



Introduction to Foundation Models

Generative AI Foundations on AWS

Emily Webber, Principal ML Specialist SA at AWS
Lesson 1 – Level 300

Topics in our journey together

1. Primer on foundation models

2. How to pick a foundation model

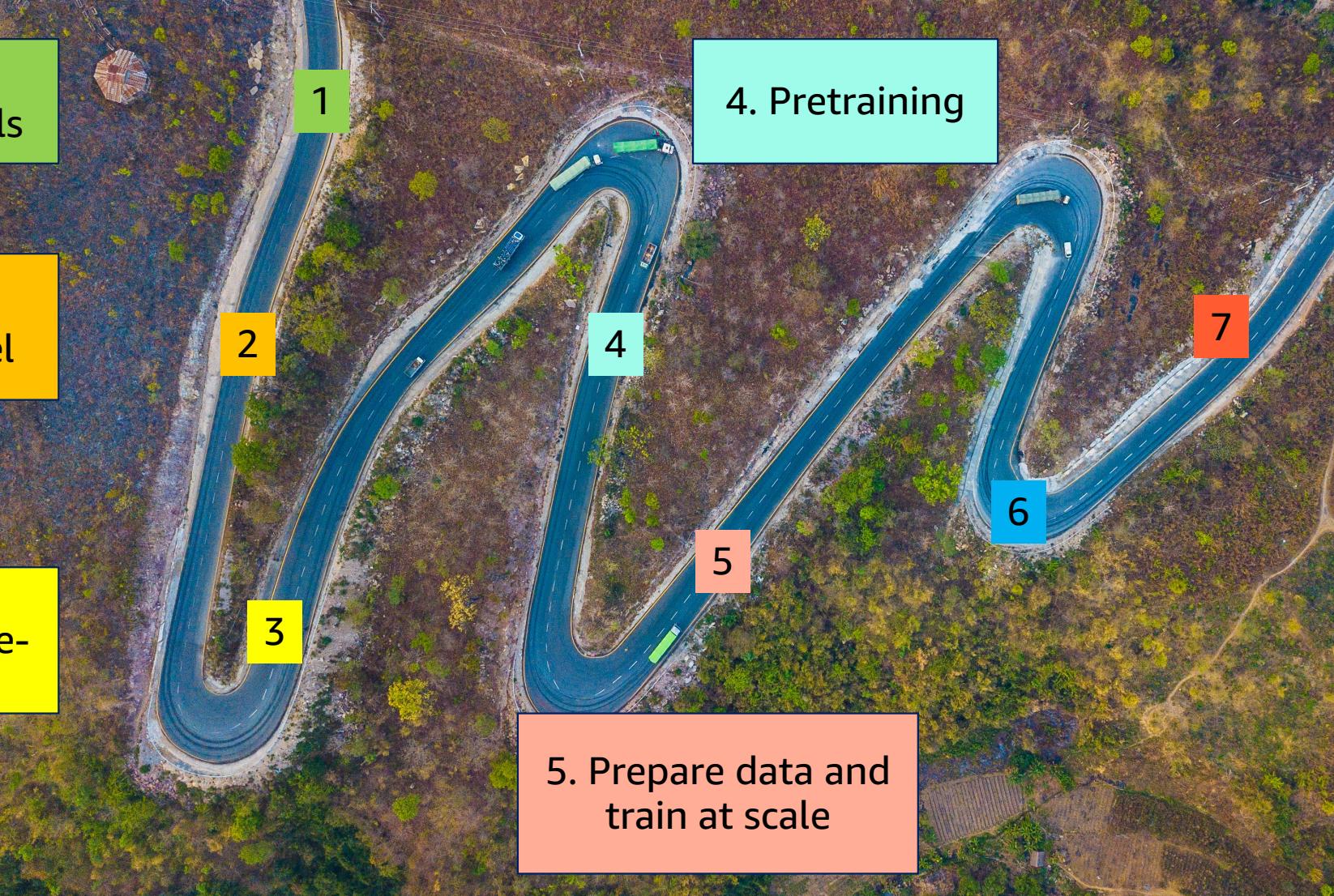
3. Prompt engineering & fine-tuning

4. Pretraining

5. Prepare data and train at scale

7. Distributed hosting

6. Reinforcement learning with human feedback



Today's activities

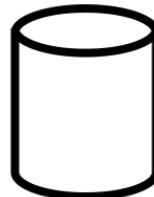


- What foundation models are
- Where they come from
- How they impact Generative AI
- Foundation model lifecycle
- Hands-on walk through: Foundation models on Amazon SageMaker

Let's say I asked you to learn **everything** on the internet.
How would you do it?



Structure



Storage



Time

$$\begin{aligned} 5.74 \text{ B pages} \times 52 \text{ seconds} \\ = \sim 83,000 \text{ hours} \end{aligned}$$

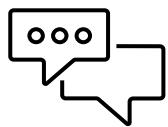
=> **~41,000 human years**

A foundation model can
do this in a few months.

You can do a lot with foundation models!



Text
generation



Q&A



Text
summarization



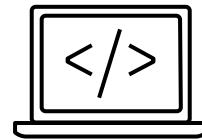
Text
extraction



Paraphrase
rephrase



Search



Code
generation



Image
generation

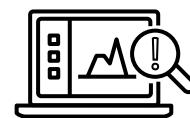
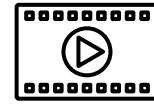


Image
classification



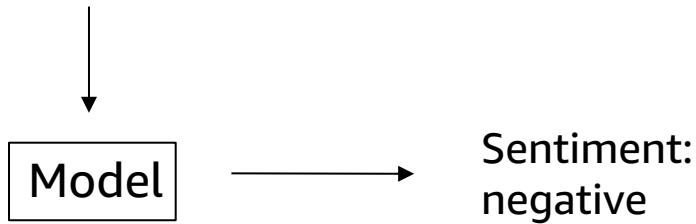
Audio
generation



Video
generation

Many ML tasks can now be re-cast as generative, and most will benefit from foundation models.

Text: I am not into this house; it's way too expensive and too far from the train line!



Traditional classification

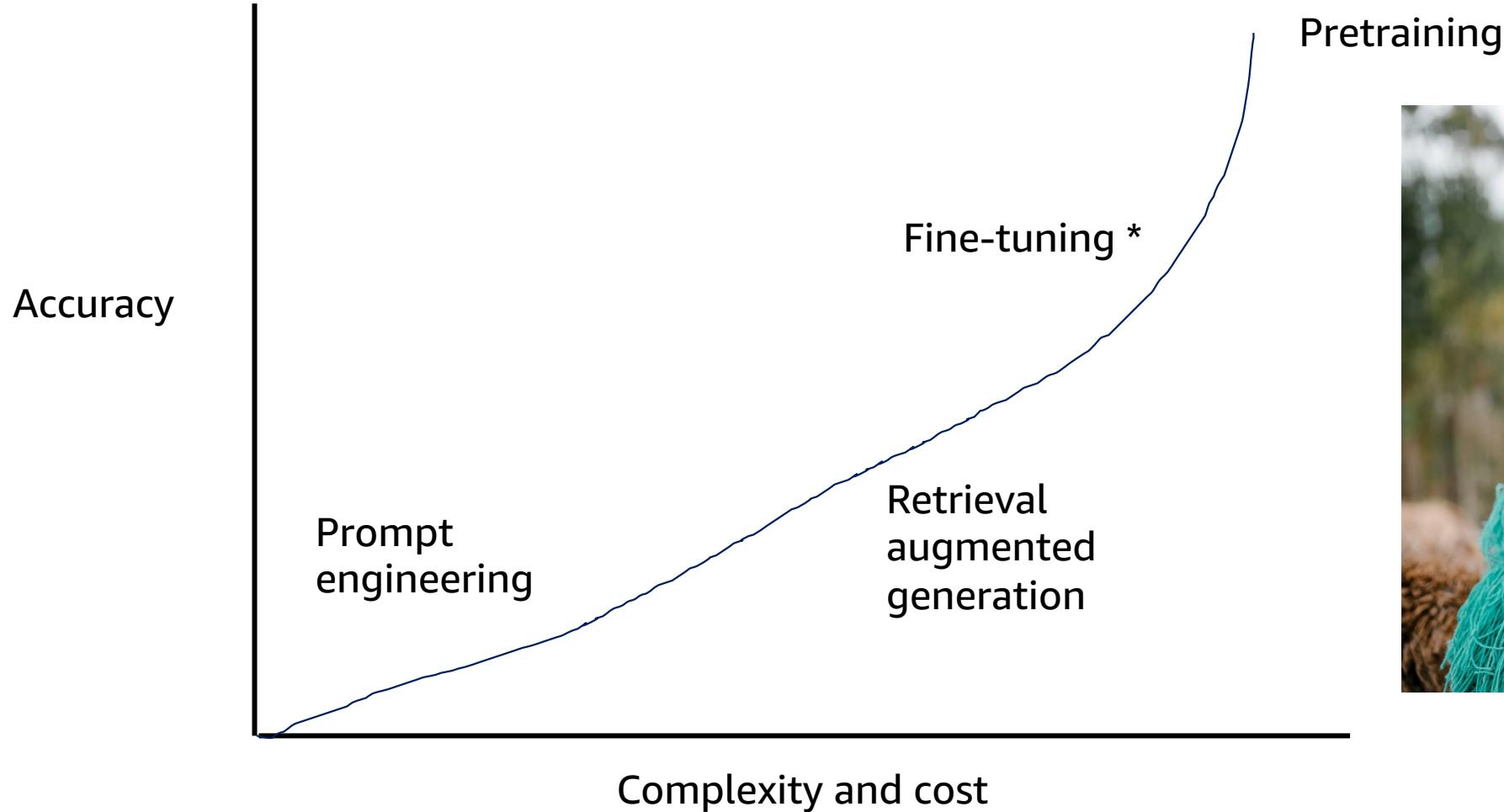
Text: I am not into this house; it's way too expensive and too far from the train line!

Classify this sentence into positive or negative sentiment:

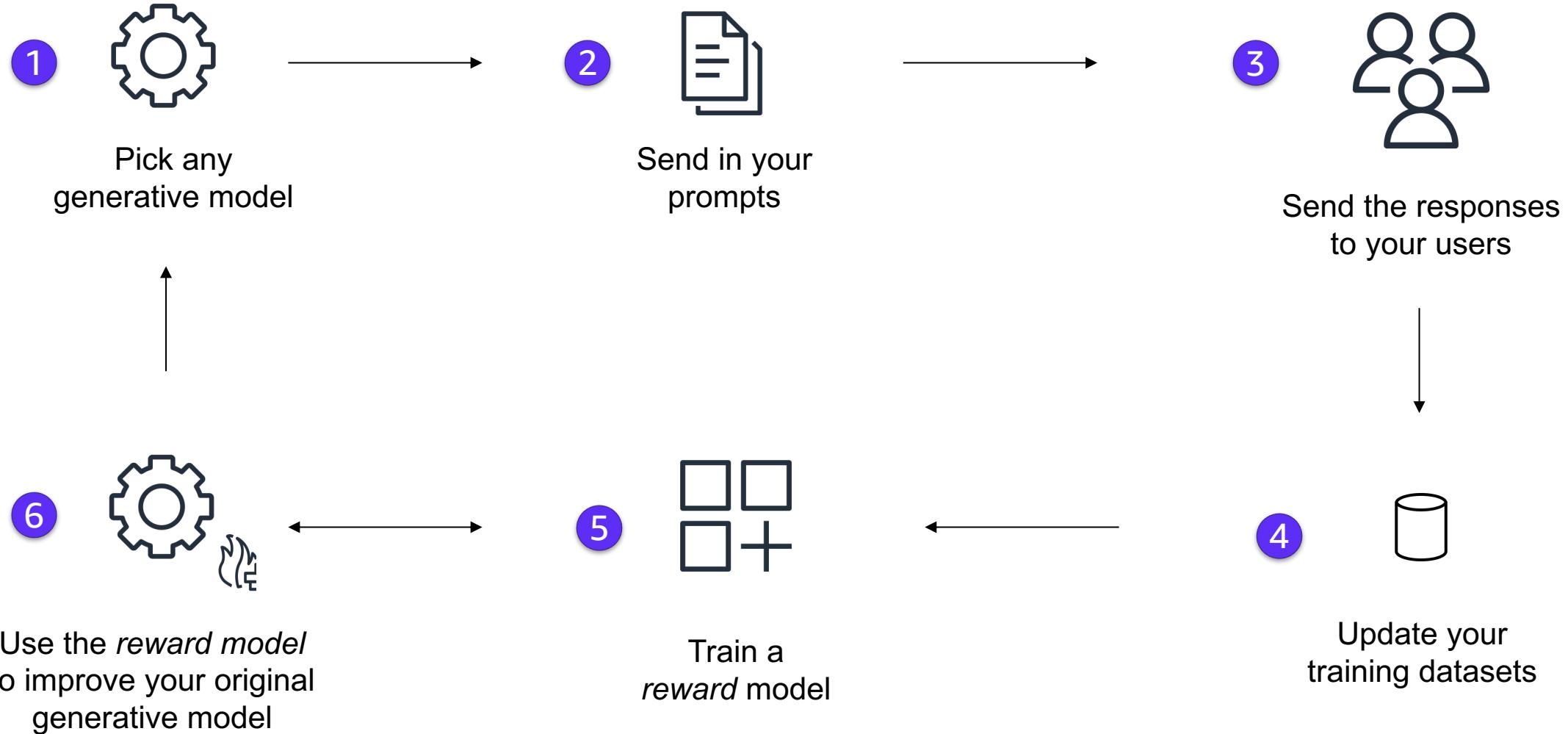


Using generation to classify text

There are many ways to customize a foundation model



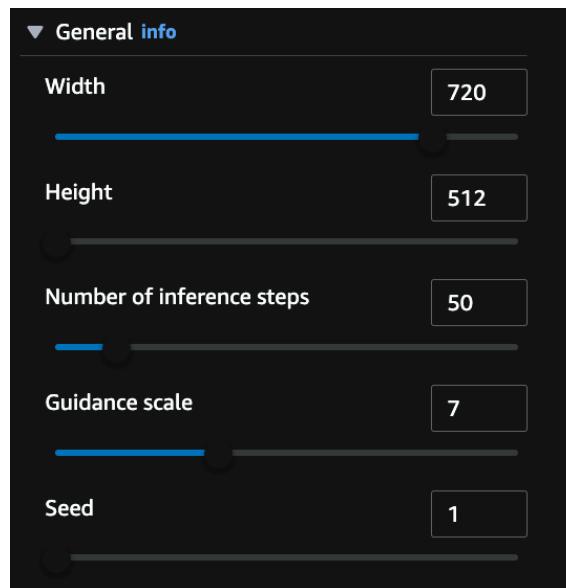
The best generative models are built on human feedback



Foundation model spotlight: Stable Diffusion

Prompt: landscape of the beautiful city of paris rebuilt near the pacific ocean in sunny california, amazing weather, sandy beach, palm trees, splendid haussmann architecture, digital painting, highly detailed, intricate, without duplication, concept art, matte painting, trending on artstation

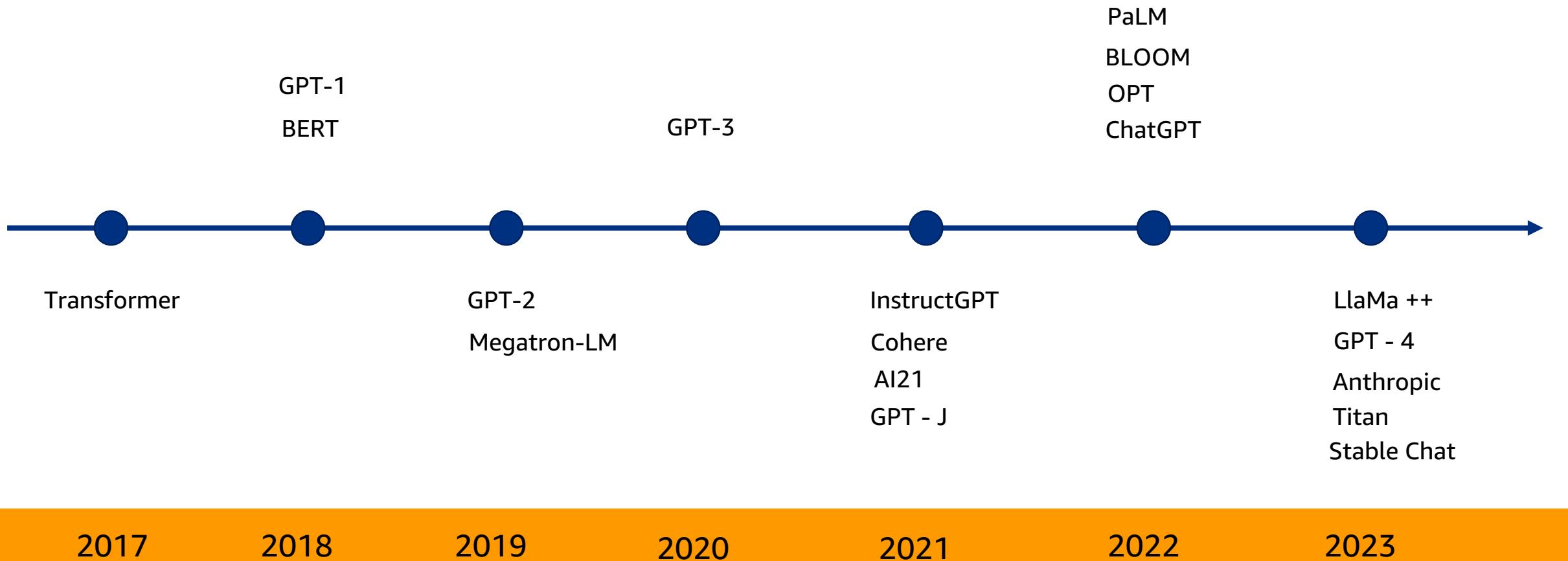
Negative prompts: trees, green



Stable Diffusion-generated image

Timeline of language foundation models

GPT = Generative Pretrained Transformers



2017

2018

2019

2020

2021

2022

2023

Foundation model spotlight: AI21 Jurassic-2 Jumbo Instruct

Prompt

Tell me a story about a dog running down the street.

▶ Generate text

Output

Once upon a time, there was a dog named Max. Max was a very happy dog, and he loved to run.

One day, Max was out for a walk with his favorite person, his owner, Mr. Jones. Mr. Jones was holding Max's leash, and Max was pulling him down the street.

Max was so excited, he couldn't stand still. He just wanted to run and run.

Mr. Jones was having a hard time keeping up with Max. He was getting tired, but he didn't want to let Max go.

Prompt

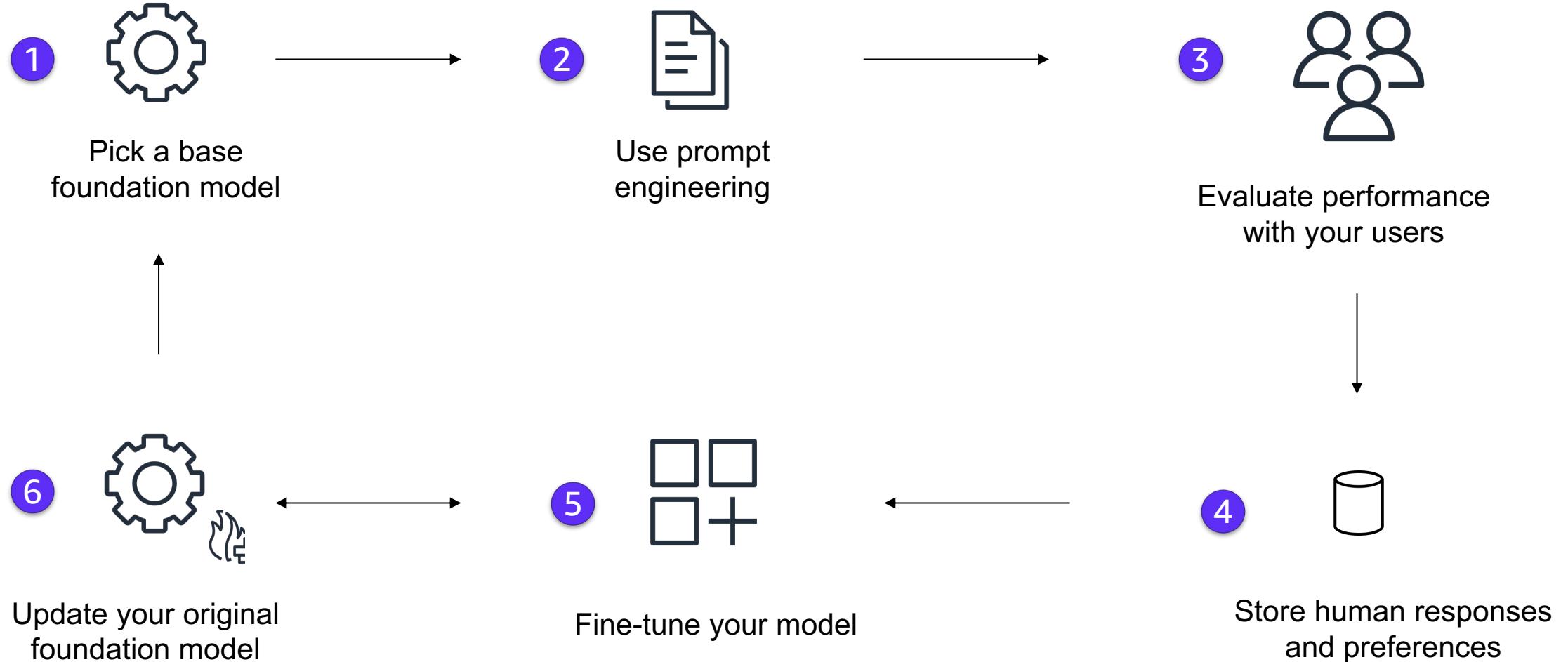
If you found two shoes, one for the right foot and one for the left foot, how many shoes would you have?

▶ Generate text

Output

If you found two shoes, one for the right foot and one for the left foot, you would have two shoes.

Foundation model lifecycle

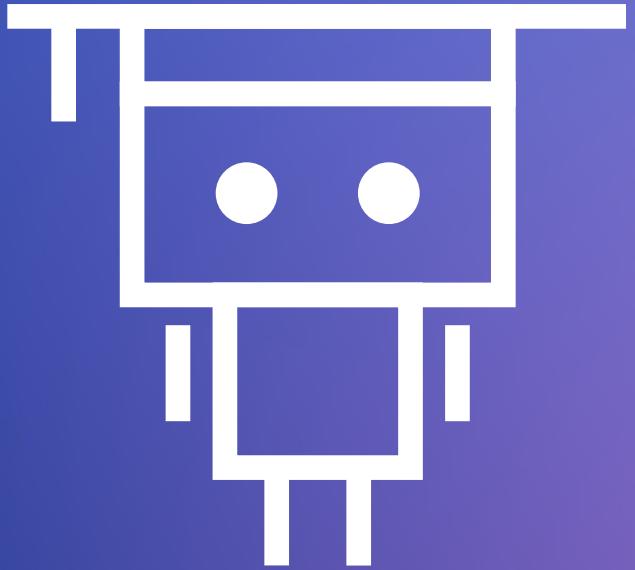




Hands-on demo

<https://bit.ly/sm-nb-1>





Thank you!

Type: Corrections, feedback, or other questions?
Contact us at <https://support.awsamazon.com/#/contacts/aws-academy>.
All trademarks are the property of their owners.