

# Generative AI for Developers

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# Agenda

- Why AI and Why Now?
  - Brief history of AI
  - AI Landscape
  - Generative AI Landscape
- Large Language Models
- Azure OpenAI Service
- Prompt Engineering Best Practices
- Demos (many of them)
- Questions

# Brief History of AI

Artificial Intelligence

Machine Learning

Deep Learning

Generative  
AI



## Artificial Intelligence

The field of computer science that seeks to create intelligent machines that can replicate or exceed human intelligence

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## Machine Learning

Subset of AI that enables machines to learn from existing data and improve upon that data to make decisions or predictions

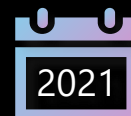
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## Deep Learning

A machine learning technique in which layers of neural networks are used to process data and make decisions

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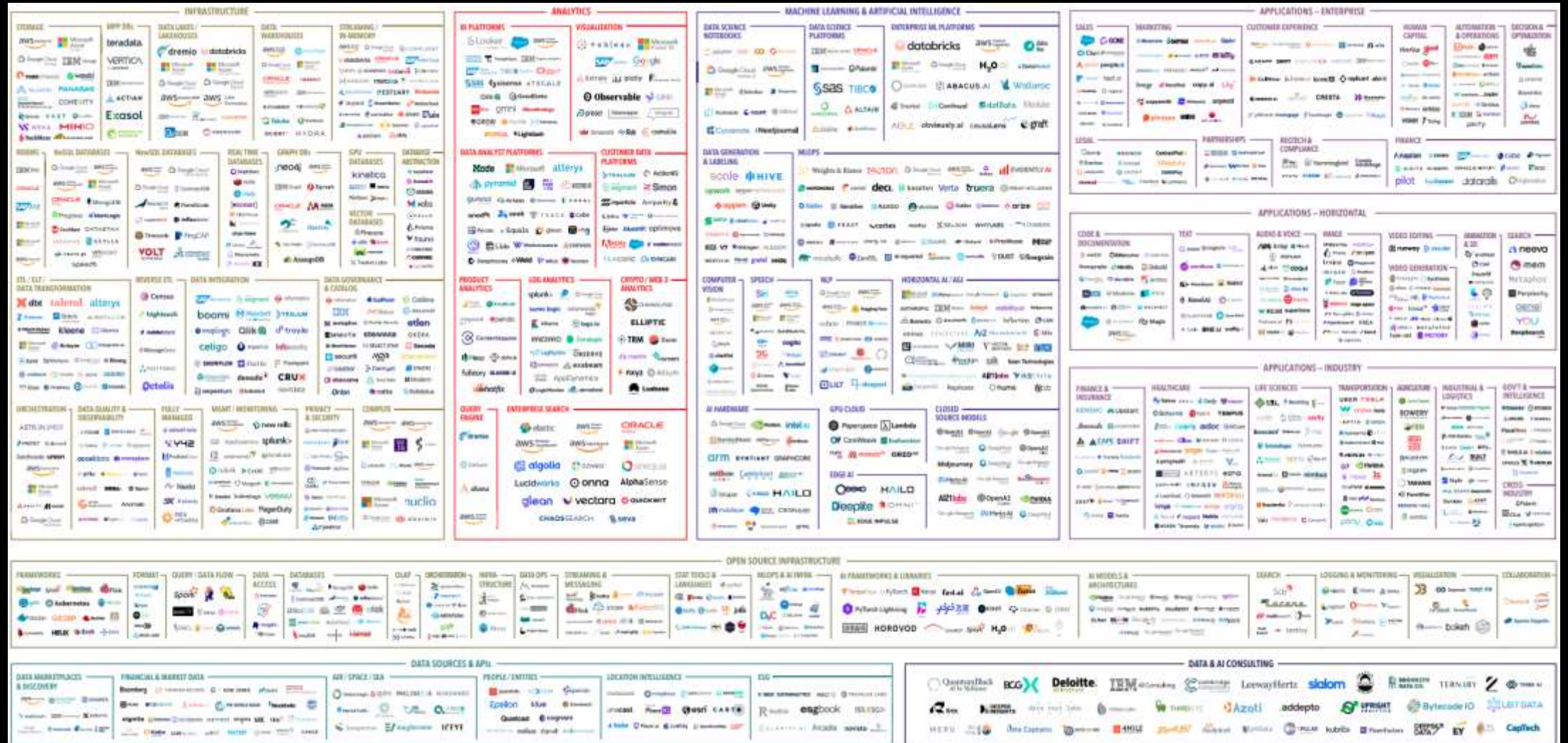
## Generative AI

Create new written, visual, and auditory content given prompts or existing data

# Why do we need to discuss this?

- Artificial Intelligence is changing the way we live and work
  - Netflix, Spotify, Instagram, Word, Excel, PowerPoint and much more...
- Almost every industry is infused by Artificial Intelligence
  - Travel
  - Retail
  - Government Services
  - Utilities
  - ...

# AI Landscape



# Generative AI

- Genie you wish you had in your pocket
- AI to create new data
  - Text
  - Audio
  - Video
  - Images
- Can write emails, articles, line of code and so on..

# Generative AI Landscape

AI 50 2023

VISUALIZED

Forbes

SEQUOIA

MERITECH

Apps

CONSUMER USES

ENTERTAINMENT

character.ai  
MidJourney

PRODUCTIVITY

OpenAI  
ChatGPT  
neeva

OTHER

trigo  
Wabi

ENTERPRISE STACK

GENERAL  
PRODUCTIVITY

ADEPT  
tome  
glean  
AlphaSense

GENERAL &  
ADMINISTRATIVE

Ironclad  
synthesia  
eightfold.ai

SALES &  
CUSTOMER SUPPORT

GONG  
Clari  
RevComm  
PolyAI

MARKETING

Jasper  
WRITER

EPD/IT/SECURITY

Moveworks  
Abnormal  
VECTRA  
GitHub Copilot

INDUSTRY VERTICALS

LAW FIRMS

Harvey.

CREATIVE

runway  
MidJourney  
Imagen  
descript

HEALTH

iz.ai  
BAYESIAN  
HEALTH  
insitro  
PathAI  
UNLEARN

DEFENSE

ANDURIL  
Shield AI  
SLINGSHOT  
VANNEVAR Labs

AGRICULTURE  
& CLIMATE

Pachama  
FarmWise

CONSTRUCTION

CANVAS

Infrastructure

DEPLOY & MONITOR

Hugging Face  
arize

TRAIN & FINE  
TUNE MODELS

Weights & Biases  
mosaicML  
PyTorch  
AX

USE OPEN SOURCE  
MODELS & FRAMEWORKS

Hugging Face  
Stanford Alpaca  
LLaMA

STORE & COMPUTE

LABEL / PROCESS DATA

Snorkel  
scale  
surge  
COACTIVE

DATA WAREHOUSES / LAKEHOUSE

snowflake  
databricks

CLOUD SERVICE PROVIDERS

Google Cloud  
aws  
Azure

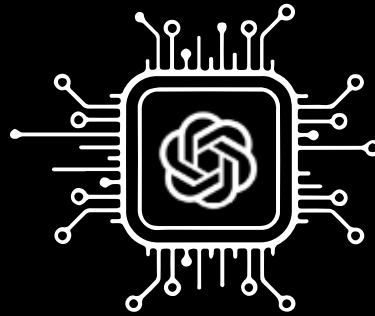
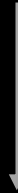
HARDWARE

nvidia  
AMD  
intel  
(etc.)

FULL STACK LARGE LANGUAGE MODELS

OpenAI  
ANTHROPIC  
cohere  
character.ai  
Inflection

Training Data



Prompt

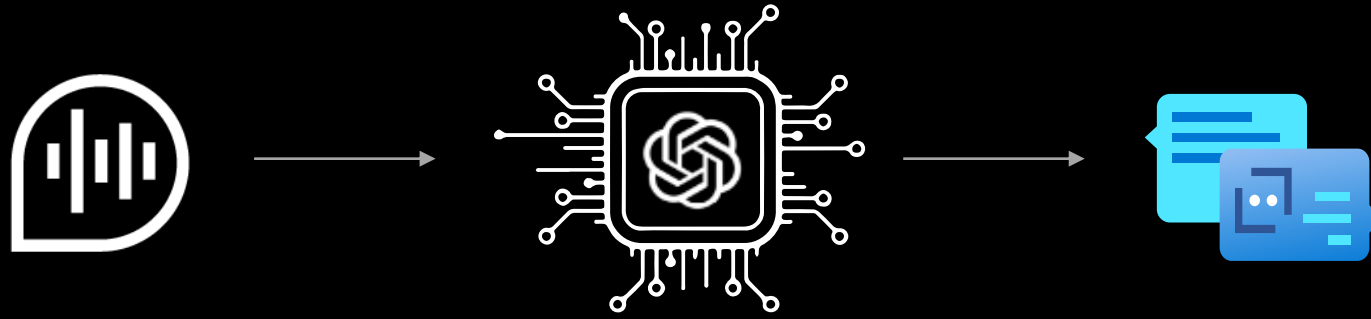
Model

Completion

“The Capital of  
Australia is”

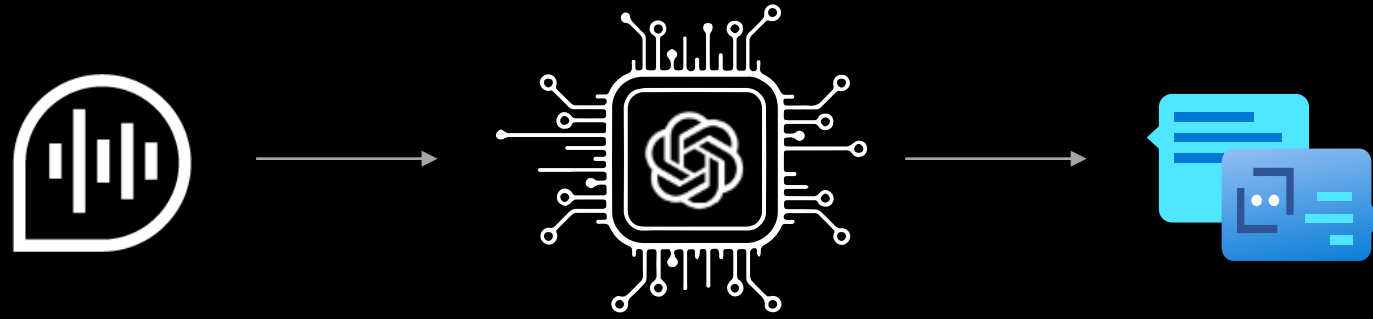
“ Canberra”





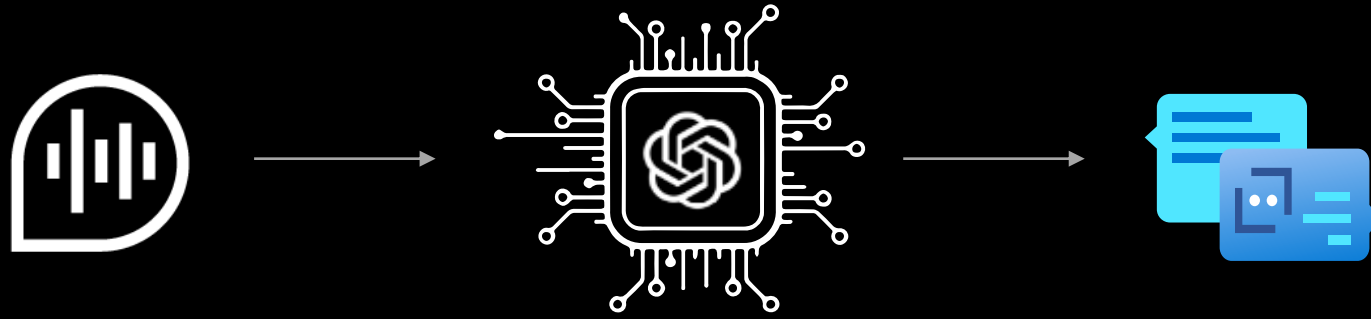
“I climbed the mango tree and  
picked a”

“ mango.”



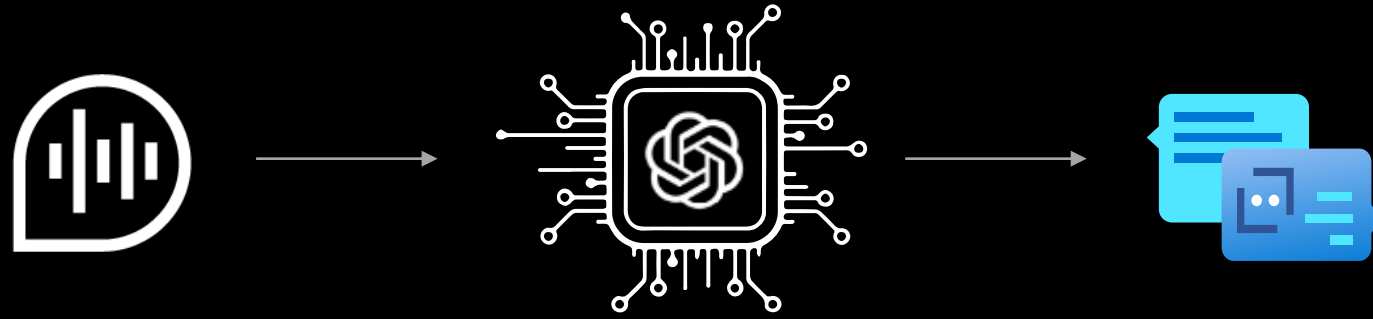
“I climbed the tree and picked a”

“ mango.”



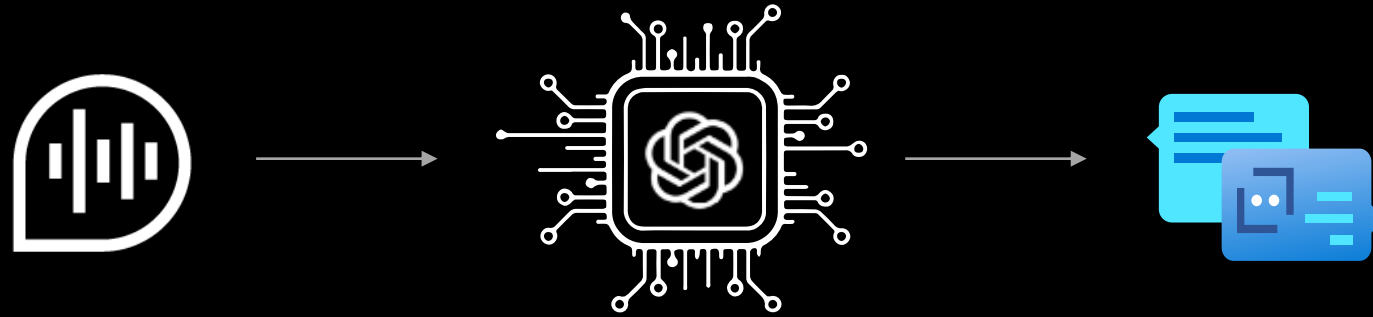
“I climbed the tree and picked a”

“ few fruits.”



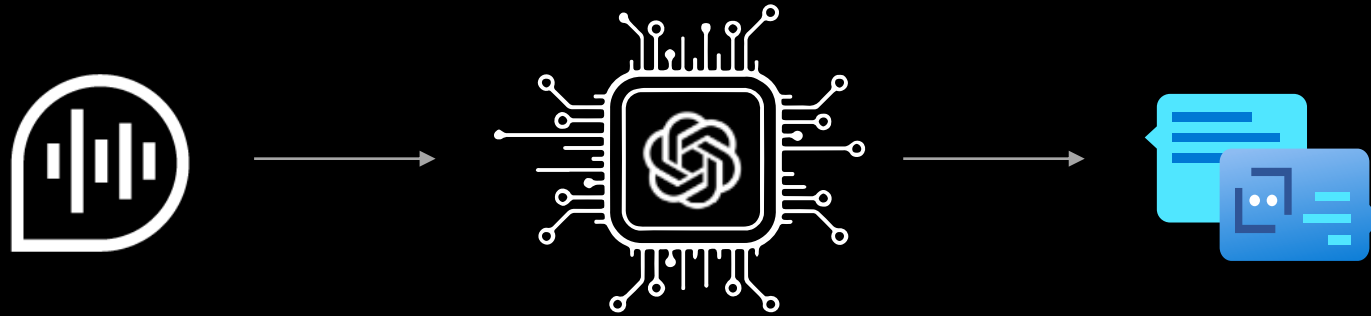
“I climbed the tree and picked a”

“ pear.”



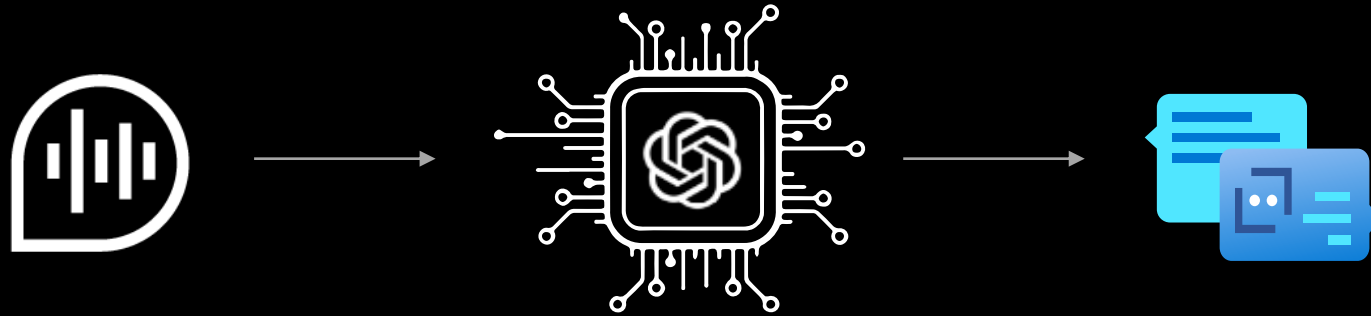
“I climbed the tree and picked a”

“ few of the plums, and I must  
say they were the sweetest plums  
I have ever tasted.”



“When did Queen Elizabeth II  
die?”

“Queen Elizabeth II is still  
alive and well and has been the  
Queen of the United Kingdom since  
1952.”

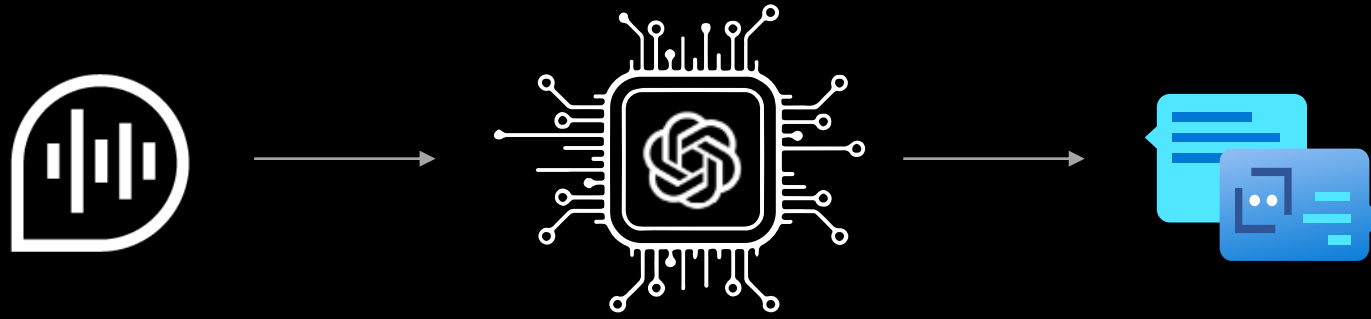


“Write a biography of Lilithia Starlight, inventor of the lit now. Include references.”

“Lilithia Starlight is a renowned inventor and entrepreneur known for her creation of the Lit Now, a revolutionary lighting system that has transformed the way people illuminate their homes and workplaces. ...

References:

- 1.<https://www.forbes.com/sites/forbestechcouncil/2018/06/26/lilithia-starlight-from-invention-to-innovation/?sh=7d2c3f3d7f45>
- 2.<https://www.nytimes.com/2019/06/18/business/lilithia-starlight-led-lights.html>”

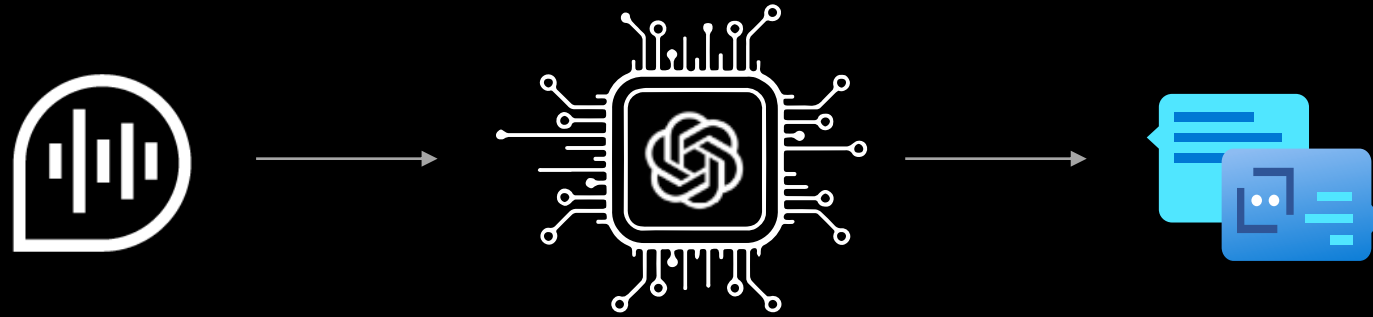


“Hi, my name is Arafat. Who are you?”

“

Hi Arafat, my name is John. Nice to meet you.”

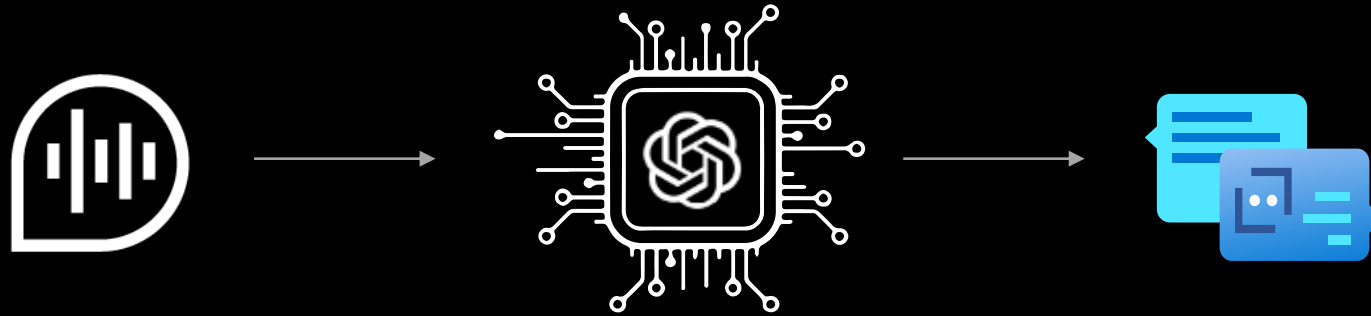




“You can give me a nickname, if  
you like.”

“

Sure! How about ‘Sparky’?”



“HUMAN: Hi, my name is Arafat.  
Who are you?”

AGENT: Hi Arafat, my name is  
John. Nice to meet you.

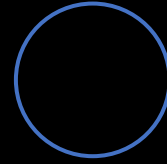
HUMAN: You can give me a  
nickname, if you like.

AGENT:”

“ Sure, how about Ara?”

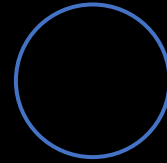


# Foundational Generative AI models can:



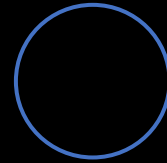
## **Generate text, images and code**

Different models are trained on different corpora, depending on the application.



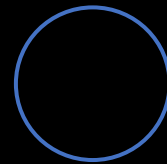
## **Generate “humanlike” output**

What is a likely continuation of the prompt, given the training data?



## **Provide information**

The continuation is likely to be similar to text frequently represented in the training data.

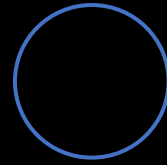


## **Create novel content**

“Creative” works: Text, images and code not contained in the training data. Also: Translations.

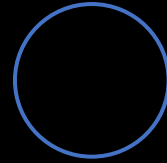


# Foundational Generative AI models are not:



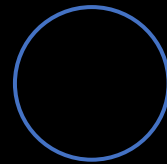
## **Intelligent**

It's just a predictive system, designed to give a likely continuation of the prompt given the training data.



## **Deterministic**

Run the same prompt. Get back a different response (probably).

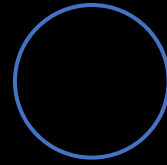


## **Grounded**

They can "hallucinate" "facts" and confidently assert them to be true.

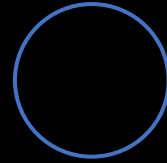


# Foundational Generative AI models can not:



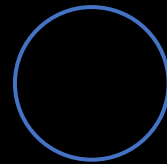
## Know Everything

The model doesn't contain verbatim documents. It's just "a blurry JPEG"<sup>1</sup> of its training data.



## Learn

The model is fixed at the time of its training. The only source of new information is the prompt.



## Act

Still constrained by an extensive set of human-crafted guardrails (prompts). Update knowledge in real-time (for now).

1. [newyorker.com/tech/annals-of-technology/chatgpt-is-a-blurry-jpeg-of-the-web](https://www.nytimes.com/2023/03/14/technology/chatgpt-is-a-blurry-jpeg-of-the-web.html)



*Ensure that artificial  
general intelligence (AGI)  
benefits humanity*



*Empower every person and  
organization on the planet  
to achieve more*

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**GPT-3.5 and GPT-4  
(GA)**

Text

**ChatGPT (GA)**

Conversation

**Codex (GA)**

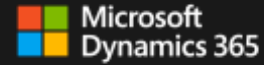
Code

**DALL·E 2 (Preview)**

Images

# Azure AI

## Applications



Partner Solutions

## Application Platform

AI Builder



Power BI



Power Apps



Power Automate



Power Virtual Agents

## Scenario-Based Services

Applied AI Services



Bot Service



Cognitive Search



Form Recognizer



Video Indexer



Metrics Advisor



Immersive Reader

## Customizable AI Models

Cognitive Services



Vision



Speech



Language



Decision



Azure OpenAI  
Service

## ML Platform



Azure Machine Learning



Business  
Users



Developers &  
Data Scientists

# Azure OpenAI Service for Generative AI

## Content creation by API

### Prompt

Write a tagline for an ice cream shop.

### Response

We serve up smiles with every scoop!

### Prompt

I'm having trouble getting my Xbox to turn on.

### Response

There are a few things you can try to troubleshoot this issue ...

### Prompt

Thanks! That worked. What games do you recommend for my 14-year-old?

### Response

Here are a few games that you might consider: ...

### Prompt

```
Table customers, columns =  
[CustomerId, FirstName,  
LastName, Company, Address,  
City, State, Country,  
PostalCode]
```

Create a SQL query for all customers in Texas named Jane  
query =

### Response

```
SELECT *  
FROM customers  
WHERE State = 'TX' AND  
FirstName = 'Jane'
```

### Prompt

A ball of fire with vibrant colors to show the speed of innovation at our media and entertainment company

### Response





# What business scenarios can this unlock?

Sentiment  
Analysis

Translation

Maker Tutorials

Text Classification

Opinion Mining

Conversational  
agent over data

Content  
recommendation

Content  
generation

Summarisation

Automated  
customer service

Document  
clustering

Information  
extraction

...

# Azure OpenAI Considerations



I need a general-purpose model that can handle multiple tasks  
e.g., translation+entity recognition+sentiment analysis



I need to generate human-like content, whilst preserving data privacy and security  
e.g., abstractive summarization, content writing, paraphrasing, code



I need rapid prototyping and quick time to market for many use cases



I could use a model with little or no training



I want to explore solutions/use cases that have been described previously



Vision



Speech

Azure OpenAI  
Service



Language



Decision

Azure AI Cognitive Services

# Azure OpenAI Service for Generative AI

Preview and coming soon features



Deploy on your  
own data



Provisioned  
Throughput  
SKU



Plugins for  
Azure OpenAI  
Service

# Best Practices for Prompt Engineering

- Be clearly descriptive and specific
  - You may ask for a structured output
    - JSON / HTML etc.
  - Evaluate if the conditions are satisfied
    - Assumptions required to do this task
- Be Iterative
- Sequence matters, set goal before context
- Give model an "out"..
  - Leave a room of unknown or not found..
- Improve your prompts with a few shot examples
  - Zero-shot, one-shot and few shot learning

# Zero-shot, one shot and few shot learning

- Zero-shot learning
  - With zero-shot learning, the AI model must generate outputs or solve tasks without having seen any examples of the specific task during training.
- One-shot learning
  - In this approach, the AI model learns to recognize or generate new content based on just one example.
- Few shot learning
  - This technique involves training the AI model with a small number of examples (usually less than 10).

# Demos

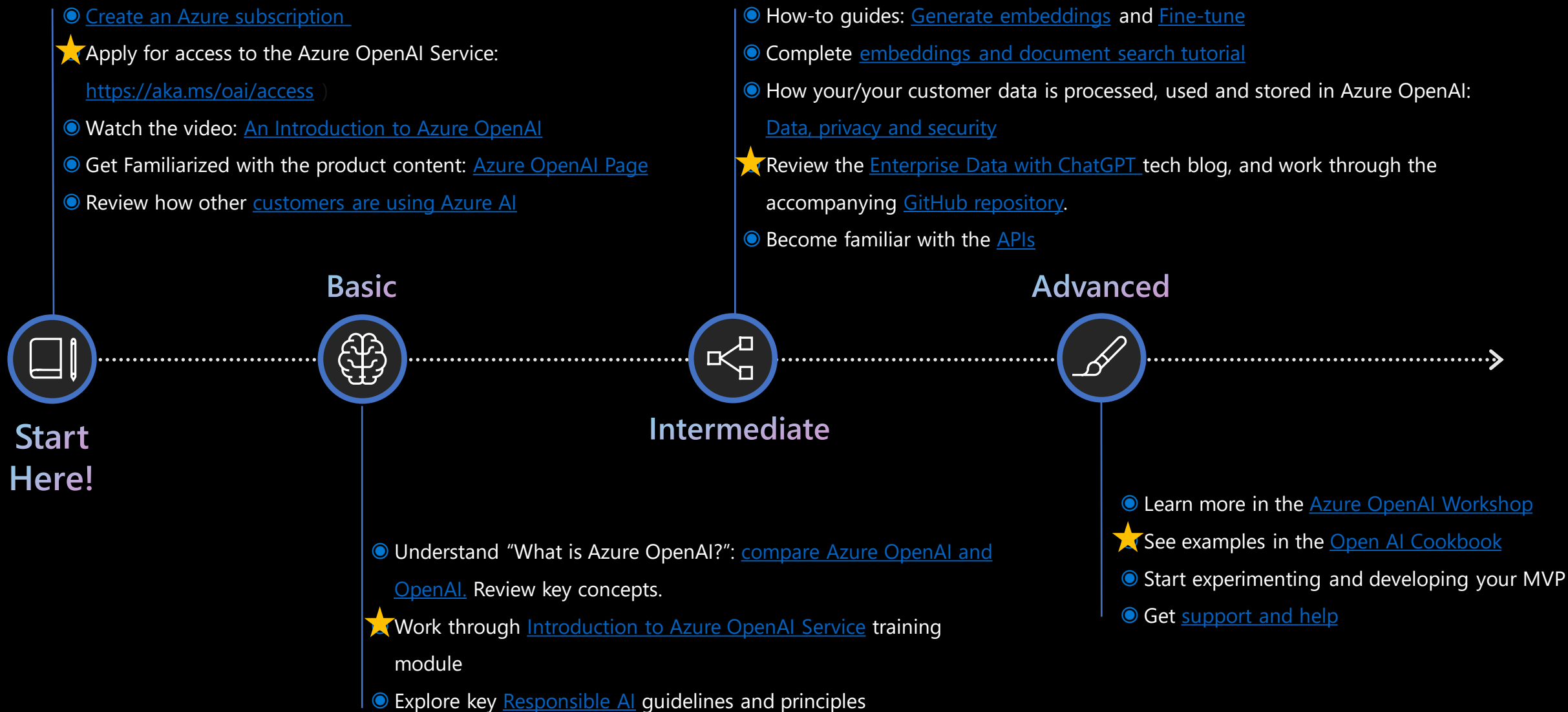
Getting started with Azure OpenAI Service

Build a Flight Tracker with AOI

Add multimodality to your solutions with text and voice

Generate images for your social media campaigns

# Azure OpenAI Service Learning Guide



# Questions

[arafat@outlook.com](mailto:arafat@outlook.com)

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[twitter.com/arafattehsin](https://twitter.com/arafattehsin)



[arafattehsin.com/blog](https://arafattehsin.com/blog)