Academy-CUR-TF-200-ACMLFO-1-PROD (EN)

Module 01 Student Guide

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200-ACMLFO-10-EN-SG

Contents

     3
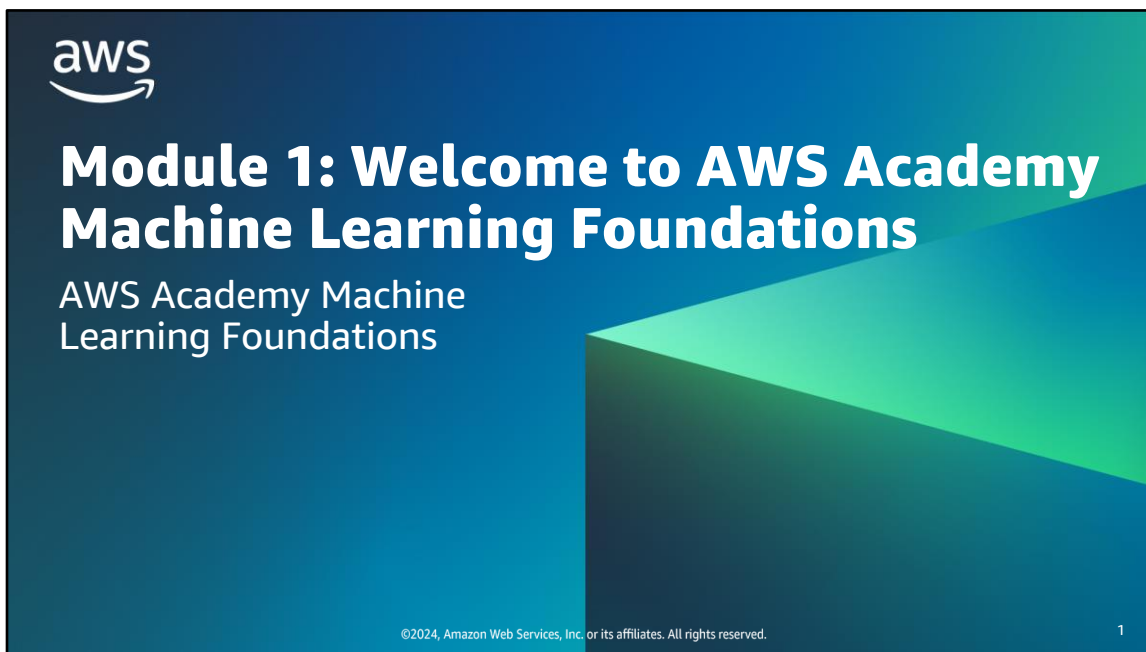
Welcome to Module 1: Welcome to AWS Academy Machine Learning.

Module objectives

At the end of this module, you should be able to:

- Identify course prerequisites and objectives
- Describe the various roles that require machine learning knowledge
- Identify resources for further learning

2

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5

Section 1: Course prerequisites and objectives

Module 1: Welcome to AWS Academy Machine Learning Foundations

3

Introducing Section 1: Course prerequisites and objectives.

Prerequisites

General required knowledge	Preferred knowledge
• IT technical knowledge • Completion of AWS Academy Cloud Foundations • Intermediate skills with Python programming • General knowledge of applied statistics	• Familiarity with cloud computing concepts • Working knowledge of distributed systems • Familiarity with general networking concepts • Working knowledge of multi-tier architectures

It is helpful to understand the prerequisites of this course.

1. It's preferable for attendees to have some general **IT knowledge**. The foundational computer literacy skills that you need to be successful include basic computer concepts, email, file management, and a good understanding of the internet. You also should have completed the AWS Academy Cloud Foundations course, intermediate skills with Python programming, and general knowledge of applied statistics.
2. **General business knowledge** is important, including insight into how information technology is used in business. Communication skills, leadership abilities, and a customer service orientation are also important skill sets.

To achieve success in this course, you also should have:

- A general familiarity with **cloud computing** concepts
- A working knowledge of **distributed systems**
- Familiarity with **general networking** concepts
- A working knowledge of **multi-tier architectures**

Course objectives

- Describe machine learning (ML)
- Implement a machine learning pipeline using Amazon SageMaker
- Use managed Amazon ML services for forecasting
- Use managed Amazon ML services for computer vision
- Use managed Amazon ML services for natural language processing (NLP)
- Identify how Amazon ML services for generative artificial intelligence (generative AI) are used

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Course outline

Module 1: Welcome to AWS Academy Machine Learning

Module 2: Introducing Machine Learning

Module 3: Implementing a Machine Learning Pipeline with Amazon SageMaker

Module 4: Introducing Forecasting

Module 5: Introducing Computer Vision

Module 6: Introducing Natural Language Processing

Module 7: Introducing Generative AI

Module 8: Course Summary

6

To achieve the course objectives, you will complete the following modules:
- Module 2 introduces machine learning.
- Module 3 describes how to implement a machine learning pipeline with Amazon SageMaker.
- Modules 4, 5, and 6 describe how to apply AWS Managed Services for problems in forecasting, computer vision, and natural language processing.
- Module 7 introduces generative AI, its benefits, use cases, and AWS services that make development of an ML application possible.
- Module 8 is a summary of the course, along with an overview of steps that you can take toward attaining certification in machine learning.

The next slides provide more detail on the subtopics that are covered in each module.

Module 2: Introducing Machine Learning

Module sections:

1. What is machine learning?

2. Business problems that are solved with machine learning

3. Machine learning process

4. Machine learning tools overview

5. Machine learning challenges

The purpose of this module is to introduce you to major concepts for understanding machine learning.

- Section 1 describes the overall field of machine learning and how machine learning relates to artificial intelligence and deep learning.
- Section 2 summarizes some of the most common business problems that you can solve with machine learning.
- Section 3 describes the general workflow for solving machine learning problems and defines some of the more common terms that are used in machine learning.
- Section 4 reviews some of the tools that machine learning professionals commonly use.
- Section 5 provides an overview of some of the common challenges that you will face when you work with machine learning problems.

Module 3: Implementing a Machine Learning Pipeline with Amazon SageMaker

Module sections:

1. Scenario introduction
2. Collecting and securing data
3. Evaluating your data
4. Feature engineering
5. Training
6. Hosting and using the model
7. Evaluating the accuracy of the model
8. Hyperparameter and model tuning

8

Module 3 provides an introduction to Amazon SageMaker and how you can use it to implement a machine learning pipeline. The module focuses on the application of machine learning to computer vision as an example of the machine learning pipeline.

- Section 1 introduces you to the general field of computer vision.
- Sections 2 through 8 describe the phases of the machine learning pipeline by using computer vision as an example application.
    - In Section 2, you learn how to collect and secure data.
    - Section 3 describes different techniques for evaluating data.
    - In Section 4, you learn about the process of feature engineering.
    - Section 5 describes the steps to take in Amazon SageMaker to train a model.
    - Section 6 provides an overview of the options for hosting and using a model with Amazon SageMaker.
    - Finally, Sections 7 and 8 cover how to evaluate and tune your model with Amazon SageMaker.

Module 4: Introducing Forecasting

Module sections:

1. Forecasting overview

2. Processing time series data

3. Using Amazon Forecast

9

This module provides an introduction to the use of machine learning to create forecasts that are based on time series data.

- Section 1 describes forecasting in general and summarizes some common applications of forecasting.
- Section 2 outlines some of the pitfalls of the use of time series data to make forecasts.
- Section 3 provides an overview of how to use the Amazon Forecast service.

Module 5: Introducing Computer Vision

Module sections:

1. Introducing computer vision

2. Analyzing image and video

3. Preparing custom datasets for computer vision

The purpose of this module is to describe how to use machine learning for computer vision.

- Section 1 describes the general problems that must be solved for computer vision.
- Section 2 outlines the process for analyzing images and videos.
- Finally, Section 3 provides the steps to take to prepare datasets for computer vision.

Module 6: Introducing Natural Language Processing

Module sections:

1. Overview of natural language processing (NLP)

2. Natural language processing managed services

This module provides an introduction to natural language processing with machine learning.

- Section 1 describes the general set of problems that you can solve with natural language processing.
- Section 2 reviews some of the managed AWS services that you can use to address natural language processing problems. The services reviewed include Amazon Transcribe, Amazon Translate, Amazon Lex, Amazon Comprehend, and Amazon Polly.
- Section 3 describes the guided lab in which you will create a bot to schedule appointments.

Module 7: Introducing Generative AI

Module sections:

1. What is generative AI?

2. How does generative AI work?

3. AWS generative AI offerings

4. Amazon Q Developer

12

This module introduces generative AI and AWS generative AI services.
- Section 1 describes what generative AI is, use cases, and benefits.
- Section 2 introduces foundation models (FMs) and compares them to traditional machine learning models. It also includes an overview of large language models (LLMs) and prompt engineering.
- Section 3 describes AWS generative AI offerings.
- Section 4 introduces Amazon Q Developer, its benefits, and the different tiers of services available to users.

Module 8: Course Summary

Module sections:

1. Course summary
2. Amazon documentation
3. Certification requirements

13

In Module 8, you review what you have learned, and you learn about the process of obtaining a certification with Amazon Machine Learning.

- Section 1 provides an overview of what you have covered in the course.
- In Section 2, you learn more about Amazon documentation and review two common frameworks for applying AWS services.
- Section 3 describes the steps that you should take to continue to work toward an AWS Certified Machine Learning – Specialty certification.

Section 2: Machine learning job roles

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14

Introducing Section 2: Machine learning job roles.

In this section, you get an overview of some of the more common job roles for machine learning professionals.

Data scientist role

- Applying knowledge of statistics and analytical skills to interpret data

- Data scientists often have degrees in statistics, computer science, or economics

- Some programming skills are required

If you decide to work toward a data scientist role, you should focus on developing analytical, statistical, and programming skills. As a data scientist, you use those skills to collect, analyze, and interpret large datasets. Some universities now offer degrees in data science, but often data scientists have degrees in statistics, math, computer science, or economics. As a data scientist, you need technical competencies in statistics, machine learning, programming languages, and data analytics.

Machine learning engineer

- Emphasis on programming and system design skills
- Often have background as a developer or software architect
- Some knowledge of statistics required

16

If you decide to work toward a career as a machine learning engineer, you need some skills that are similar to a data scientist's skills. However, your focus is more on programming skills and software architecture. As a machine learning engineer, you can apply those skills to design and develop machine learning systems. Machine learning engineers often have previous experience with software development. Although these roles also require technical competencies in statistics and machine learning, they rely more on programming and software engineering than other machine learning roles.

Applied science researcher

- Applies machine learning technology to a specific domain

- Requires knowledge of both the domain and machine learning

You might also decide to work toward a career in science where you can apply machine learning technology. Machine learning has an impact on everything from astronomy to zoology, so many different paths are open to you. As an applied science researcher, your primary focus is on the type of science that you decide to concentrate on. You need some of the skills of a data scientist, but you must also know how to apply those skills to your chosen domain. These roles also require technical competencies in statistics and machine learning.
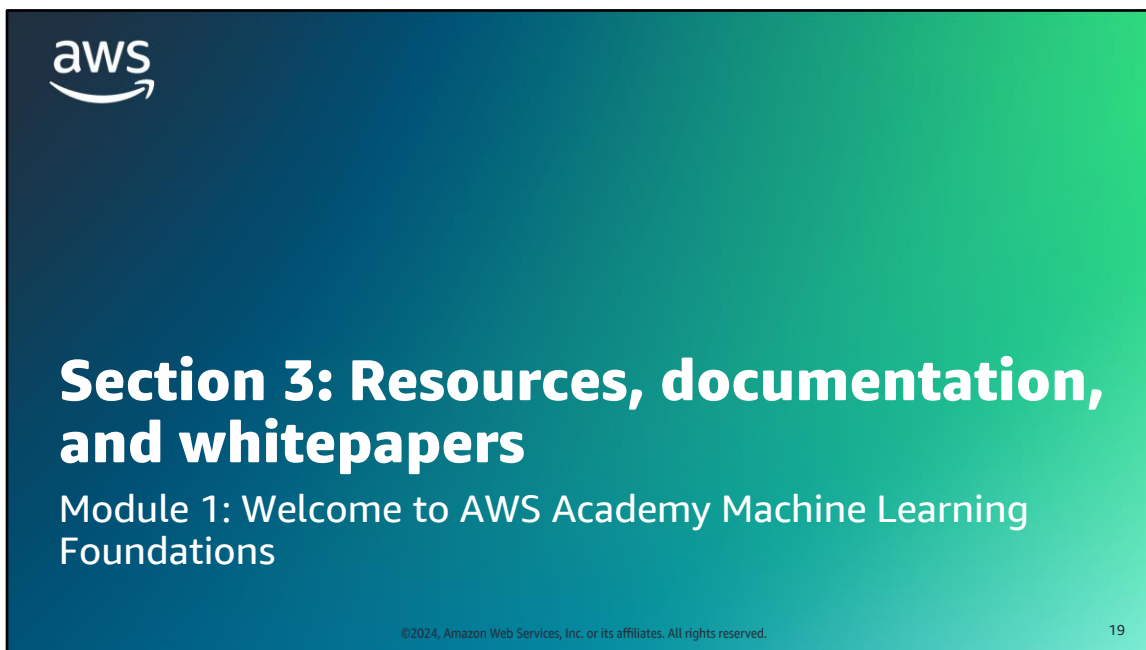
Machine learning developer role

- Integrating machine learning with software applications

- Requires strong application development skills and machine learning knowledge

Many software developers are now integrating machine learning into their applications. If you are working toward a career as a software developer, you should include machine learning technology in your course of study. As a machine learning developer, your primary focus is on software development skills, but you also need some of the skills of a data scientist. Therefore, you should include coursework in statistics and applied mathematics.

Section 3: Resources, documentation, and whitepapers

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19

Introducing Section 3: Resources, documentation, and whitepapers. This section provides some useful links to extra resources you can use in this course.

Resources and documentation

- Machine Learning on AWS
- AWS Machine Learning Blog
- Machine Learning Solutions in AWS Marketplace
- Amazon Machine Learning Service Documentation
- Machine Learning in the AWS Partner Network
- Getting Started – Amazon Q Developer

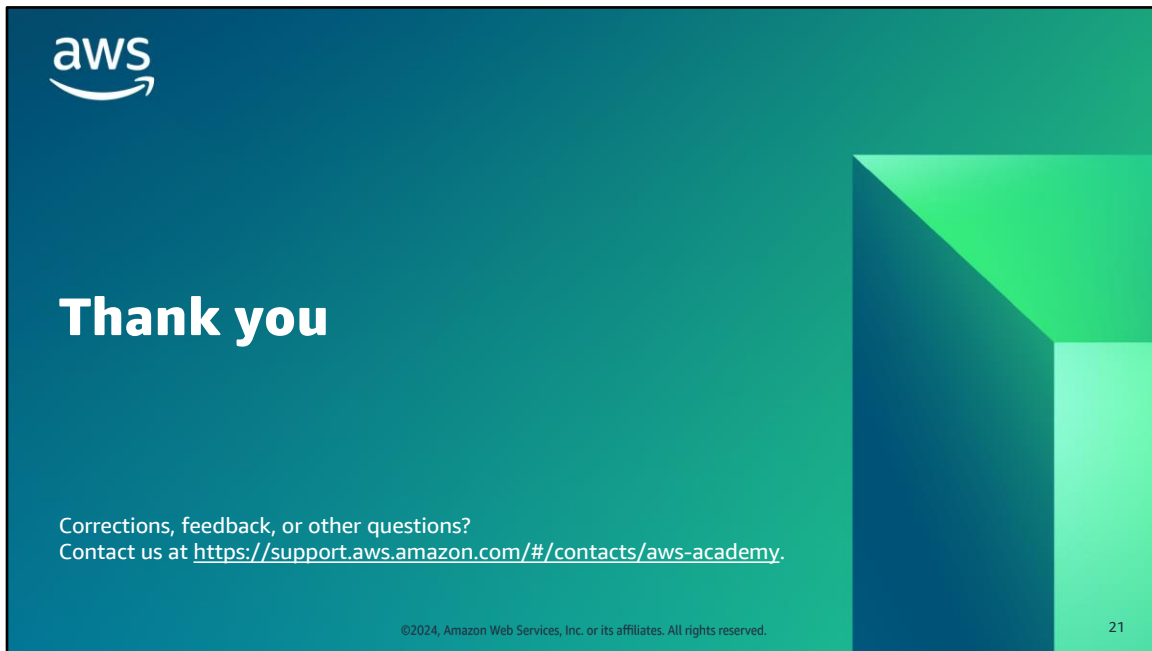For information about Machine Learning, see:
- "Machine Learning on AWS" at https://aws.amazon.com/machine-learning/?nc2=h_ql_sol_use_ml
- "AWS Machine Learning Blog" at https://aws.amazon.com/blogs/machine-learning/classify-a-large-number-of-images-with-amazon-rekognition-and-aws-batch/
- "Machine Learning Solutions" in AWS Marketplace at https://aws.amazon.com/marketplace/solutions/machine-learning
- "Amazon Machine Learning Service Documentation" at https://docs.aws.amazon.com/machine-learning/?id=docs_gateway
- "Machine Learning in the AWS Partner Network" at https://aws.amazon.com/partners/featured/machine-learning/foundations/
- "Getting Started – Amazon Q Developer" at https://aws.amazon.com/q/developer/

Thank you

Corrections, feedback, or other questions?
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21

Thank you for completing this module.