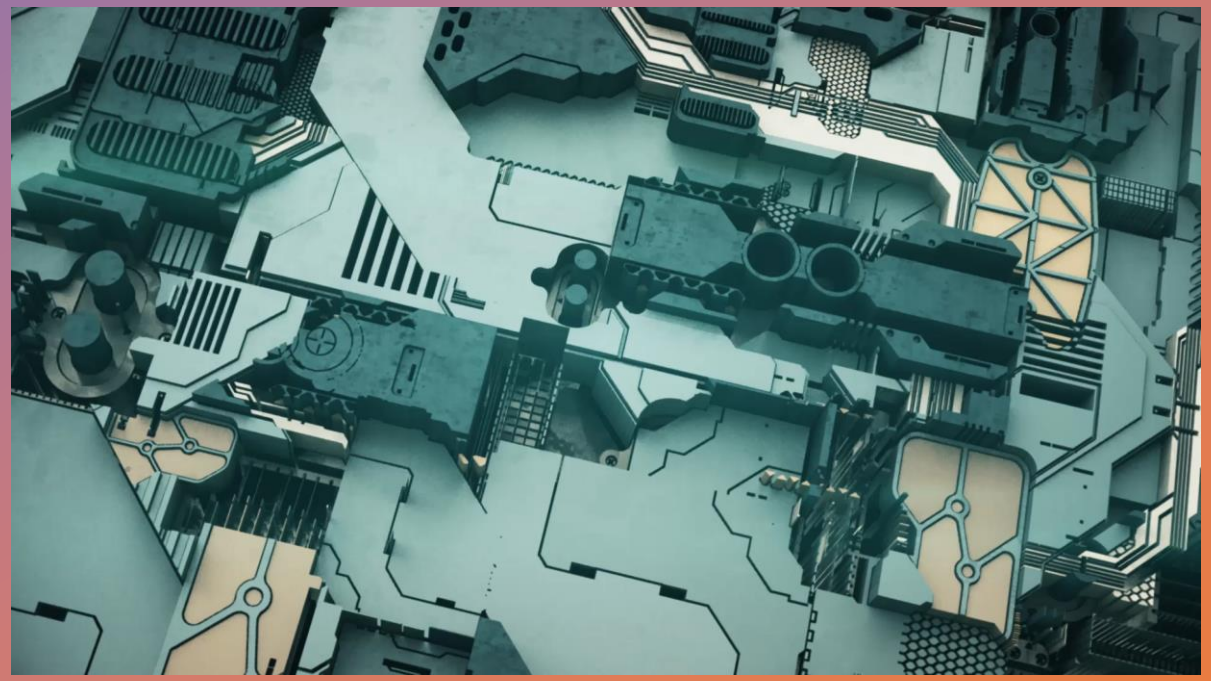
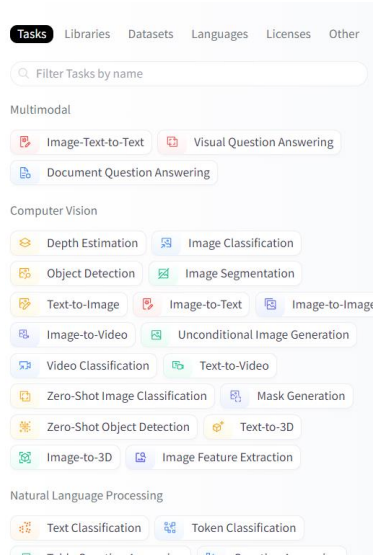
AI-102– Extra modules



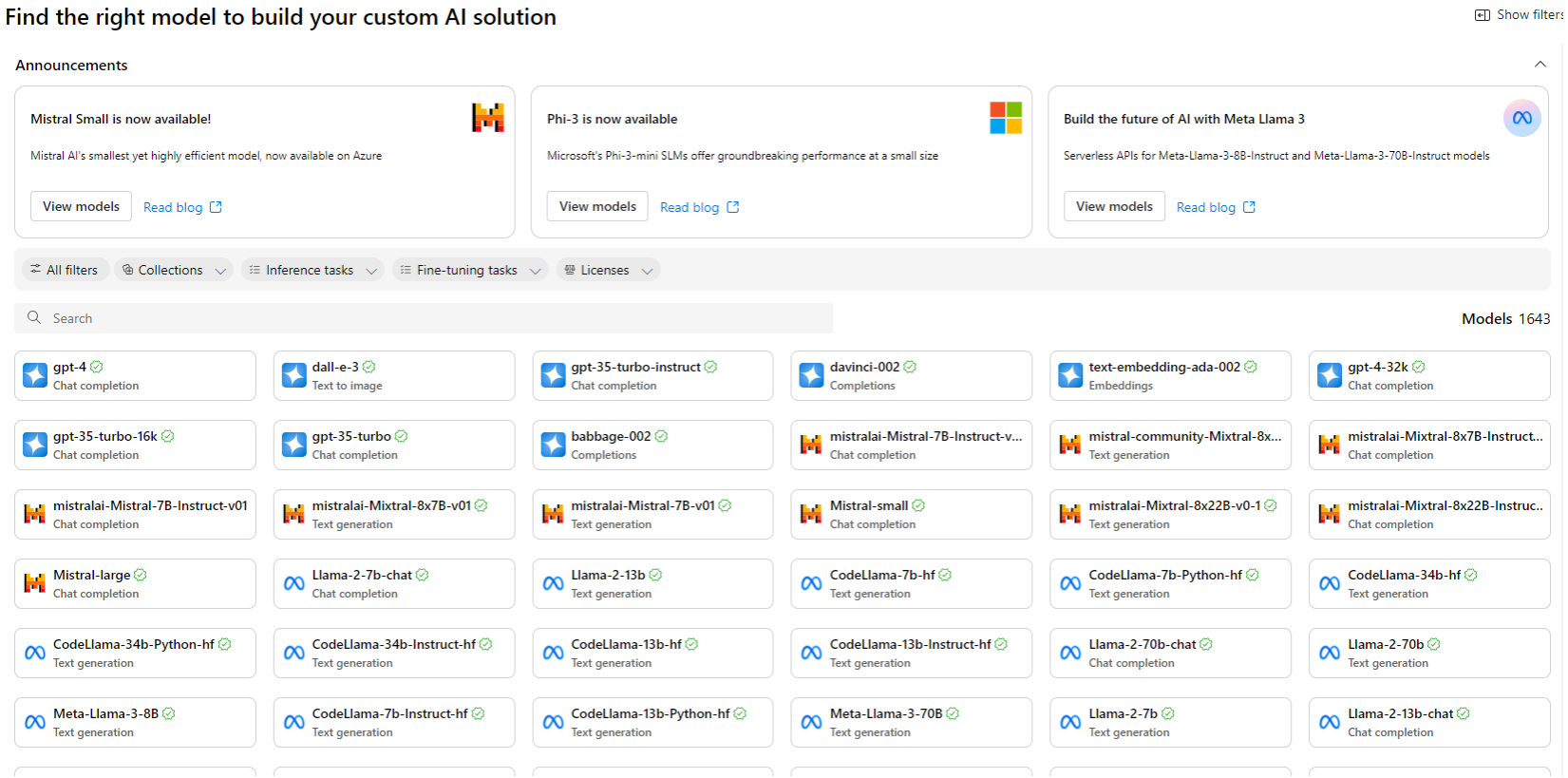
Demo:Prompt engineering – med kode

Hugging Face

Hugging face og modeller



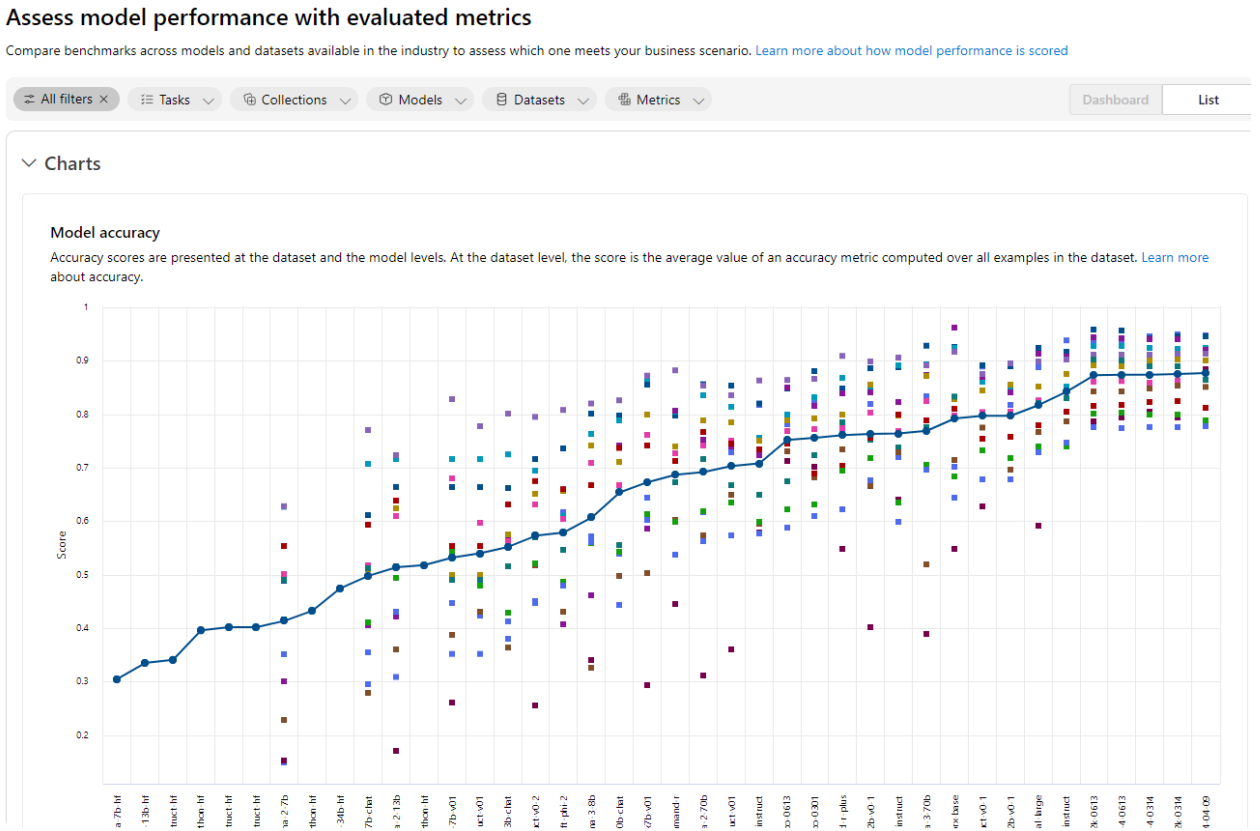
MODELS


Find the right model to build your custom AI solution
Show filters
Announcements
Mistral Small is now available!
Mistral AI's smallest yet highly efficient model, now available on Azure
View models
Read blog
Phi-3 is now available
Microsoft's Phi-3-mini SLMs offer groundbreaking performance at a small size
View models
Read blog
Build the future of AI with Meta Llama 3
Serverless APIs for Meta-Llama-3-8B-Instruct and Meta-Llama-3-70B-Instruct models
View models
Read blog
All filters
Collections
Inference tasks
Fine-tuning tasks
Licenses
Search
Models 1643
gpt-4 Chat completion
dall-e-3 Text to image
gpt-35-turbo-instruct Chat completion
davinci-002 Completions
text-embedding-ada-002 Embeddings
gpt-4-32k Chat completion
gpt-35-turbo-16k Chat completion
gpt-35-turbo Chat completion
babbage-002 Completions
mistralai-Mistral-7B-Instruct-v... Chat completion
mistral-community-Mixtral-8x... Text generation
mistralai-Mixtral-8x7B-Instruct... Chat completion
mistralai-Mistral-7B-Instruct-v01 Chat completion
mistralai-Mixtral-8x7B-v01 Text generation
mistralai-Mistral-7B-v01 Text generation
Mistral-small Chat completion
mistralai-Mixtral-8x22B-v0-1 Text generation
mistralai-Mixtral-8x22B-Instruc... Chat completion
Mistral-large Chat completion
Llama-2-7b-chat Chat completion
Llama-2-13b Text generation
CodeLlama-7b-hf Text generation
CodeLlama-7b-Python-hf Text generation
CodeLlama-34b-hf Text generation
CodeLlama-34b-Python-hf Text generation
CodeLlama-34b-Instruct-hf Text generation
CodeLlama-13b-hf Text generation
CodeLlama-13b-Instruct-hf Text generation
Llama-2-70b-chat Chat completion
Llama-2-70b Text generation
Meta-Llama-3-8B Text generation
CodeLlama-7b-Instruct-hf Text generation
CodeLlama-13b-Python-hf Text generation
Meta-Llama-3-70B Text generation
Llama-2-7b Text generation
Llama-2-13b-chat Chat completion

HOW TO USE MODELS

- **Discover:** Review model cards, try sample inference and browse code samples to evaluate, fine-tune, or deploy the model.
- **Compare:** Compare benchmarks across models and datasets available in the industry to assess which one meets your business scenario.
- **Evaluate:** Evaluate if the model is suited for your specific workload by providing your own test data. Evaluation metrics make it easy to visualize how well the selected model performed in your scenario.
- **Fine-tune:** Customize fine-tunable models using your own training data and pick the best model by comparing metrics across all your fine-tuning jobs. Built-in optimizations speedup fine-tuning and reduce the memory and compute needed for fine-tuning.
- **Deploy:** Deploy pretrained models or fine-tuned models seamlessly for inference. Models that can be deployed to real-time endpoints can also be downloaded.

BENCHMARKING MODELS



HuggingFace

- https://huggingface.co/docs/transformers/quicktour
- https://huggingface.co/docs/transformers/index

HUGGING FACE - DEMO

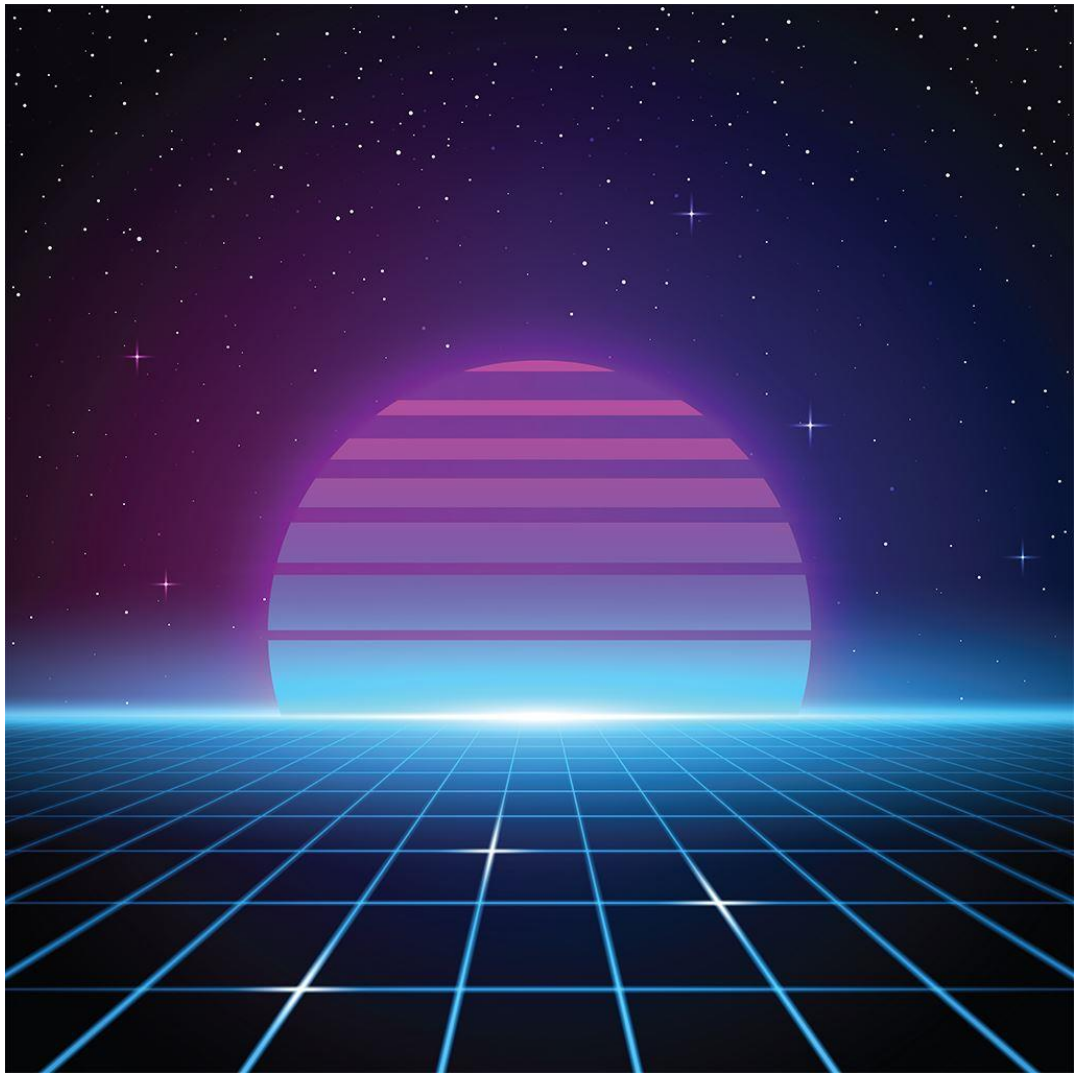
Hugging

MODUL 3

GENERATIV AI - EMBEDDINGS

USING EMBEDDINGS WITH AZURE AI SEARCH AND PROMPTING

- Azure AI Search enables developers to discover and reuse existing AI solutions
- Embeddings are commonly used for search, clustering, recommendations, and classification
- Azure PromptFlow allows developers to coordinate individual parts of your AI solutions



EMBEDDINGS

Elements in a token embedding vector as *coordinates* in multidimensional space

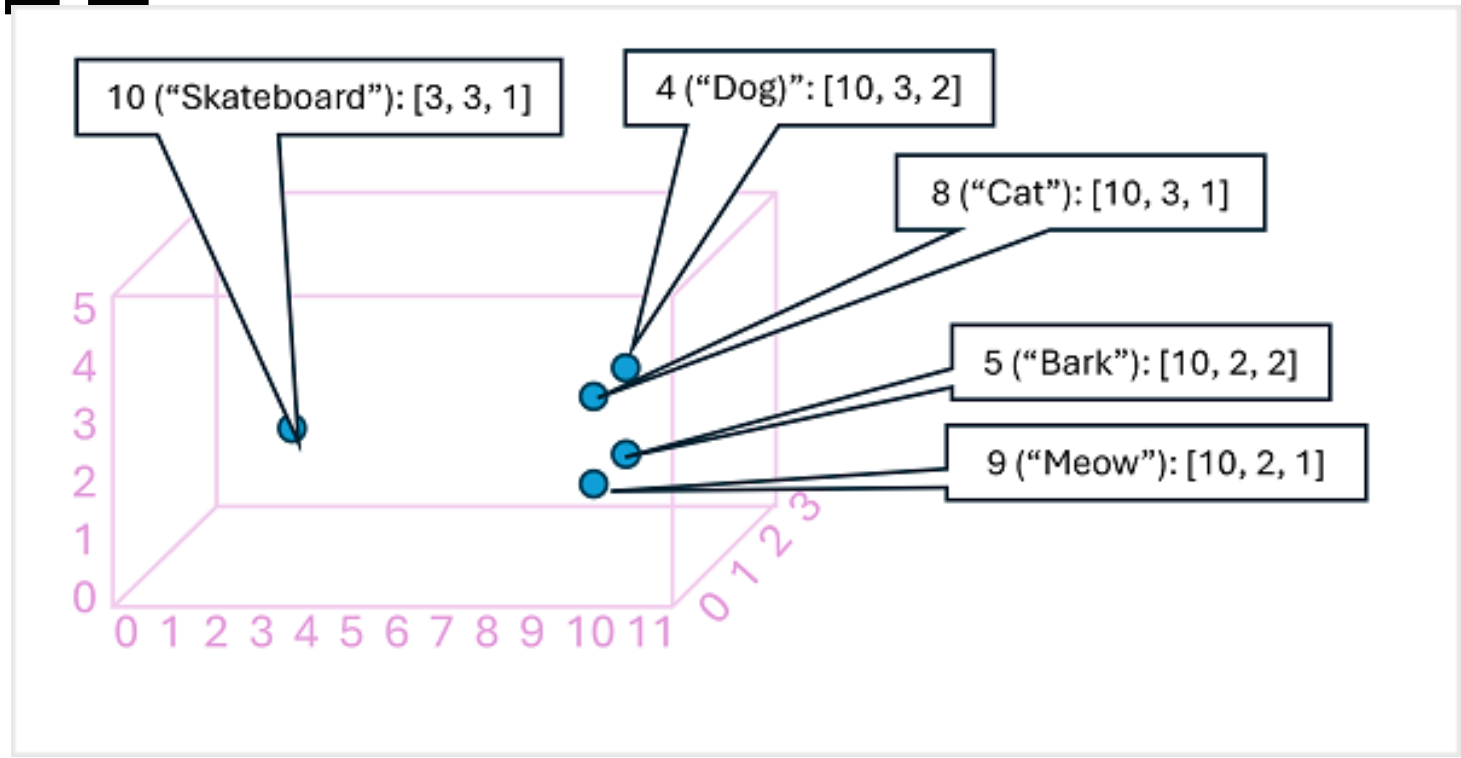
Each token occupies a specific "location."

The closer tokens are to one another along a particular dimension, the more semantically related they are.

In other words, related words are grouped closer together.

EMBEDDINGS – AN EXAMPLE

- 4 ("dog"): [10.3.2]
- 5 ("bark"): [10,2,2]
- 8 ("cat"): [10,3,1]
- 9 ("meow"): [10,2,1]
- 10 ("skateboard"): [3,3,1]



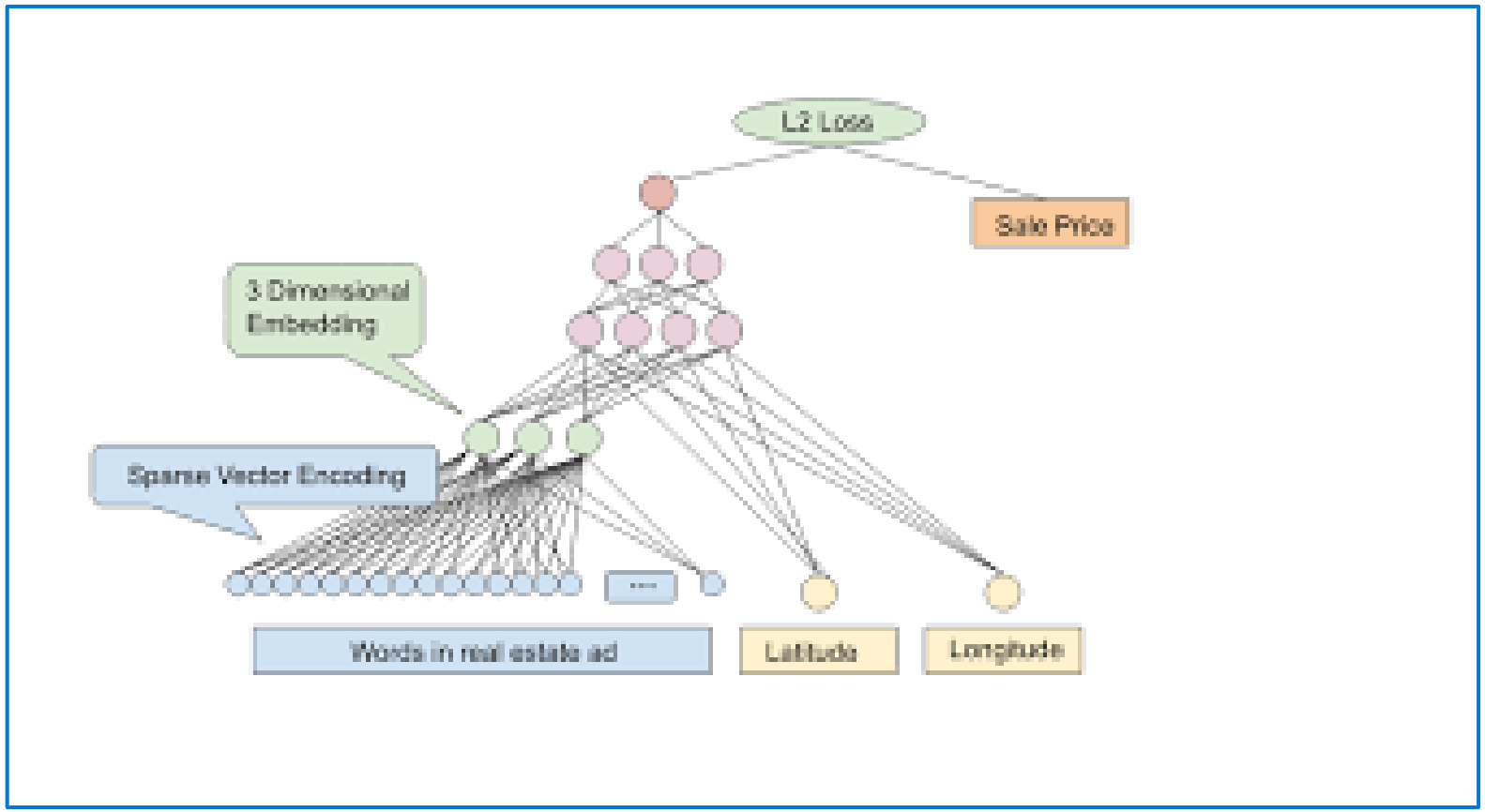
EMBEDDING IN PRACTICE

1. **Text Input**: A user sends a message in the chat.
2. **Azure OpenAI Service**: The message is sent to the Azure OpenAI service.
3. **Embedding Generation**: Azure OpenAI converts the text message into an embedding, which is a vector of numbers representing the semantic meaning of the text.
4. **Semantic Search**: The embedding is used to perform a semantic search in Azure AI Search.
5. **Search Results**: The most semantically relevant documents or information are retrieved based on the similarity of embeddings.

1. User: "How do I reset my password?"
2. Azure OpenAI Service: Receives the query and generates an embedding.
3. Embedding: [0.85, -0.23, 0.91, ..., 0.42] // A vector representing the query.
4. Azure AI Search: Uses the embedding to find the most relevant documents.
5. Search Results: Returns documents related to password resetting.

Embedding

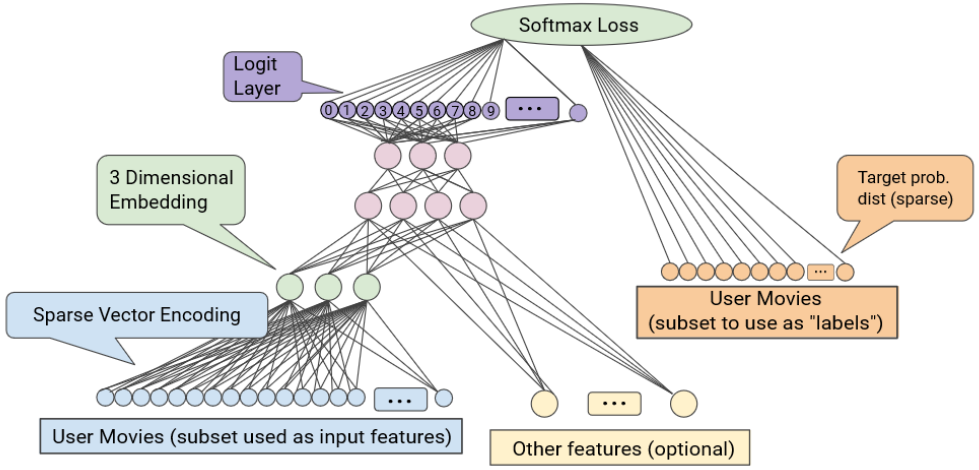
An embedding is a special format of data representation that can be easily utilized by machine learning models and algorithms. The embedding is an information dense representation of the semantic meaning of a piece of text. Each embedding is a vector of floating point numbers, such that the distance between two embeddings in the vector space is correlated with semantic similarity between two inputs in the original format.

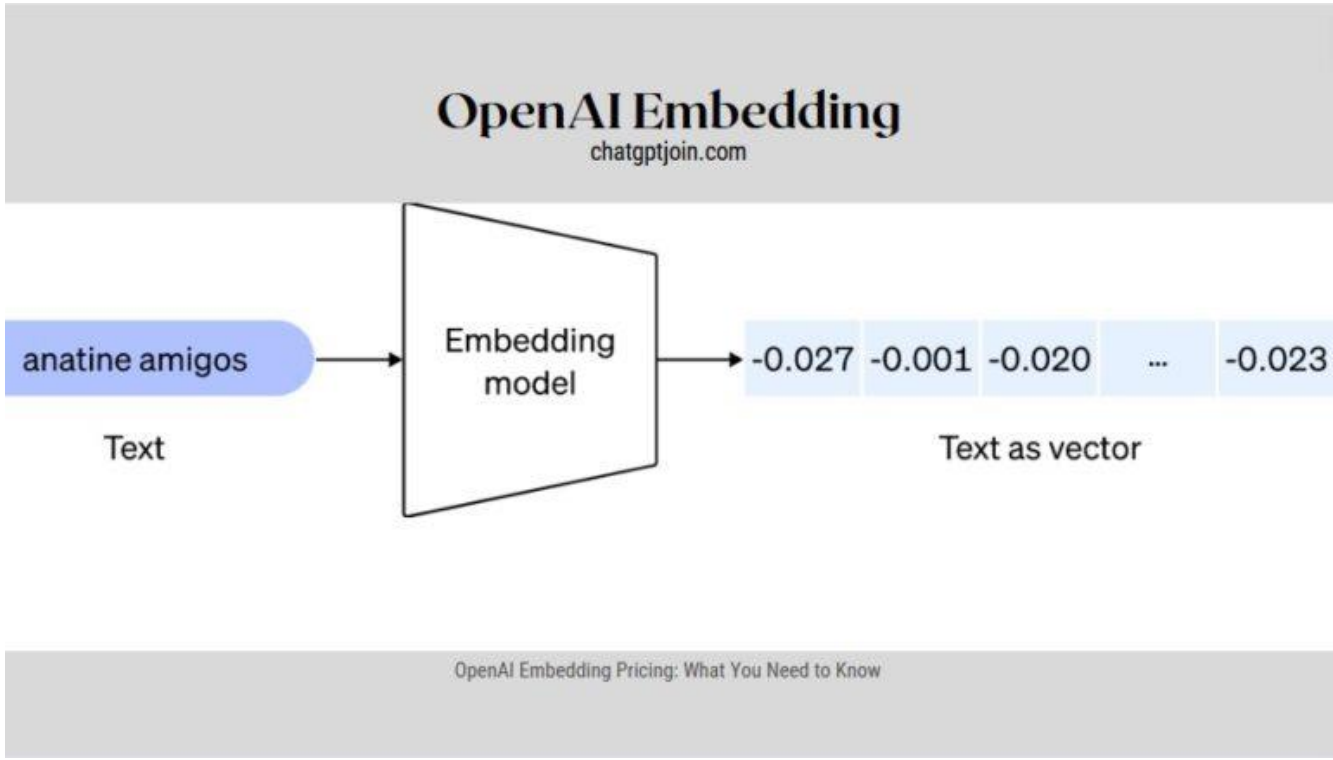


https://ai.google.dev/docs/embeddings_guide

Embeddings

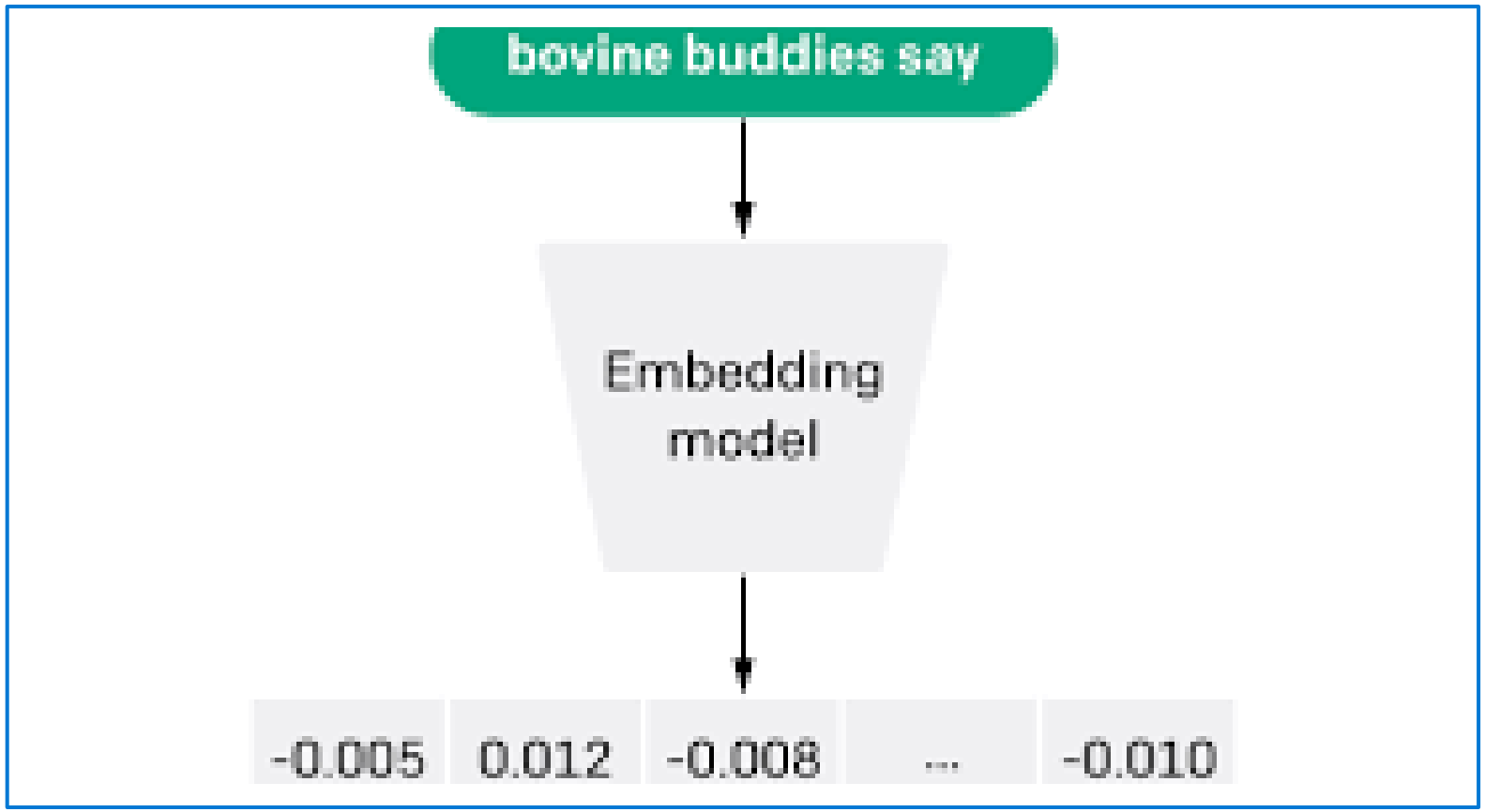
https://learn.microsoft.com/en-us/azure/ai-services/openai/how-to/embeddings?tabs=python-new



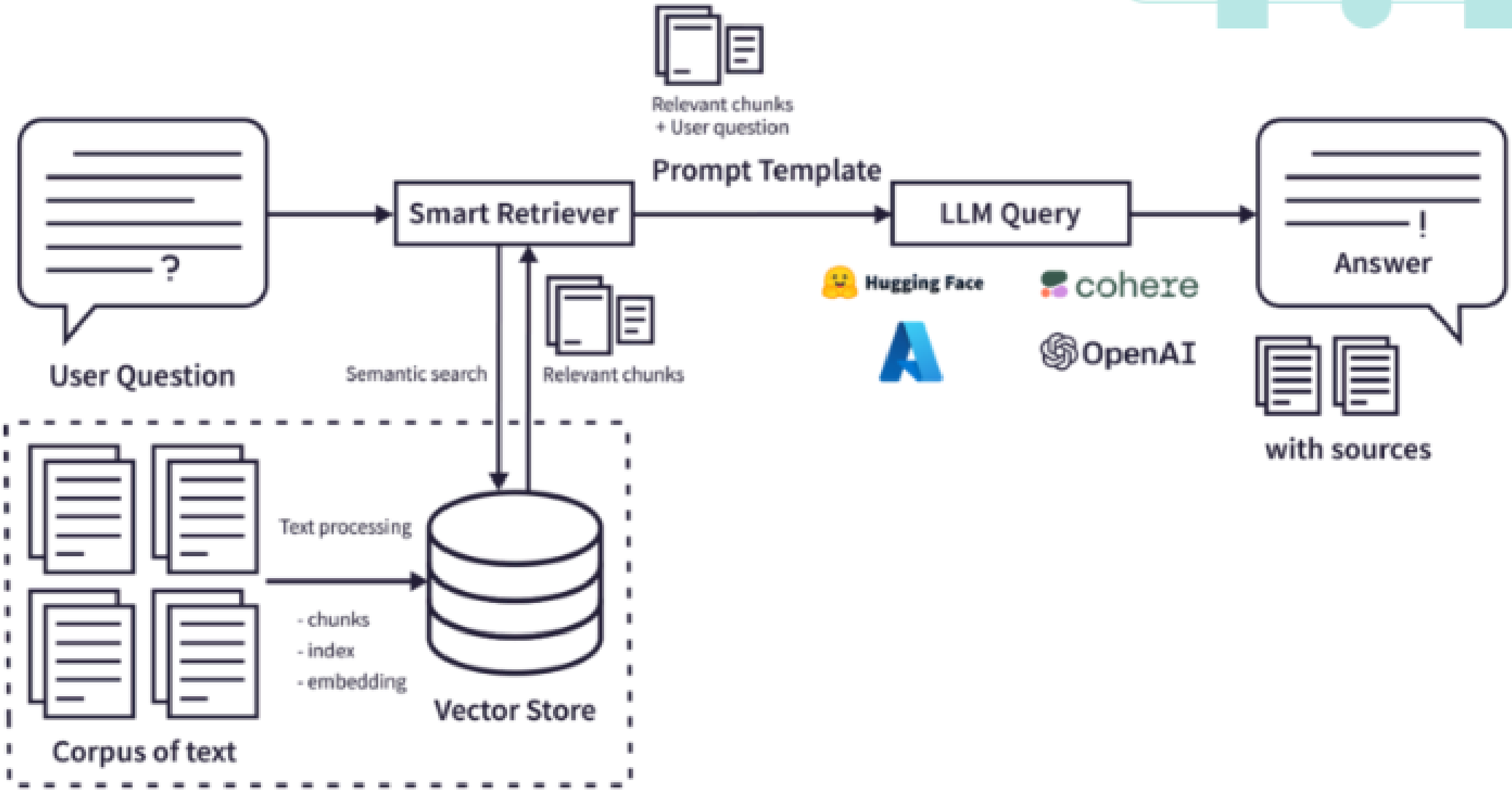


Embeddings – Demo/Lab

https://github.com/Azure-Samples/openai/blob/main/Basic_Samples/Embeddings/basic_embeddings_example_restapi.ipynb



RAG pipeline



From: dataiku

EMBEDDINGS USE CASES

- What are embeddings?
- OpenAI's text embeddings measure the relatedness of text strings. Embeddings are commonly used for:
- **Search** (where results are ranked by relevance to a query string)
- **Clustering** (where text strings are grouped by similarity)
- **Recommendations** (where items with related text strings are recommended)
- **Anomaly detection** (where outliers with little relatedness are identified)
- **Diversity measurement** (where similarity distributions are analyzed)
- **Classification** (where text strings are classified by their most similar label)
- An embedding is a vector (list) of floating point numbers. The distance between two vectors measures their relatedness. Small distances suggest high relatedness and large distances suggest low relatedness.

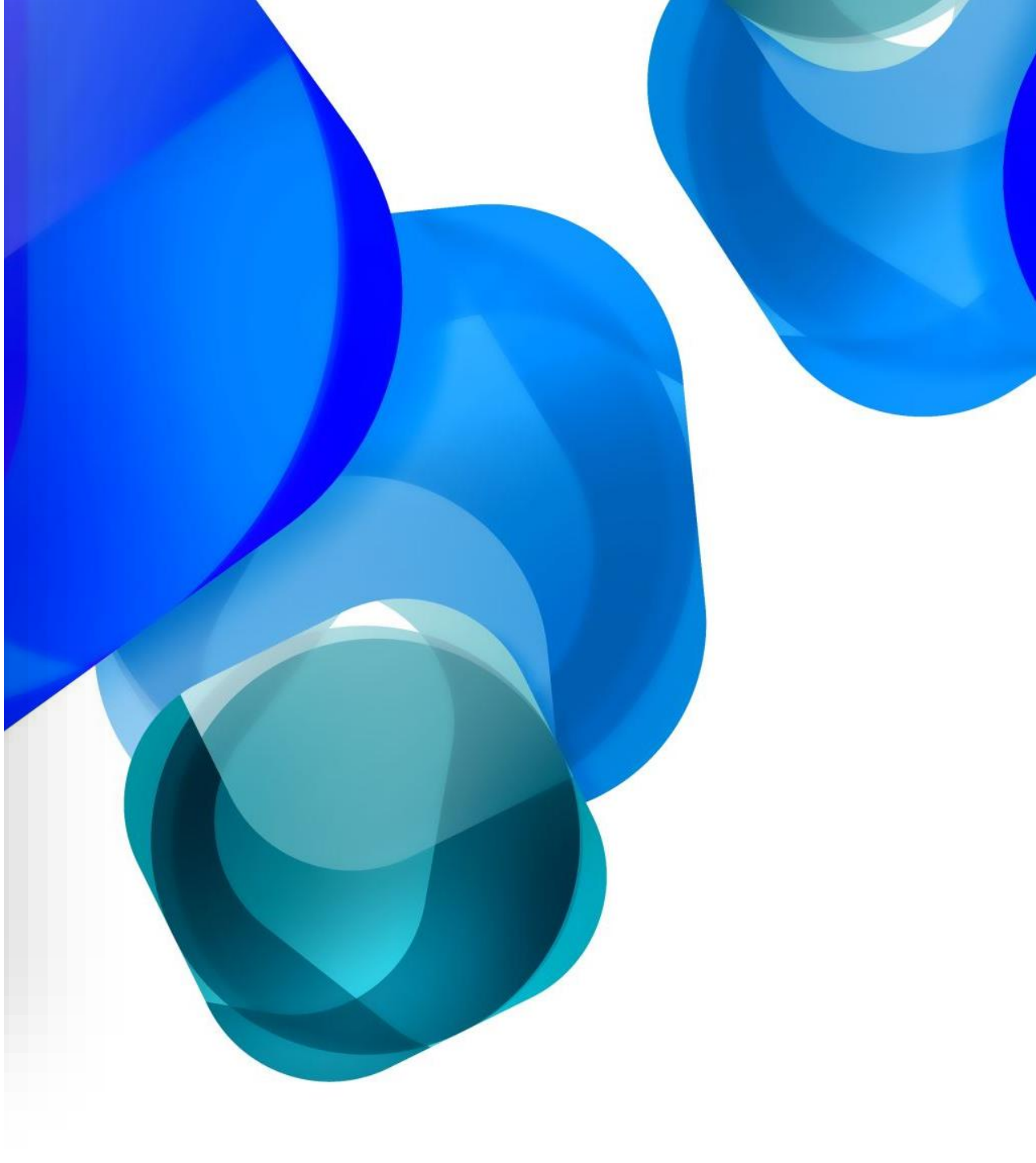
EMBEDDINGS - DEMO

Azure OpenAI - RAG

Demo RAG – with Azure AI search and embeddings

Azure OpenAI on your own data with RAG

- Demo/Lab:
  - Using your data with Azure OpenAI Service - Azure OpenAI | Microsoft Learn
  - Use your own images: Use your image data with Azure OpenAI Service in Azure OpenAI studio - Azure OpenAI | Microsoft Learn



Rag - grafikk

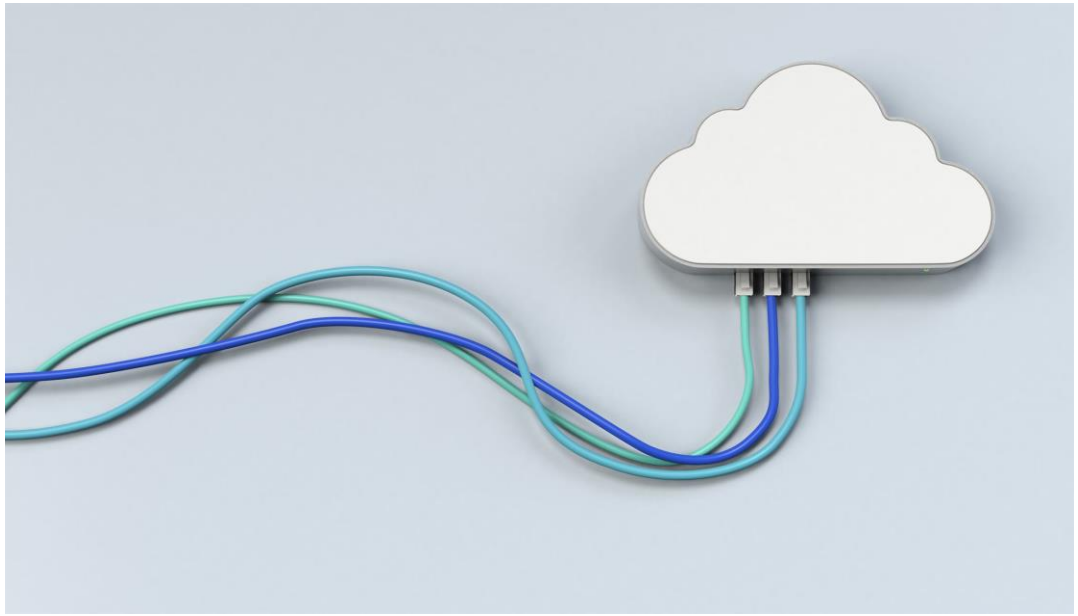
Rag-nice-graphics.docx

Azure AI studio


Azure AI Studio - demoer

INTRODUCTION TO AZURE PROMPTFLOW

- Azure PromptFlow is an orkestration tool developed by Microsoft for Azure AI Studio.
- It allows developers to coordinate the individual parts of their AI solutions and make them work seamlessly together.
- PromptFlow supports the use of both graphical and code-based development approaches, giving developers the flexibility to choose which approach works best for them.



GENERATIV AI - LIMITATIONS

SOME LIMITATIONS OF USING CHATGPT

- Context
- Knowledge
- Manipulation
- Unreliability
- Understanding
- Legal and ethical issues (Responsible AI)

COMMON SENSE AND TACIT KNOWLEDGE

- Large language models, such as ChatGPT, have limited knowledge of the world. This applies to both GPT-3.5 and GPT-4, for example.
- Copilot in Bing, for example, therefore, uses both ChatGPT and Bing Search
- Generative AI models – such as ChatGPT – are just a probability machine.

THE CONVERSATION SITUATION

- Lack of emotional intelligence: While ChatGPT can generate responses that seem empathetic, it does not have true emotional intelligence. It can't detect subtle emotional cues or respond appropriately to complex emotional situations. When people communicate, we use far more than rational language – including body language.
- Limitations in understanding context: ChatGPT has difficulty understanding context, especially sarcasm and humor. While ChatGPT is proficient in language processing, it can struggle to understand the subtle nuances of human communication. For example, if a user were to use sarcasm or humor in their message, ChatGPT may fail to capture the intended meaning and instead provide a response that is inappropriate or irrelevant.

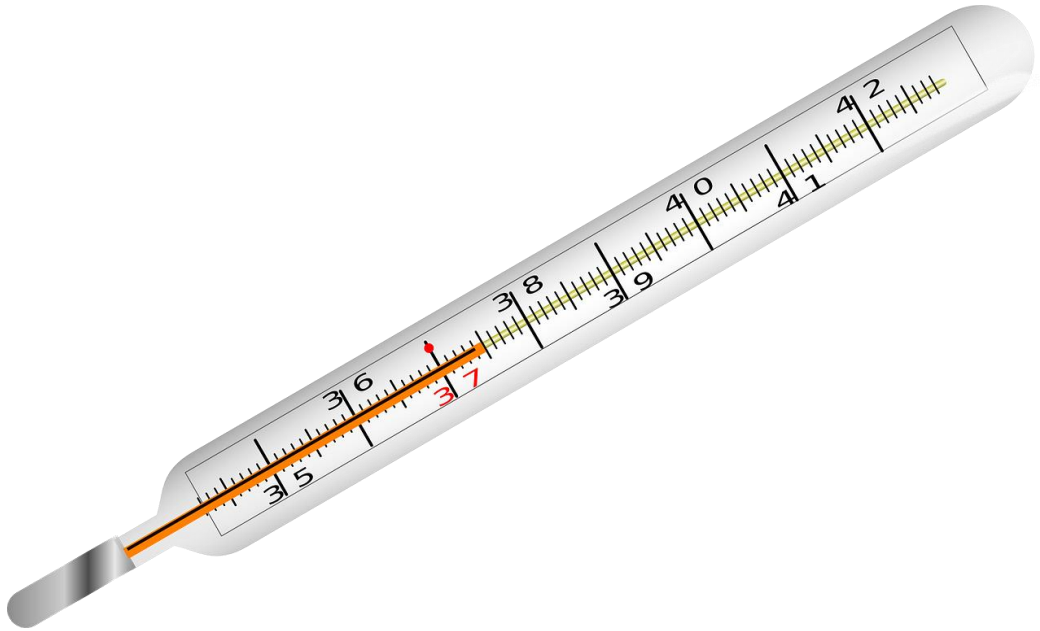
BIAS- WITH CHATGPT AS AN EXAMPLE

- ChatGPT was trained on texts by people all over the world, past and present. Unfortunately, this means that the same real-world biases can also appear in the model.
- ChatGPT has been shown to produce responses that discriminate against gender, race, and minority groups, which the company is trying to curb.
- One way to explain this problem is to point to the data as the problem, blaming humanity for the biases embedded in the internet and beyond. But part of the responsibility also lies with OpenAI and Microsoft, whose researchers and developers choose the data used to train ChatGPT.

CHATGPT AND HALLUCINATION

- When an AI model "hallucinates," it generates fabricated information in response to a user's questions but presents it as if it is factual and correct.
- Suppose you asked an AI chatbot to write an article about the Statue of Liberty. The chatbot would be hallucinating if it said that the monument was located in California instead of saying that it is in New York.
- But the mistakes are not always so obvious. In response to the Statue of Liberty message, the AI chatbot can also create names of designers who worked on the project or state that it was built in the wrong year.
- This happens because large language models, often referred to as AI chatbots, are trained on massive amounts of data, which is how they learn to recognize patterns and connections between words and topics. They use this knowledge to interpret questions and generate new content, such as text or images.
- However, since AI chatbots are essentially predicting the word that is most likely to come next in a sentence, they can sometimes generate outputs that sound correct but aren't actually true.

TEMPERATURE



EVALUATING AI MODELS IN AZURE AI STUDIO

- Evaluation assesses the performance of generative AI models
- Built-in metrics evaluate single or multi-turn conversations
- Evaluation can be applied to various task types, such as question answering

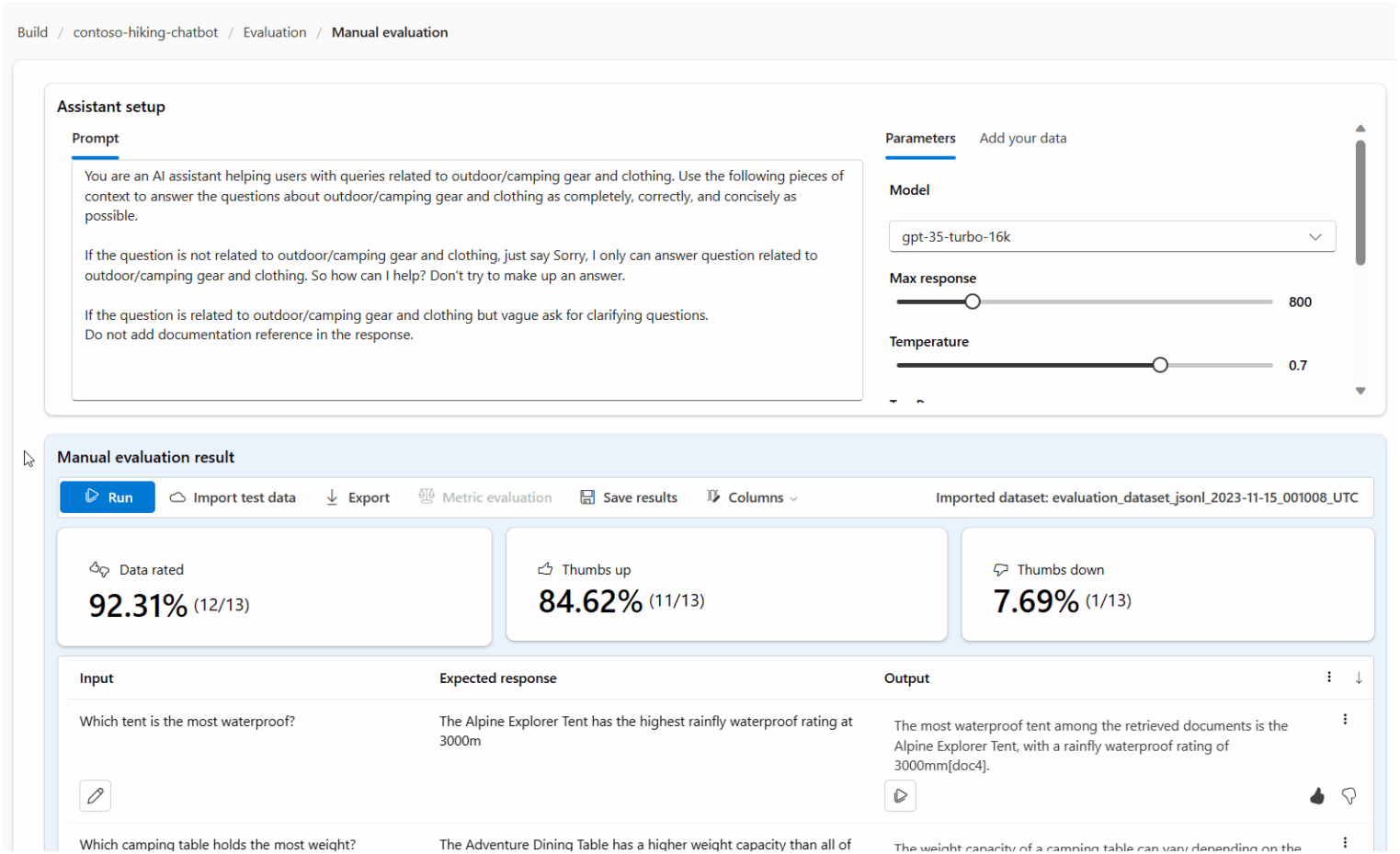
AZURE AI STUDIO EVALUATION PAGE

- Hub for visualizing, assessing, and optimizing AI model results
- Compare results across multiple evaluation runs
- Identify trends and make data-driven decisions for performance enhancement

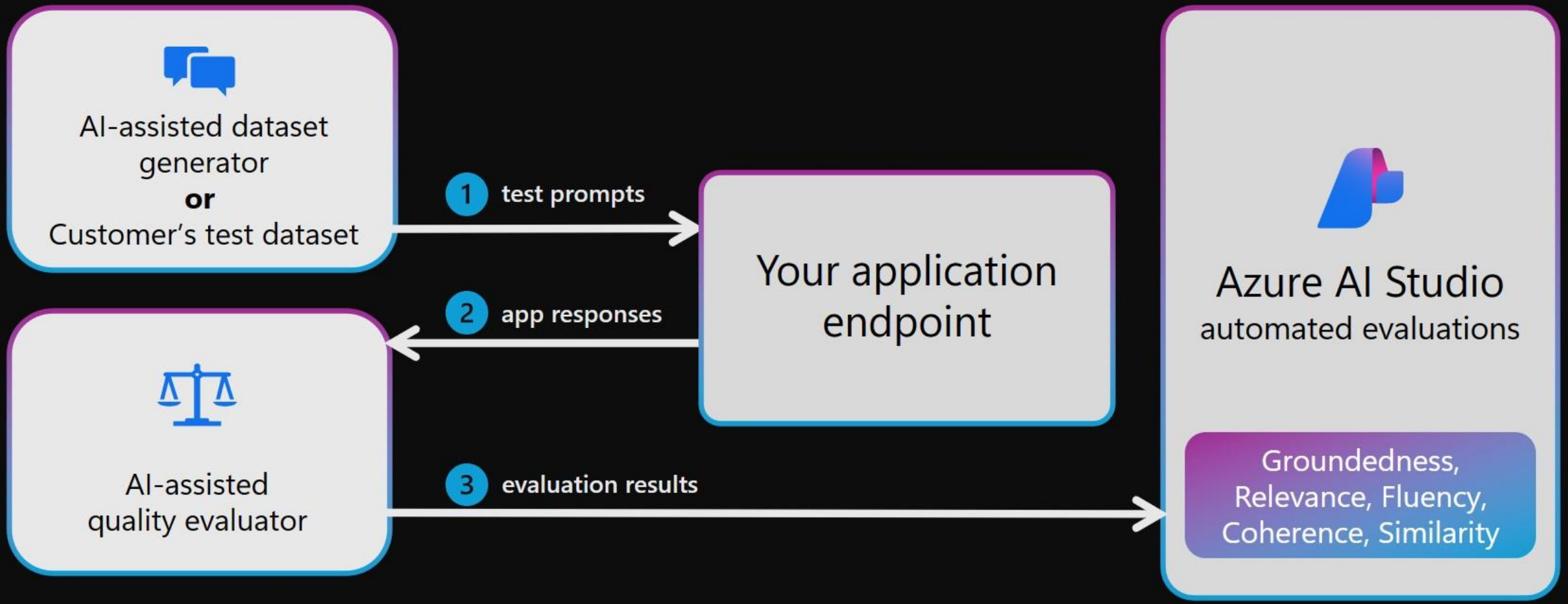
MANUAL EVALUATION TOOLS IN AZURE AI STUDIO

- Manual evaluation tools iteratively test and refine prompts
- Test against test data within a single interface
- Critical component for ensuring AI model quality and relevance

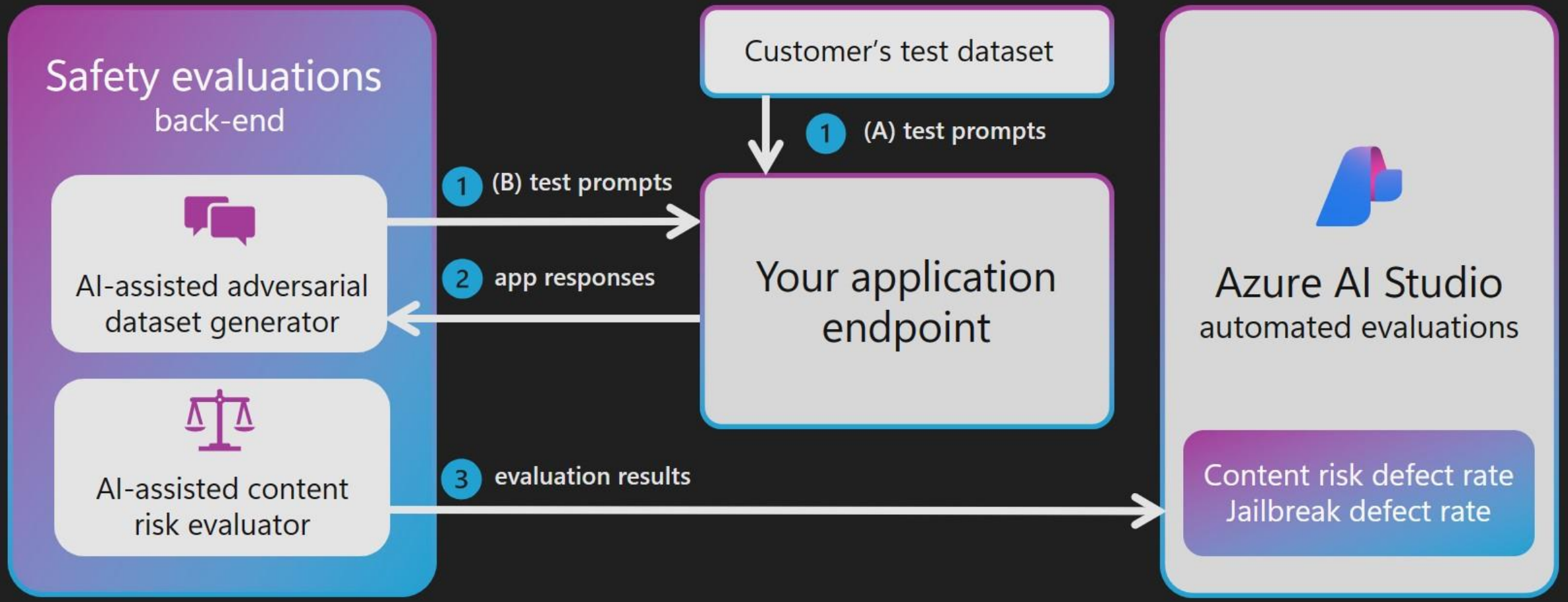
MANUAL EVALUATION

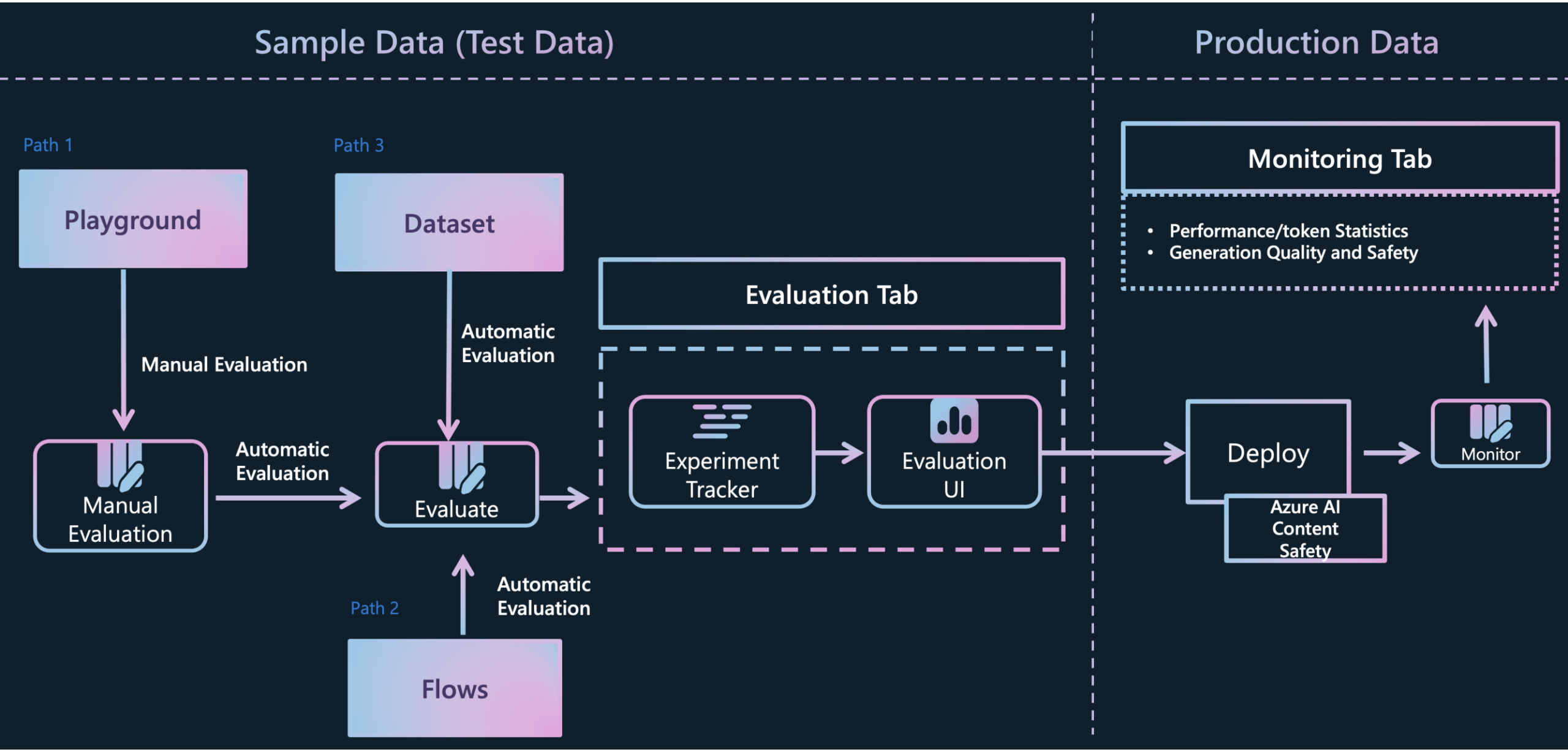


Evaluate generative AI application quality with Azure AI Studio

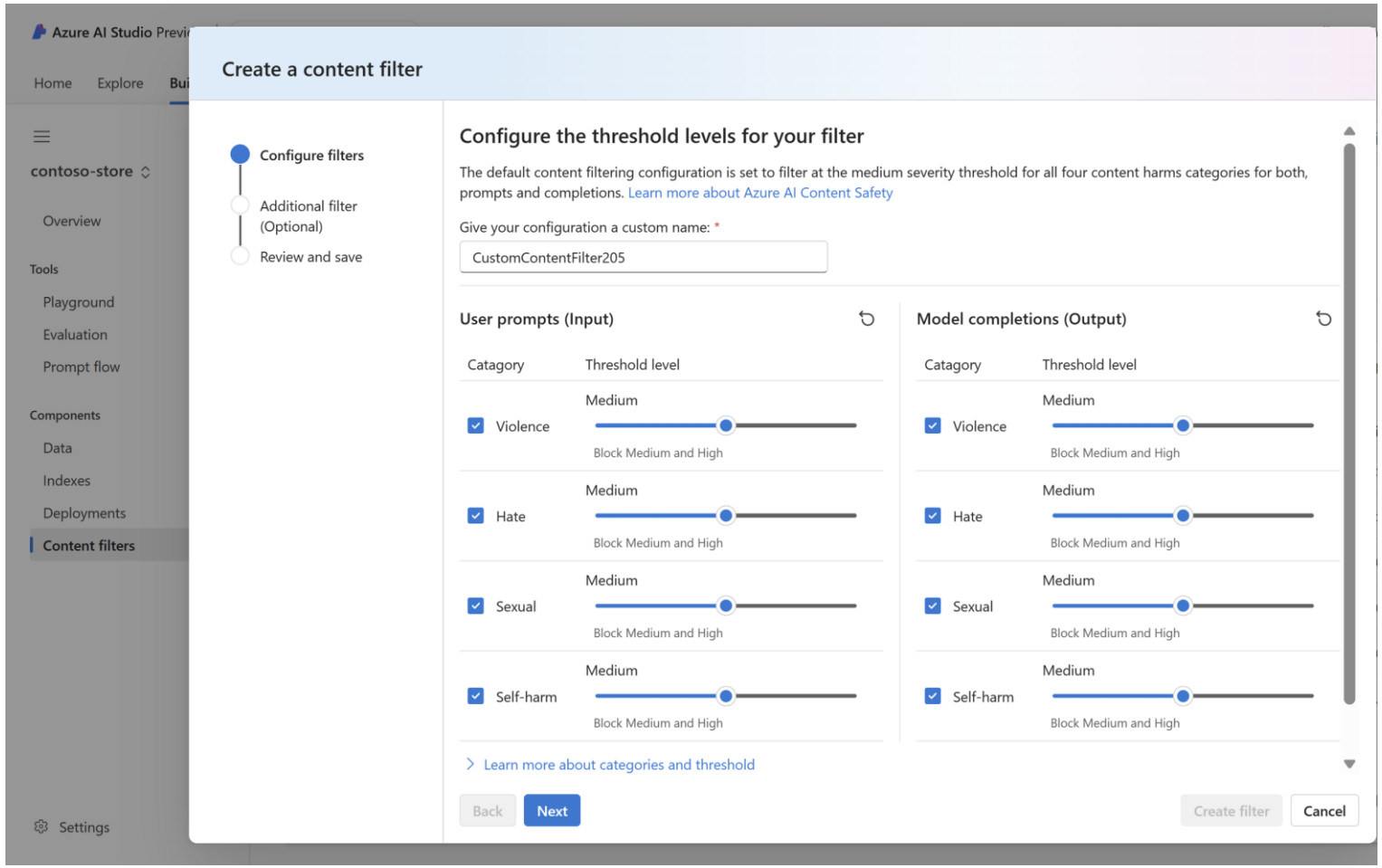


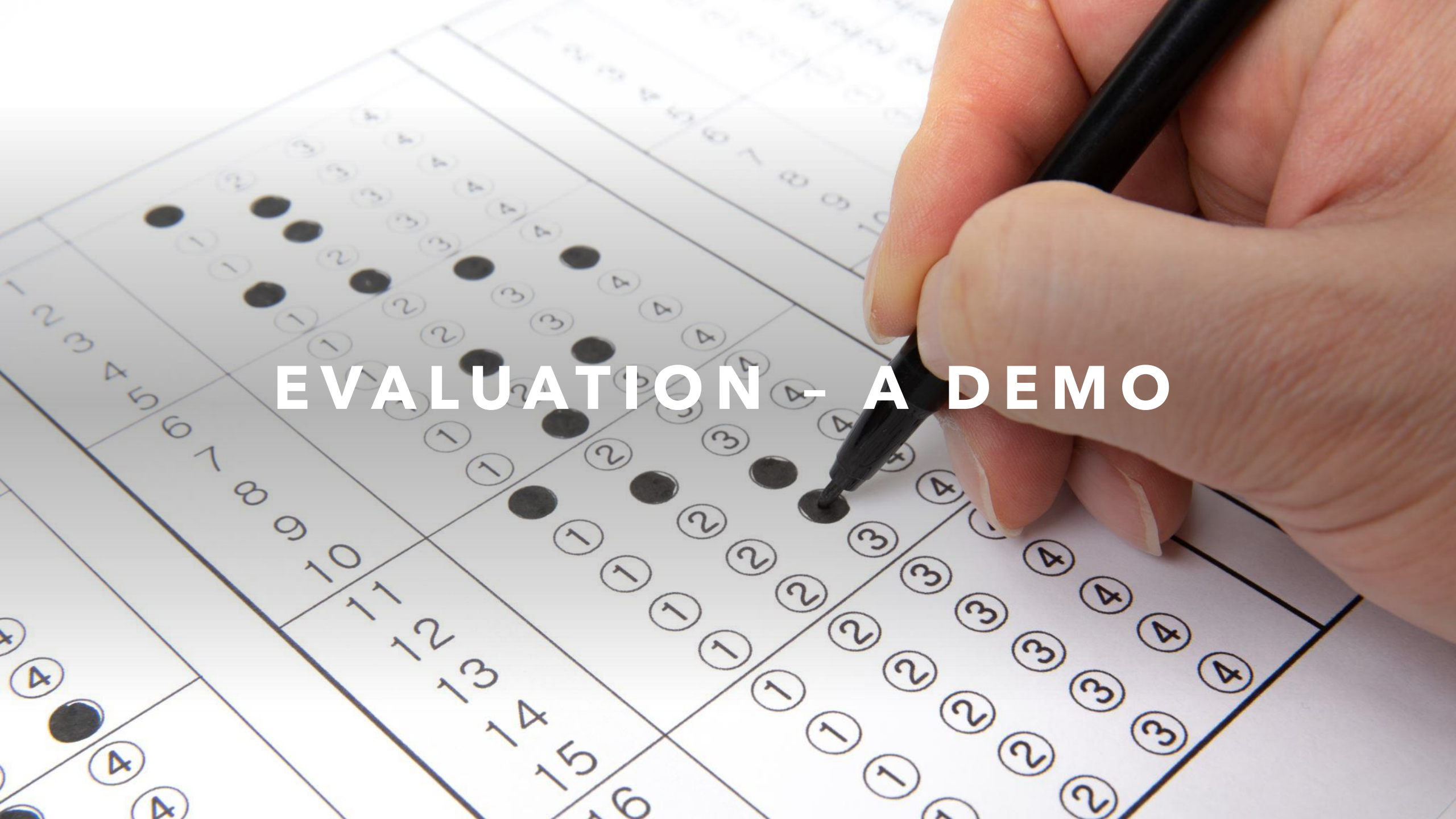
Evaluate generative AI application safety with Azure AI Studio




Sample Data (Test Data)
Production Data
Path 1
Path 3
Playground
Dataset
Monitoring Tab
• Performance/token Statistics
• Generation Quality and Safety
Evaluation Tab
Manual Evaluation
Automatic Evaluation
Automatic Evaluation
Experiment Tracker
Evaluation UI
Deploy
Monitor
Manual Evaluation
Automatic Evaluation
Evaluate
Azure AI Content Safety
Path 2
Automatic Evaluation
Flows

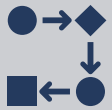
CONTENT FILTERING





EVALUATION – A DEMO

Azure AI Studio – se eget oppgaveark



https://learn.microsoft.com/en-us/azure/ai-studio/tutorials/deploy-chat-web-app (stopp når du kommer til Deploy – vi har nok ikke nok ressurser) – og bare les gjennom resten av oppgaven

https://learn.microsoft.com/en-us/azure/ai-studio/tutorials/deploy-copilot-ai-studio

Frameworks for LLMS

Demo - Langchain

- Start with a simple notebook: (in folder /kode)
- Start with this: https://python.langchain.com/docs/get_started/quickstart
- Start with this code sample from langchain: https://python.langchain.com/docs/expression_language/get_started
- Add some more samples from Langchain cookbook: https://python.langchain.com/docs/expression_language/cookbook/

More code with Azure OpenAI

Github – code – let’s try out some samples

Microsoft Azure

Compute og ressurser

Azure ML Studio

Azure Open AI – flere oppgaver

https://github.com/Azure-Samples/openai

1. Last ned og unzip-filene
2. Chat:
    1. Start med å legge inn requirements, nøkkel og endepunkt: https://github.com/Azure-Samples/openai/blob/main/Basic_Samples/Chat/README.md

    2. Åpne og test fortløpende de enkelte notebooks:
        1. Basic_chatcompletions…
        2. ChatGPT_managing…
        3. Chat_with_your_own_data..

Labb/Oppgaver

- https://github.com/MicrosoftLearning/mslearn-ai-services
- https://github.com/MicrosoftLearning/mslearn-ai-vision
- https://github.com/MicrosoftLearning/mslearn-ai-language
- https://github.com/MicrosoftLearning/mslearn-ai-document-intelligence
- https://github.com/MicrosoftLearning/mslearn-knowledge-mining/
- https://github.com/MicrosoftLearning/mslearn-openai