker training course teaches attendees data science, ML, and artificial intelligence (AI) fundamentals. Participants learn how to use Amazon SageMaker to quickly build, train, and deploy ML models.

**Prerequisites**

* Familiarity with the Python programming language
* Basic understanding of machine learning

**Materials**

All Amazon SageMaker training students receive comprehensive courseware.

**Software Needed on Each Student PC**

A modern web browser and an Internet connection free of restrictive firewalls, so that the student can connect by SSH or Remote Desktop (RDP) into AWS virtual machines.

**Objectives**

* Understand the basics of data science, ML, and AI
* Apply data science techniques to solve real-world problems
* Develop machine learning algorithms
* Build and deploy AI applications
* Use Amazon SageMaker to build, train, and deploy machine learning models at scale

**Outline**

* Introduction to Data Science, Machine Learning, and AI
	+ What is Data Science?
	+ Data Science Ecosystem
	+ What is Machine Learning?
	+ What is AI?
	+ Features and Observations
	+ Representing Observations
	+ Labels
	+ Continuous and Categorical Features
	+ Continuous Features
	+ Categorical Features
	+ Common Distance Metrics
	+ The Euclidean Distance
	+ What is a Model?
	+ Model Evaluation
	+ Bias-Variance (Underfitting vs Overfitting) Trade-off
	+ The Modeling Error Factors
	+ One Way to Visualize Bias and Variance
	+ Underfitting vs. Overfitting Visualization
	+ Balancing Off the Bias-Variance Ratio
	+ Types of Machine Learning
	+ Supervised vs. Unsupervised Machine Learning
	+ Unsupervised Learning (UL) Type: Clustering
	+ Clustering Examples
	+ k-Means Clustering (UL)
	+ k-Means Clustering in a Nutshell
	+ XGBoost (Supervised Learning)
	+ Gradient Boosting
	+ Which Algorithm to Choose?
	+ The Typical ML Workflow
	+ A Better Algorithm or More Data?
	+ Artificial Neural Networks
	+ The Basic 3-Layer Neural Network
	+ Neural Network Terminology
	+ Model Learning Process in Neural Networks
	+ The Forward Pass
	+ The Backpropagation Pass
	+ When the Learning Process Stops
	+ Deep Learning vs. Traditional ML
* Amazon SageMaker
	+ What is SageMaker
	+ ML with SageMaker
	+ The ML Phases Diagram
	+ Supported Systems and Frameworks
	+ ML Algorithms Supported by SageMaker
	+ SageMaker in the AWS Management Console
	+ Ground Truth
	+ Notebooks
	+ Training
	+ Training Options
	+ The Model Training Flow Diagram
	+ Inference
	+ Deployment of Models to the SageMaker Hosting Service
	+ The SagaMaker Hosting Service Architecture
	+ Improving Your ML Models
	+ The AWS Marketplace of ML Algorithms
	+ EC2 P3 Instances
	+ SageMaker Pricing
* Conclusion