Developing Generative AI Applications on AWS

Course Number: AWS-GENAI-APP

Duration: 2 days

Course Description

This course is designed to introduce generative artificial intelligence (AI) to software developers interested in using large language models (LLMs) without fine-tuning. The course provides an overview of generative AI, planning a generative AI project, getting started with Amazon Bedrock, the foundations of prompt engineering, and the architecture patterns to build generative AI applications using Amazon Bedrock and LangChain.

Skills Gained

In this course, you will learn to do the following:

- Describe generative AI and how it aligns to machine learning
- Define the importance of generative AI and explain its potential risks and benefits
- Identify business value from generative AI use cases
- Discuss the technical foundations and key terminology for generative AI
- Explain the steps for planning a generative AI project
- Identify some of the risks and mitigations when using generative AI
- Understand how Amazon Bedrock works
- Familiarize yourself with basic concepts of Amazon Bedrock
- Recognize the benefits of Amazon Bedrock
- List typical use cases for Amazon Bedrock

- Describe the typical architecture associated with an Amazon Bedrock solution
- Understand the cost structure of Amazon Bedrock
- Implement a demonstration of Amazon Bedrock in the AWS Management Console
- Define prompt engineering and apply general best practices when interacting with foundation models (FMs)
- Identify the basic types of prompt techniques, including zero-shot and few-shot learning
- Apply advanced prompt techniques when necessary for your use case
- Identify which prompt techniques are best suited for specific models
- Identify potential prompt misuses
- Analyze potential bias in FM responses and design prompts that mitigate that bias
- Identify the components of a generative AI application and how to customize an FM
- Describe Amazon Bedrock foundation models, inference parameters, and key Amazon Bedrock APIs
- Identify Amazon Web Services (AWS) offerings that help with monitoring, securing, and governing your Amazon Bedrock applications
- Describe how to integrate LangChain with LLMs, prompt templates, chains, chat models, text embeddings models, document loaders, retrievers, and Agents for Amazon Bedrock
- Describe architecture patterns that you can implement with Amazon Bedrock for building generative AI applications
- Apply the concepts to build and test sample use cases that use the various Amazon Bedrock models, LangChain, and the Retrieval Augmented Generation (RAG) approach

Who Can Benefit

This course is intended for software developers.

- Software developers interested in using LLMs without fine
- tuning

Prerequisites

Recommended previous knowledge

- Completed _AWS Technical Essentials
- Intermediate-level proficiency in Python

Course Details

Exploring Components of Generative AI Applications on AWS

- Understanding generative AI concepts
- Identifying AWS generative AI stack components
- Designing generative AI application components

Programming with Amazon Bedrock

- Guiding model response generation
- Using Amazon Bedrock programmatically
- Hands-on lab: Develop with Amazon Bedrock APIs
- Hands-on lab: Develop Streaming Patterns with Amazon Bedrock APIs

Applying Prompt Engineering for Developers

- Introducing prompt engineering
- Introducing prompt techniques
- Optimizing prompts for better results

Using Amazon Bedrock APIs in Common Architectures

- Implementing architecture patterns with Amazon Bedrock APIs
- Exploring common use cases
- Adding conversational memory to extend context
- Hands-on lab: Develop Conversation Patterns with Amazon Bedrock APIs

Customizing Generative AI Responses with RAG

- Implementing Retrieval Augmented Generation (RAG)
- Using Amazon Bedrock Knowledge Bases
- Hands-on lab: Develop Retrieval Augmented Generation (RAG) Applications with Amazon Bedrock Knowledge Bases

Integrating Open Source Frameworks with Amazon Bedrock

- Invoking a foundation model in Amazon Bedrock using LangChain
- Using LangChain for context-aware responses
- Hands-on lab: Develop a Generative AI Application Pattern using Open Source Frameworks and Amazon Bedrock Knowledge Bases

Evaluating Generative AI Application Components

- Evaluating application components
- Evaluating model output
- Evaluating RAG output
- Optimizing latency and cost

- Hands-on lab: Evaluating Retrieval Augmented Generation (RAG) Applications

Implementing Responsible AI

- Understanding responsible AI
- Mitigating bias and addressing prompt misuses
- Using Amazon Bedrock Guardrails
- Hands-on lab: Securing Generative AI Applications Using Bedrock Guardrails

Using Tools and Agents in Generative AI Applications

- Using tools
- Understanding AI agents
- Understanding open source agentic frameworks
- Understanding agent interoperability

Developing Amazon Bedrock Agents

- Implementing Amazon Bedrock Flows
- Designing Amazon Bedrock Agents
- Developing Amazon Bedrock Inline Agents
- Designing multi-agent collaboration
- Using Amazon Bedrock AgentCore
- Hands-on lab: Developing Amazon Bedrock Agents Integrated with Amazon Bedrock Knowledge Bases and Guardrails

Related Certifications

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