Introduction to Generative AI

Generative AI

Module 1 – Lesson 1

“Generative models are a key enabler of machine creativity, allowing machines to go beyond what they’ve seen before and create something new”

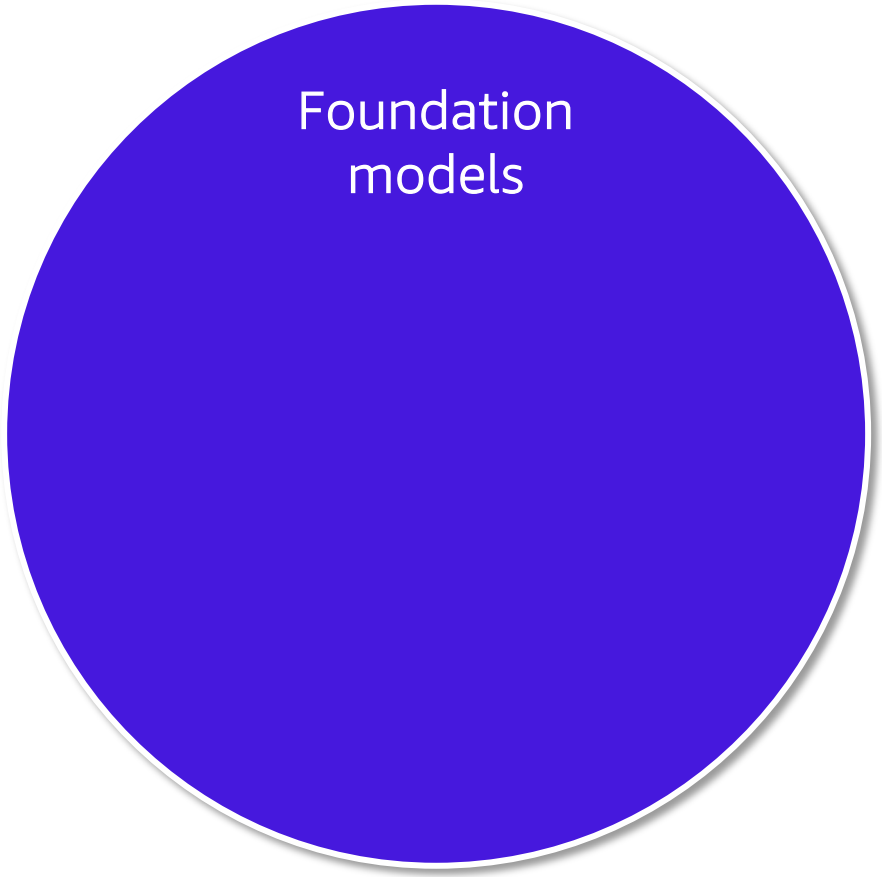
- **Ian Goodfellow**, Computer Scientist

Today’s activities

- Foundation models and LLMs
- Use cases of LLMs
- Amazon Bedrock

Introduction to generative AI

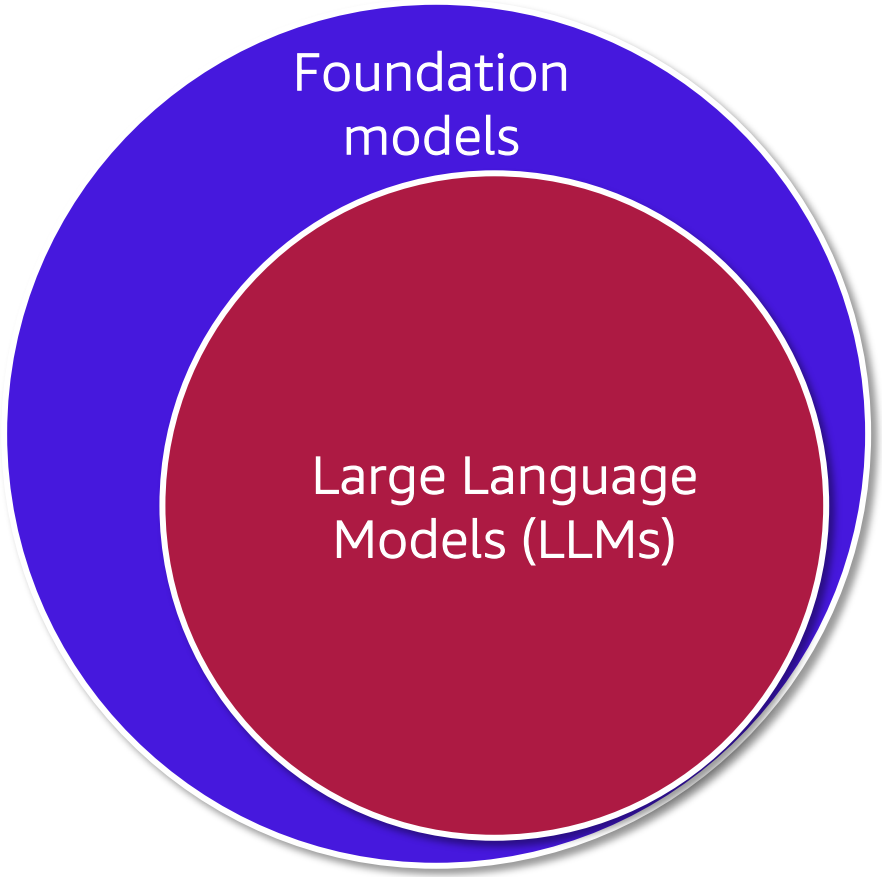
Foundation models



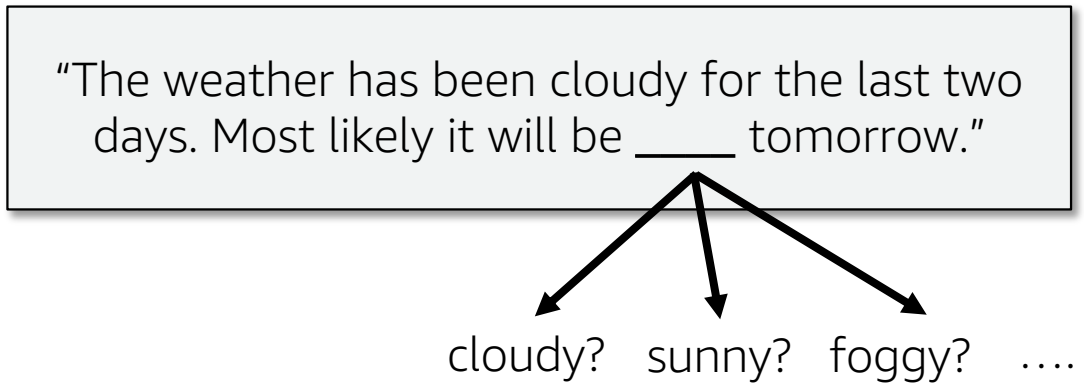
- Large ML models that are **pre-trained** with **vast amounts of data**. These can be **adapted** to more specialized tasks.

- Can be trained on any kind of data
  - Text
  - Images
  - Video
  - Audio
  - Etc…

Large Language Models (LLMs)

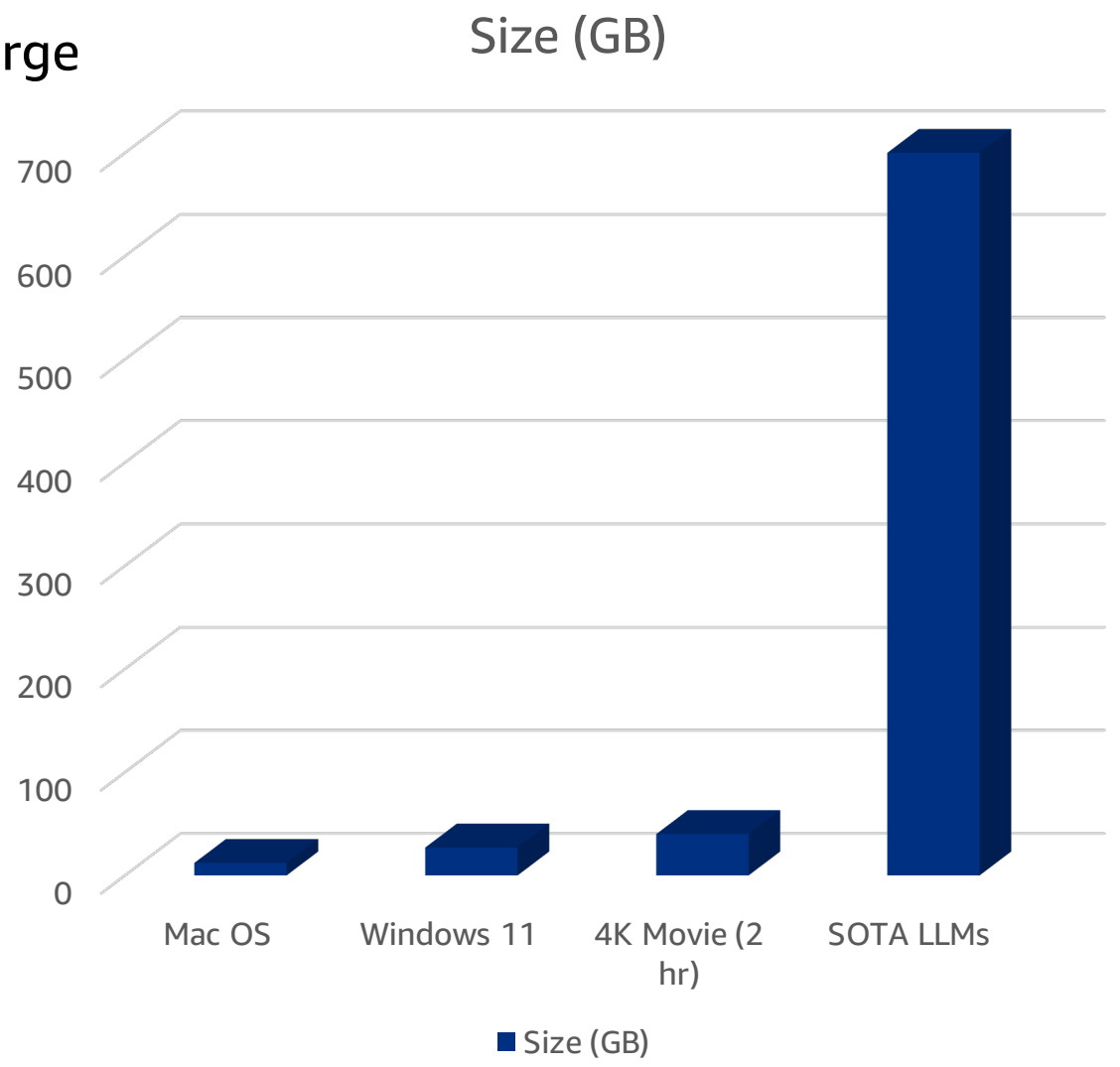


- Foundation models trained on **text.**
- Large ML models that learn the **probabilities of words** being used in certain contexts.
- **Training task:** Learn to predict the missing word in a text sequence.



How big are foundation models?

- Size of state-of-the-art (SOTA) models are as large as:
  - 474,000,000 page document
  - 35 hours of 4K content
  - Codebase with 80,000,000,000 lines of code
- Requires a lot of resources
  - Can cost more than $100 million
  - Hundreds of people involved

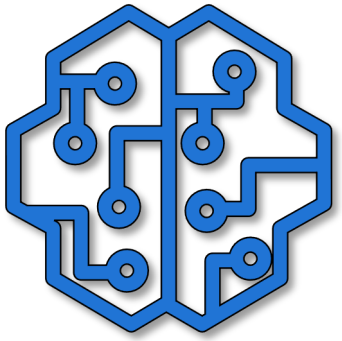


Use cases of LLMs

Revolutionizing various domains

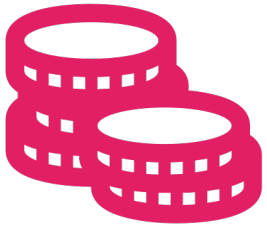
Healthcare

Education



FMs

Customer Service



Finance

Law

Marketing

Conversational chatbots

- Interactive chat applications
- Human-like dialogues
- Personalized responses
- Conversational awareness
  - Allow follow-up questions
- Used as powerful virtual assistants

Interactive training

- Rapid content generation and adaptation
- Dynamic and personalized content
- Accessibility and inclusivity for diverse audiences
- Multilingual support
- Create slides, exercises, quizzes, explanations for specific use cases

Creative assistant

- Creative content generation
- Intuitive prompt-based guidance:
  - Generate artistic works
  - Generate music
  - Written content
- Adapting content using input prompts, images, audio, etc

Productivity tools

- Automate routine, trivial tasks
- Document writing
  - Generate drafts
  - Format, edit, summarize documents
- Code generation
  - Implement features and functionality
  - Code formatting, commenting and restructuring
  - Test case writing
- Efficient communication
  - Draft, summarize and auto-complete emails
  - Personalize responses for different groups, teams, individuals, etx

Data analytics

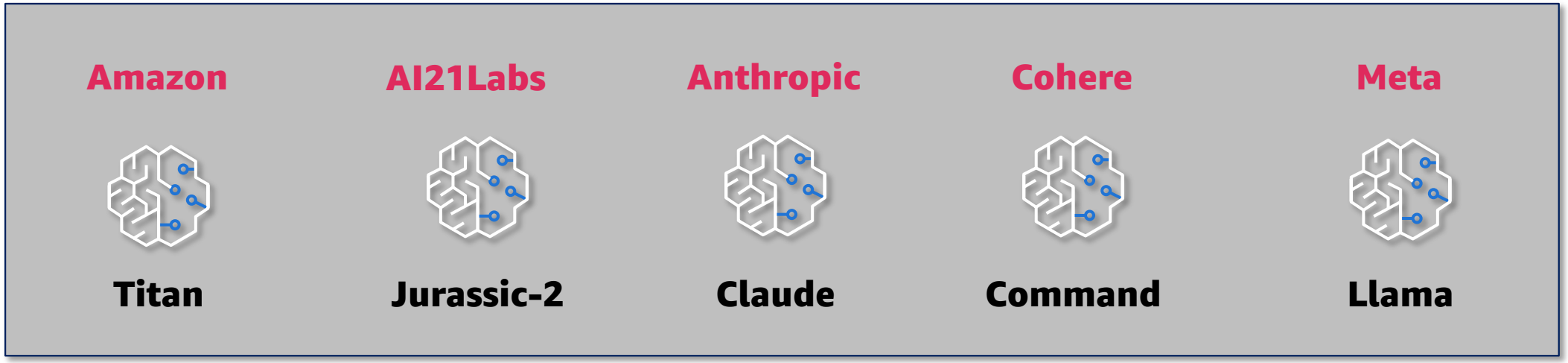
- Uncover hidden patterns from data
  - Sentiments, PII, topics, etc
- Analyze charts, graphs and other visual data
- Generate insightful reports
  - Suggest potential solutions
- Create synthetic data for testing and training

Amazon Bedrock

Amazon Bedrock

A fully-managed service that makes **foundation models** available via an API.

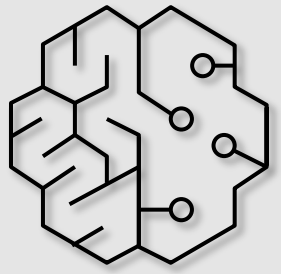
Some foundation models (FMs) available:



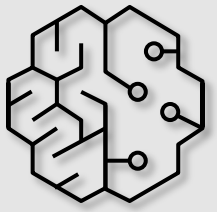
Amazon Bedrock

- Customers can:
  - **Privately customize FMs** with their own data
  - Easily **integrate them into their applications** using AWS tools and capabilities without having to provision or manage any infrastructure
- Prompts and responses are **not shared** with AWS or third-party providers.
- Bedrock provides **additional security capabilities** such as encryption, IAM, and various compliance designations.

Amazon Titan models

Amazon Titan	Benefits:
Innovate responsibly with high-performing FMs from Amazon.  **Titan models**	⚙ Automate natural language tasks such as summarization and text generation ⚙ Enhance search and improve personalized recommendations with Titan Embeddings ⚙ Support responsible use of AI by reducing inappropriate or harmful content

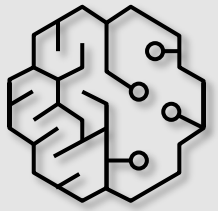
Amazon Titan Text Models



Titan Text

A generative foundation model for tasks such as:

- Summarization
- Text generation (for example, creating a blog post)
- Classification
- Open-ended Q&A
- Information extraction.



Titan Embeddings

Translates text inputs (words, phrases, or possibly large units of text) into numerical representations (known as embeddings) that contain the semantic meaning of the text.

Bedrock Use Cases (1/2)

Text generation: Create new pieces of original content, such as short stories, essays, social media posts, and webpage.

Chatbots: Build conversational interfaces such as chatbots and virtual assistants to enhance the user experience for your customers.

Search: Search, find, and synthesize information to answer questions from a large corpus of data.

Bedrock Use Cases (2/2)

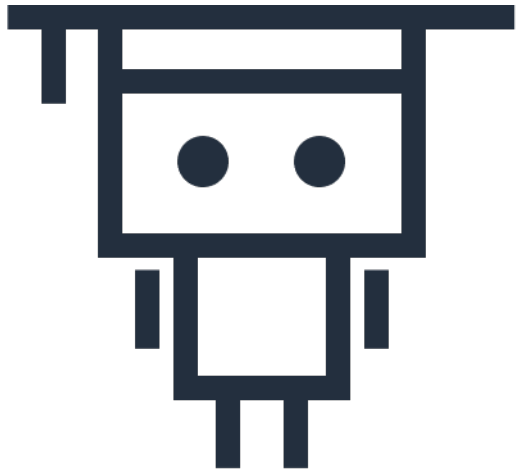
Text summarization: Get a summary of textual content, such as articles, blog posts, books, and documents, to get the gist without having to read the full content.

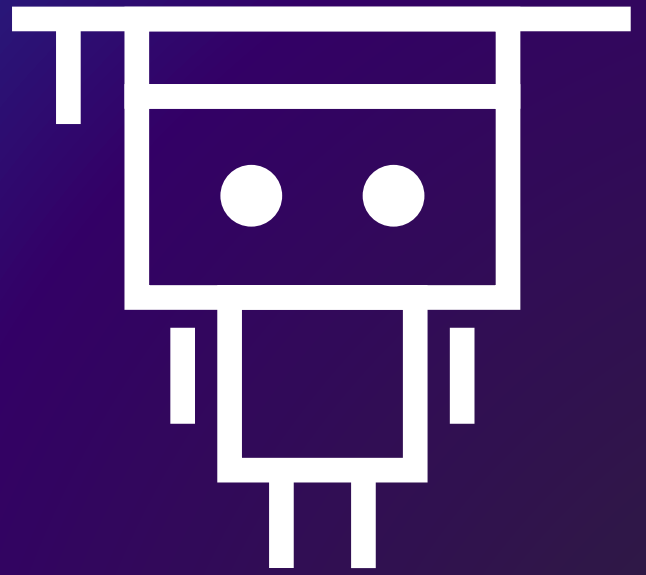
Image generation: Create realistic and artistic images of various subjects, environments, and scenes from language prompts.

Personalization: Help customers find what they're looking for with more relevant and contextual product recommendations than word matching.

Next lesson

- This lesson covered fundamentals of generative AI.
- In the next lesson, you will explore foundation models and large language models further.





Thank you!