

**NOVA**

**IMS**

Information  
Management  
School

AI

# Artificial Intelligence

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# AI – Microsoft AI Overview

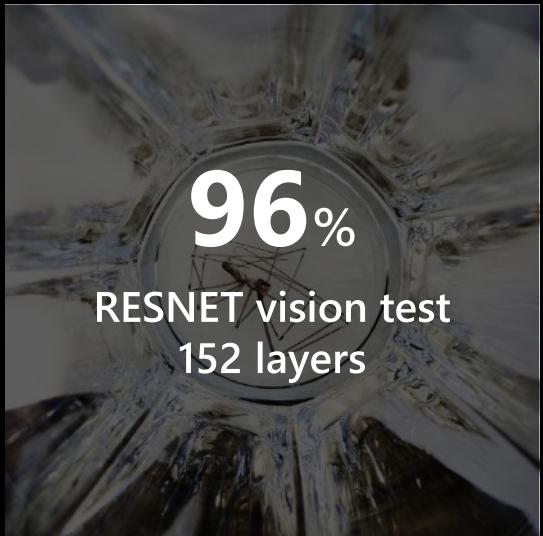


A close-up, profile shot of Satya Nadella, Microsoft's CEO. He is wearing blue-framed glasses and a dark blue shirt. He is gesturing with his right hand, pointing his index finger upwards, while holding a white Microsoft remote control in his left hand. The background is dark.

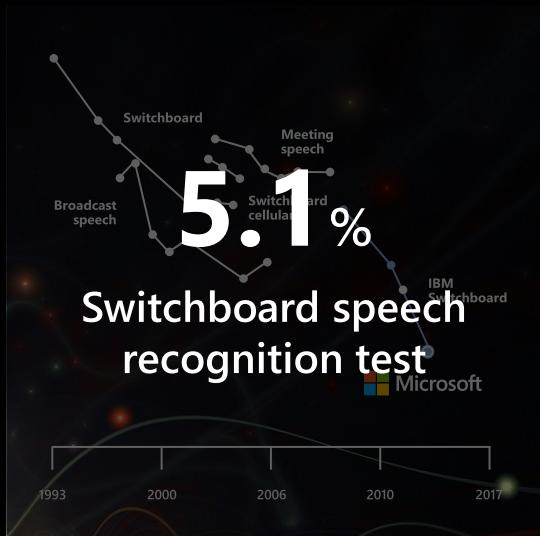
*Our strategy is to build best-in-class platforms and productivity services for an intelligent cloud and an intelligent edge infused with artificial intelligence (“AI”).*

# Microsoft AI breakthroughs

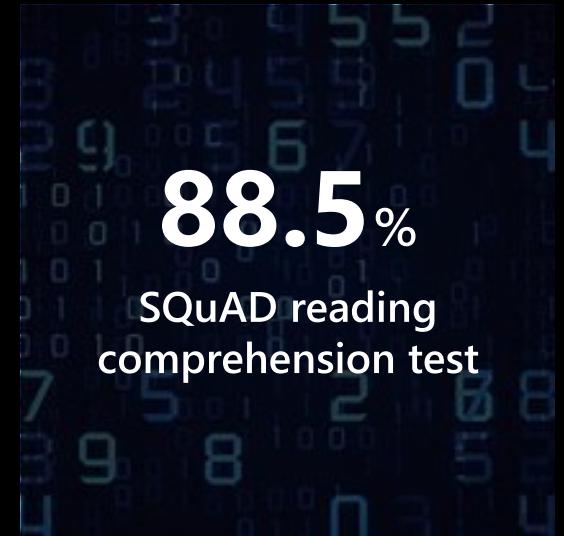
## Vision



## Speech



## Language



2016

Object recognition  
Human parity

2017

Speech recognition  
Human parity

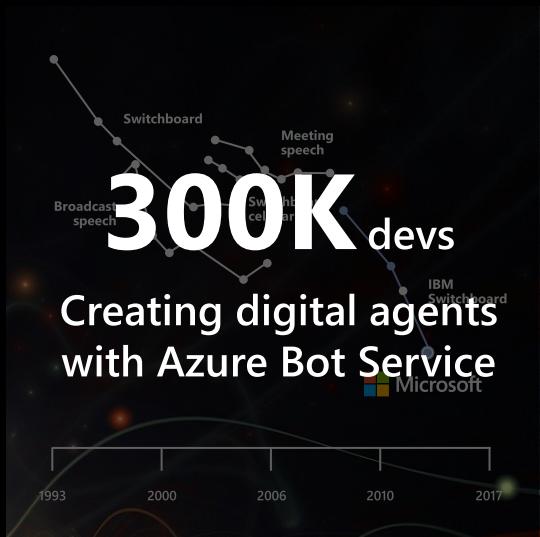
March 2018

Machine translation  
Human parity

January 2018

Machine reading comprehension  
Human parity

# Microsoft AI Momentum



## 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



## Machine Learning

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



## Deep Learning

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



## Generative AI

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

# How the tech behind ChatGPT could change the world—an

[How the tech behind ChatGPT could change the world—an updated episode from our archive | The Economist](#)

# OpenAI's new DALL-E model draws anything—but bigger, better and faster than before

[dall-e | TechCrunch](#)

# A.I. Can Now Write Its Own Computer Code. That's Good News for Humans.

[A.I. Can Now Write Its Own Computer Code. That's Good News for Humans. - The New York Times \(nytimes.com\)](#)

# *Microsoft Bets Big on the Creator of ChatGPT in Race to Dominate A.I.*

[Microsoft Bets Big on the Creator of ChatGPT in Race to Dominate A.I. - The New York Times \(nytimes.com\)](#)

## **ChatGPT has given everyone a glimpse at AI's astounding progress**

[OpenAI's ChatGPT is a fascinating glimpse into the scary power of AI - Vox](#)

## **GPT-3: We're at the very beginning of a new app ecosystem**

[GPT-3: We're at the very beginning of a new app ecosystem | VentureBeat](#)



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



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

### GPT-3

Generate and Understand Text

### Codex

Generate and Understand Code

### DALL·E

Generate images from text prompts



## Generative AI

### GPT-3

Prompt:

Write a tagline for an ice cream shop.

Response:

We serve up smiles with every scoop!

### Codex

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'
```

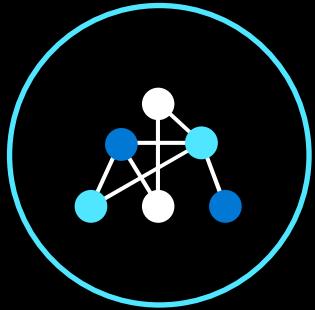
### DALL·E

Prompt: A white Siamese cat

Response:



# Azure AI



Machine learning



AI apps & agents



Knowledge mining

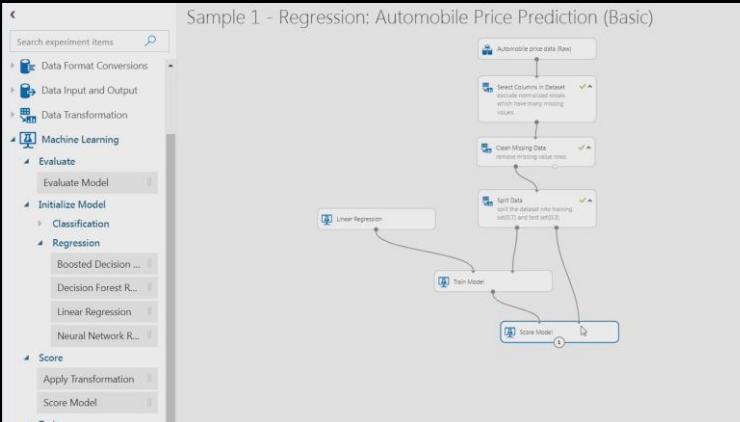
# Simplify machine learning for any skill level

Welcome to Automated Machine Learning

**Getting Started**  
Create your first experiment with automated machine learning to produce quality models with zero effort.

**Create experiment**

**What's Possible with Automated Machine Learning**  
Automate the process of algorithm selection, hyperparameter tuning, and best model selection with automated machine learning, and accelerate your productivity. Select your data and let automated ML do the rest to provide the best model from endless possible options.



jupyter distributed-pytorch-with-horovod Last Checkpoint: 5 minutes ago (autosaved)

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Licensed under the MIT License.

**Distributed PyTorch with Horovod**  
In this tutorial, you will train a PyTorch model on the [MNIST](#) dataset using distributed training via [Horovod](#) across a GPU cluster.

**Prerequisites**

- Go through the [Configuration](#) notebook to install the Azure Machine Learning Python SDK and create an Azure ML [Workspace](#)
- Review the [tutorial](#) on single-node PyTorch training using Azure Machine Learning

```
In [ ]: # Check core SDK version number
import azureml.core

print("SDK version:", azureml.core.VERSION)
```

**Diagnostics**

Automated  
machine learning UI

Visual interface

Machine learning notebooks

# Simplify machine learning for any skill level

Create a new automated machine learning experiment

Back

Experiment name \* my\_automated\_ml\_exp

Select a compute \* aml-compute (profiling enabled)

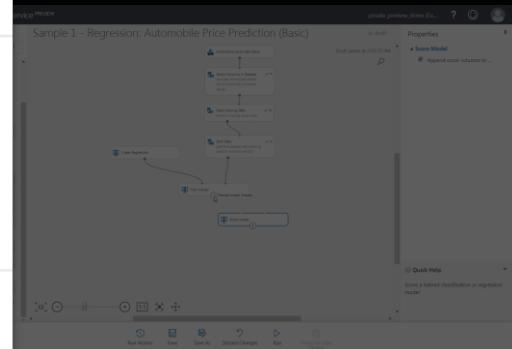
Create a new compute Refresh compute

Cancel Next

Select compute

This screenshot shows the 'Create a new automated machine learning experiment' wizard. It includes fields for 'Experiment name' (set to 'my\_automated\_ml\_exp') and 'Select a compute' (set to 'aml-compute (profiling enabled)'). Below these are buttons for 'Create a new compute' and 'Refresh compute'. At the bottom are 'Cancel' and 'Next' buttons.

Automated  
machine learning UI



Visual interface

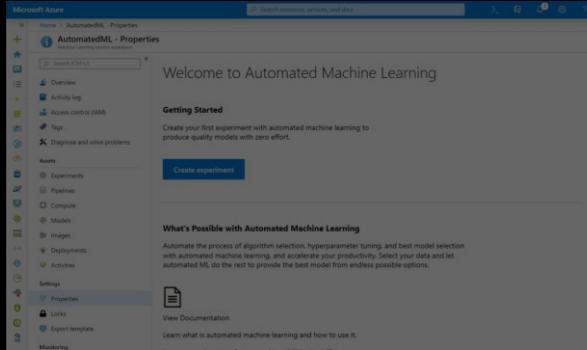
This screenshot shows a Jupyter notebook titled 'distributed-pytorch-with-horovod'. The notebook contains code for distributed PyTorch training using Horovod. It includes sections for 'Distributed PyTorch with Horovod' and 'Prerequisites'. The code cell shows the following Python code:

```
# Check core SDK version number
import azureml.core
print("SDK version:", azureml.core.VERSION)
```

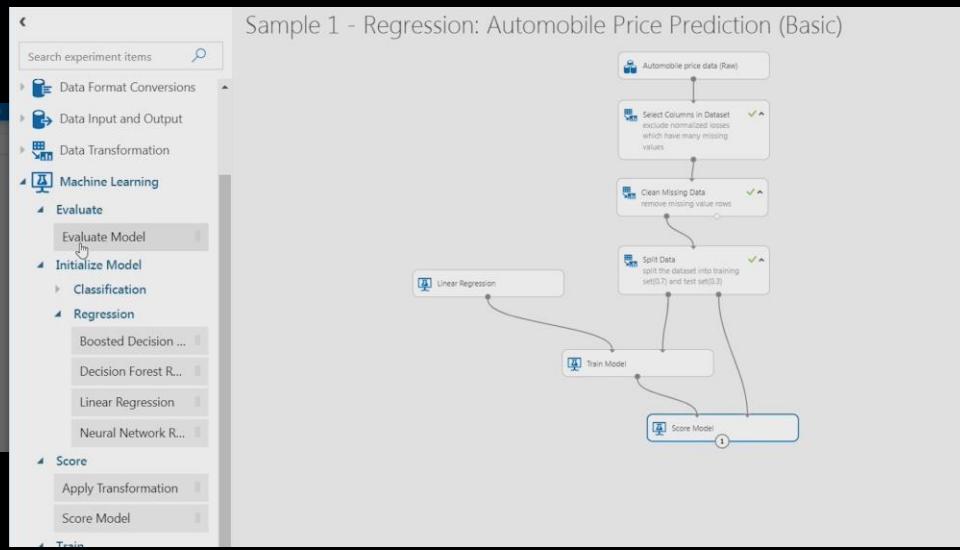
The 'Diagnostics' section shows the output of the code execution.

Machine learning notebooks

# Simplify machine learning for any skill level



Automated  
machine learning UI



Visual interface

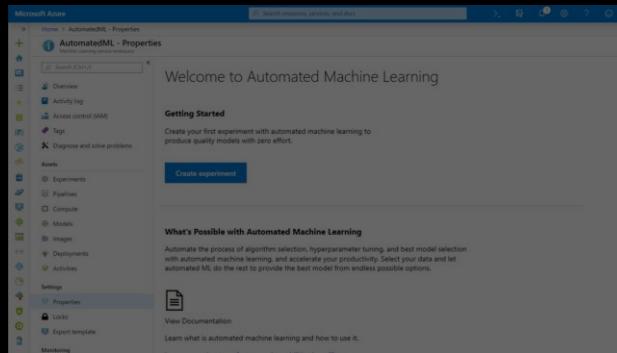
A screenshot of a Jupyter notebook titled 'distributed-pytorch-with-horovod'. The notebook interface shows the following details:

- File Edit View Insert Cell Kernel Widgets Help
- jupyter distributed-pytorch-with-horovod Last Checkpoint: 5 minutes ago (autosaved)
- Copyright © Microsoft Corporation. All rights reserved.  
Licensed under the MIT License.
- Distributed PyTorch with Horovod**  
In this tutorial, you will train a PyTorch model on the MNIST dataset using distributed training via Horovod across a GPU cluster.
- Prerequisites**
  - Go through the Configuration notebook to install the Azure Machine Learning Python SDK and create an Azure ML Workspace
  - Review the tutorial on single-node PyTorch training using Azure Machine Learning
- In [1]:

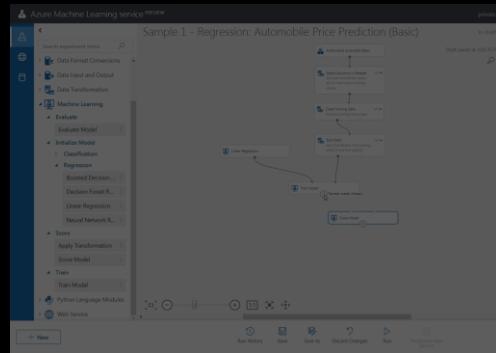
```
# Check core SDK version number
import azureml.core
print("SDK version:", azureml.core.VERSION)
```
- Diagnostics**

Machine learning notebooks

# Simplify machine learning for any skill level



Automated  
machine learning UI



Visual interface

A screenshot of a Jupyter notebook titled 'distributed-pytorch-with-horovod'. The notebook interface shows a toolbar at the top with various buttons for file operations. The main content area contains text about the tutorial, a 'Prerequisites' section, and a code cell for checking the core SDK version. The code cell contains the following Python code:

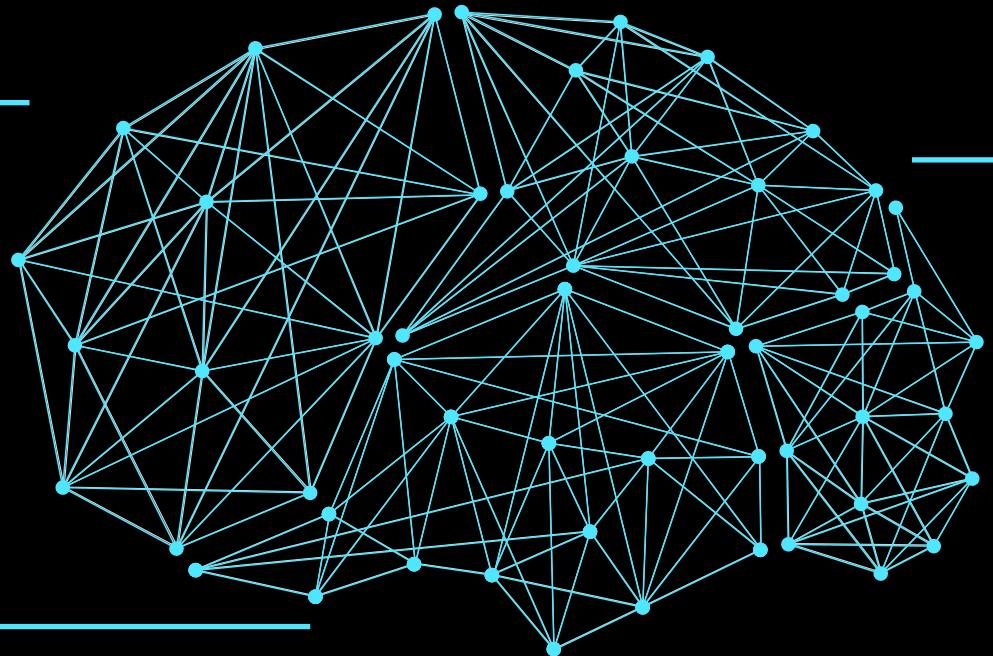
```
In [ ]: # Check core SDK version number
import azureml.core
print("SDK version:", azureml.core.VERSION)
```

Diagnostics

Machine learning notebooks

# Azure Cognitive Services

Decision

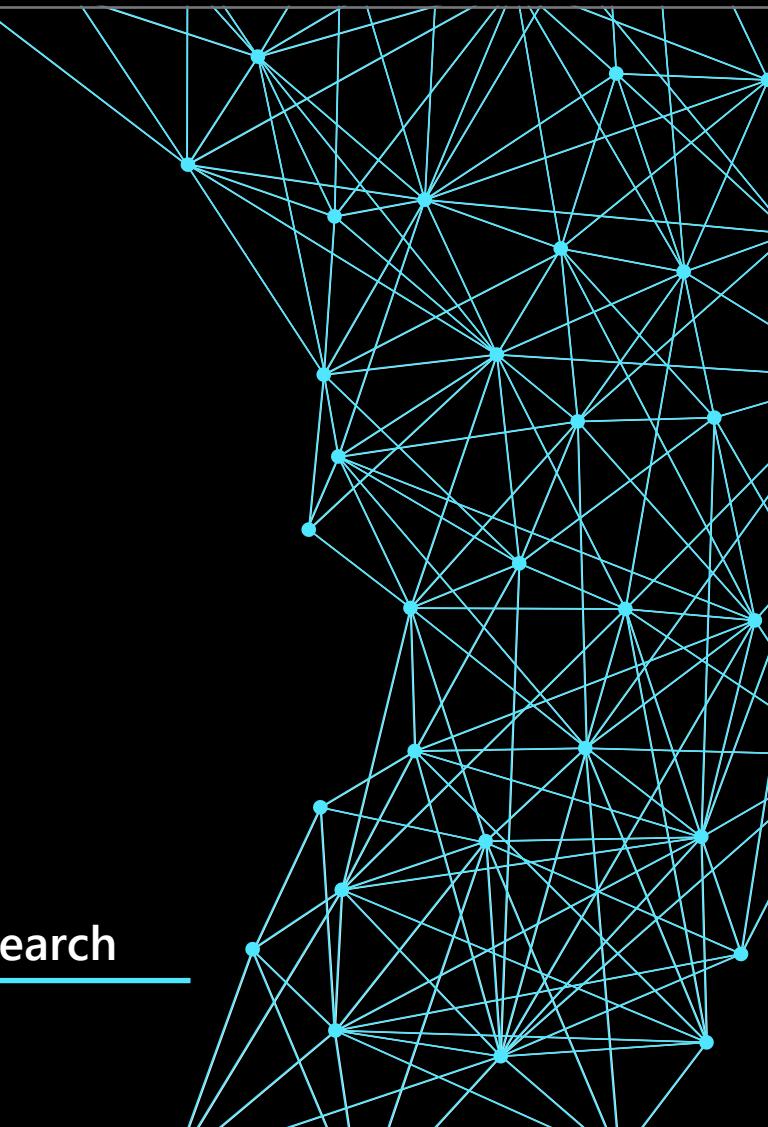


Speech

Language

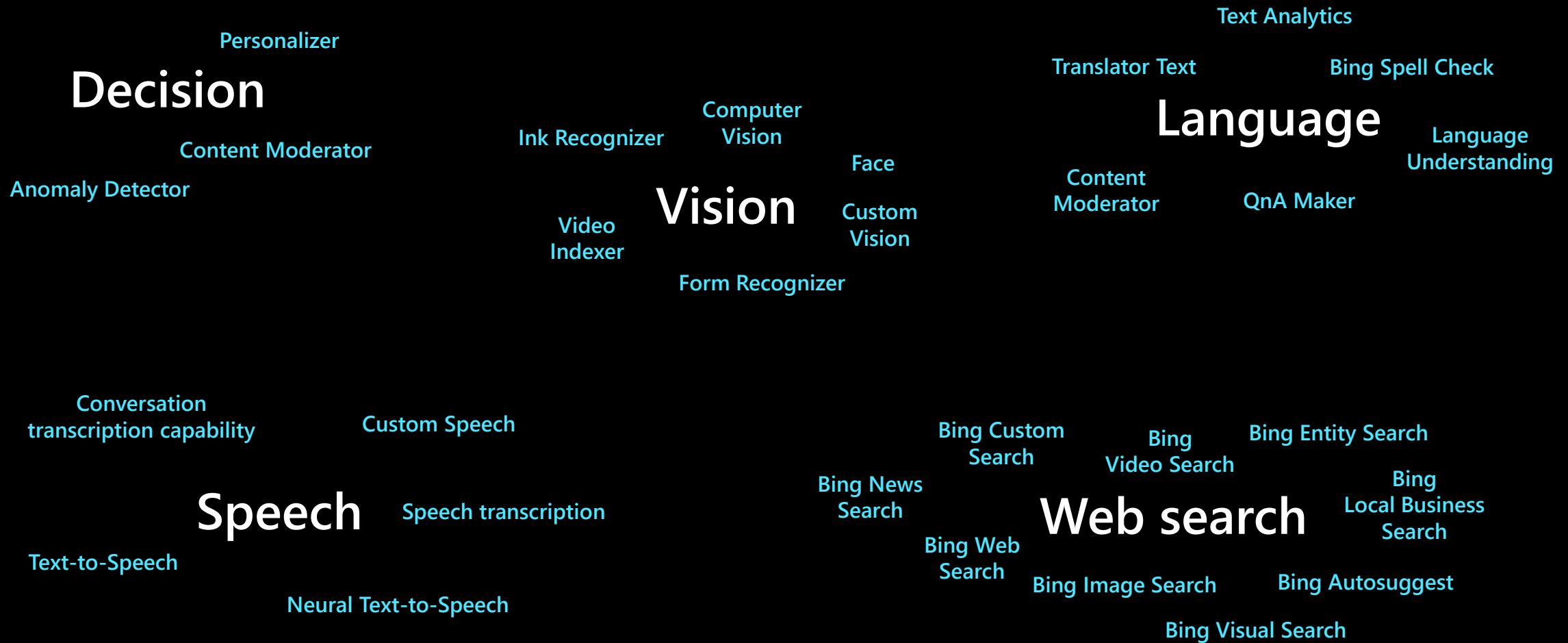
Vision

Web search

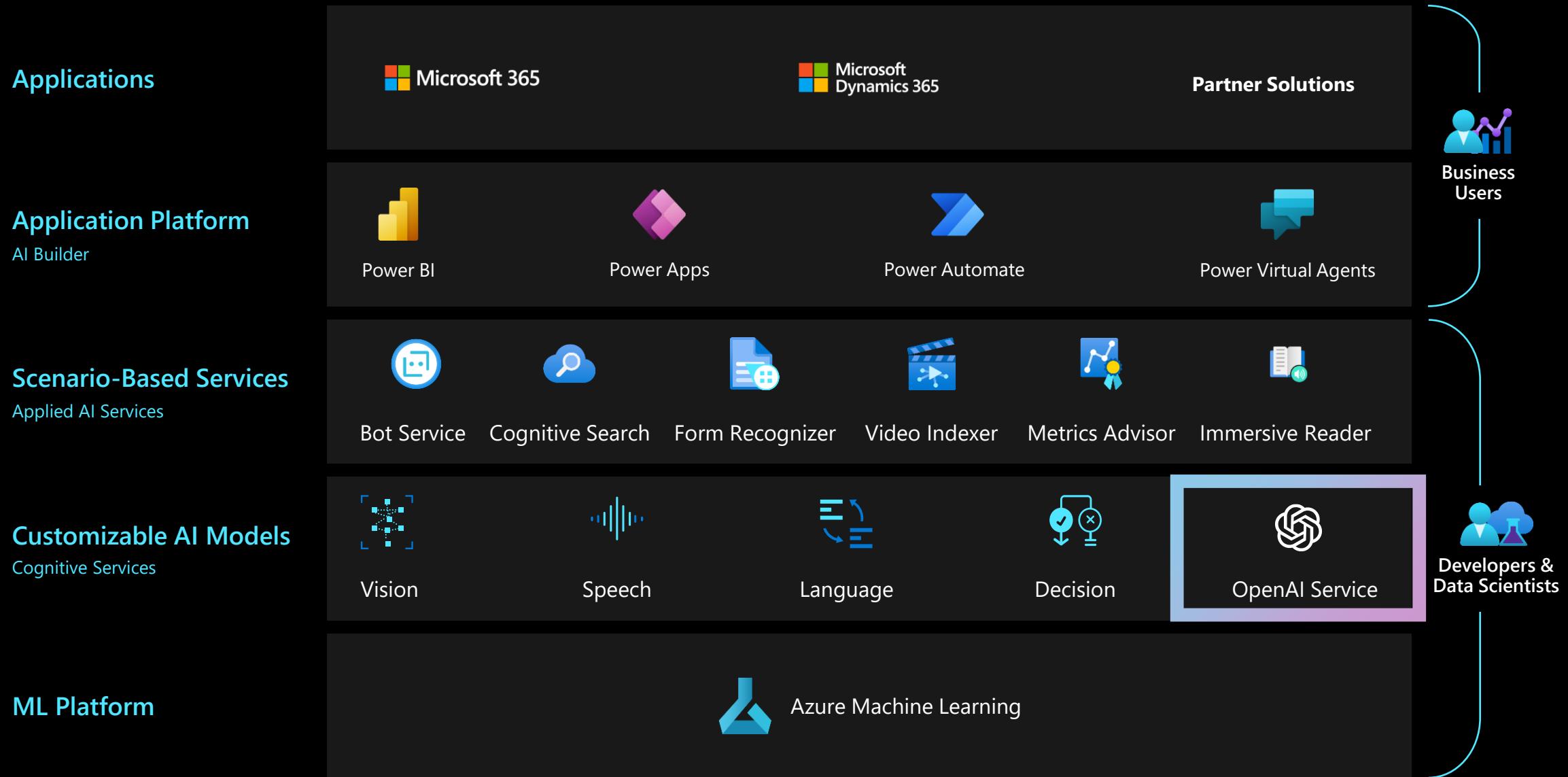


# Azure Cognitive Services

## The most comprehensive pre-trained AI



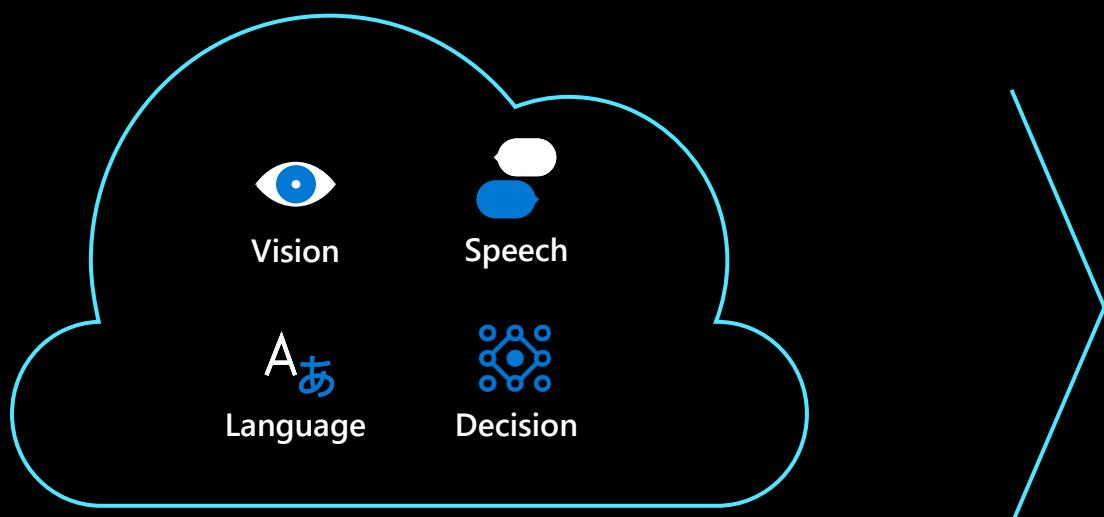
# Azure AI



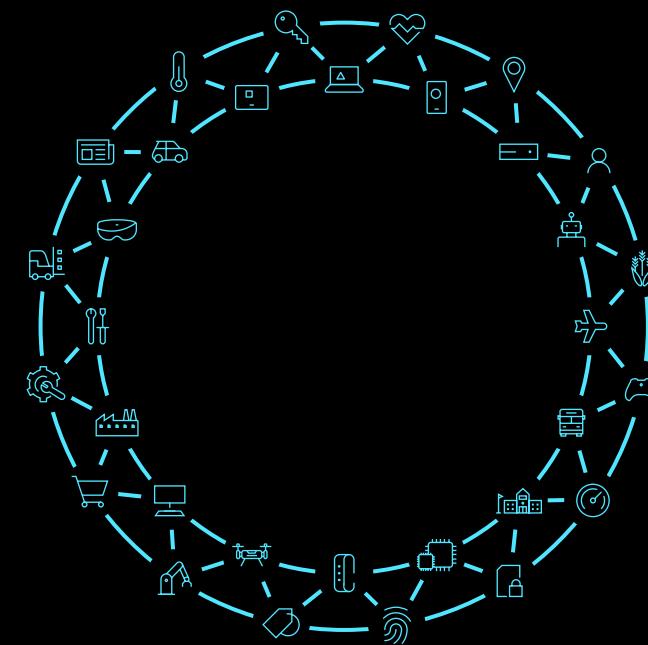
# Azure Cognitive Services

Deploy anywhere using containers

Azure Cognitive Services



Wherever your data resides



# Computer Vision

## Visual Intelligence Made Easy

Easily customize your own state-of-the-art computer vision models that fit perfectly with your unique use case. Just bring a few examples of labeled images and let Custom Vision do the hard work.



# Main Types of Computer Vision Algorithms

## IMAGE CLASSIFICATION

What are my images about?



## OBJECT DETECTION

Locate rectangular areas containing known objects in an image



## SEMANTIC SEGMENTATION

Locate known objects in an image, at pixel level

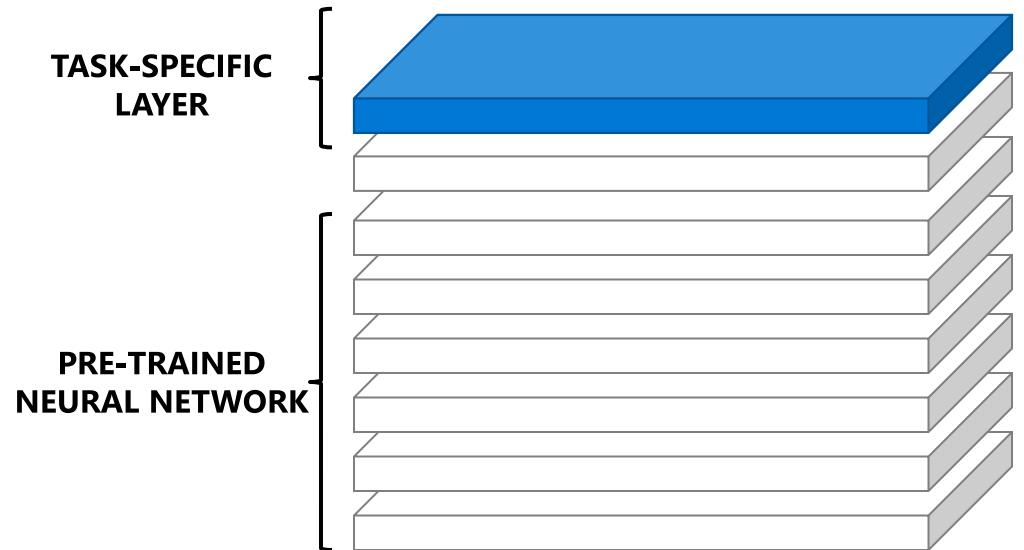


# Standing on the Shoulder of Giants – Transfer Learning

By **leveraging existing pre-trained models**

it becomes possible to train highly performant models using a relatively small task-specific data set.

Microsoft Cognitive Services for Computer Vision are ready-to-use and designed around that approach. Custom models trained on ImageNet (AlexNet, Resnet...) are also good examples of foundations for transfer learning.



# DEMO

Object Detection – Custom Vision API

- GENERAL AVAILABILITY

## Cognitive Services—Speech

- Speech to text
- Text to speech
- Speech translation
- Ability to customize all three capabilities



A あ



A あ

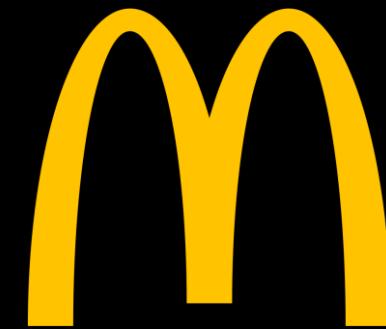


AI



# **DEMO**

Text To Speech– Speech API  
Automatic Speech Recognition – Speech API





## Future of Order Taking

drivethru.wav

Start Recognition

# Neural TTS Samples

A palpable chill passes through the room at this maladroit refusal .



Synthesized



Recorded

You can't know how long Tara would have been mad , because that was taken away from her.



Synthesized



Recorded

In Georgia , governor Zell Miller has declared a state of emergency in four counties.



Recorded



Synthesized

Nostalgia could still be evoked after only twenty years , and many remembered when.



Recorded



Synthesized

The forecast for next week shows sunshine with highs in the mid forties.



Synthesized



Recorded

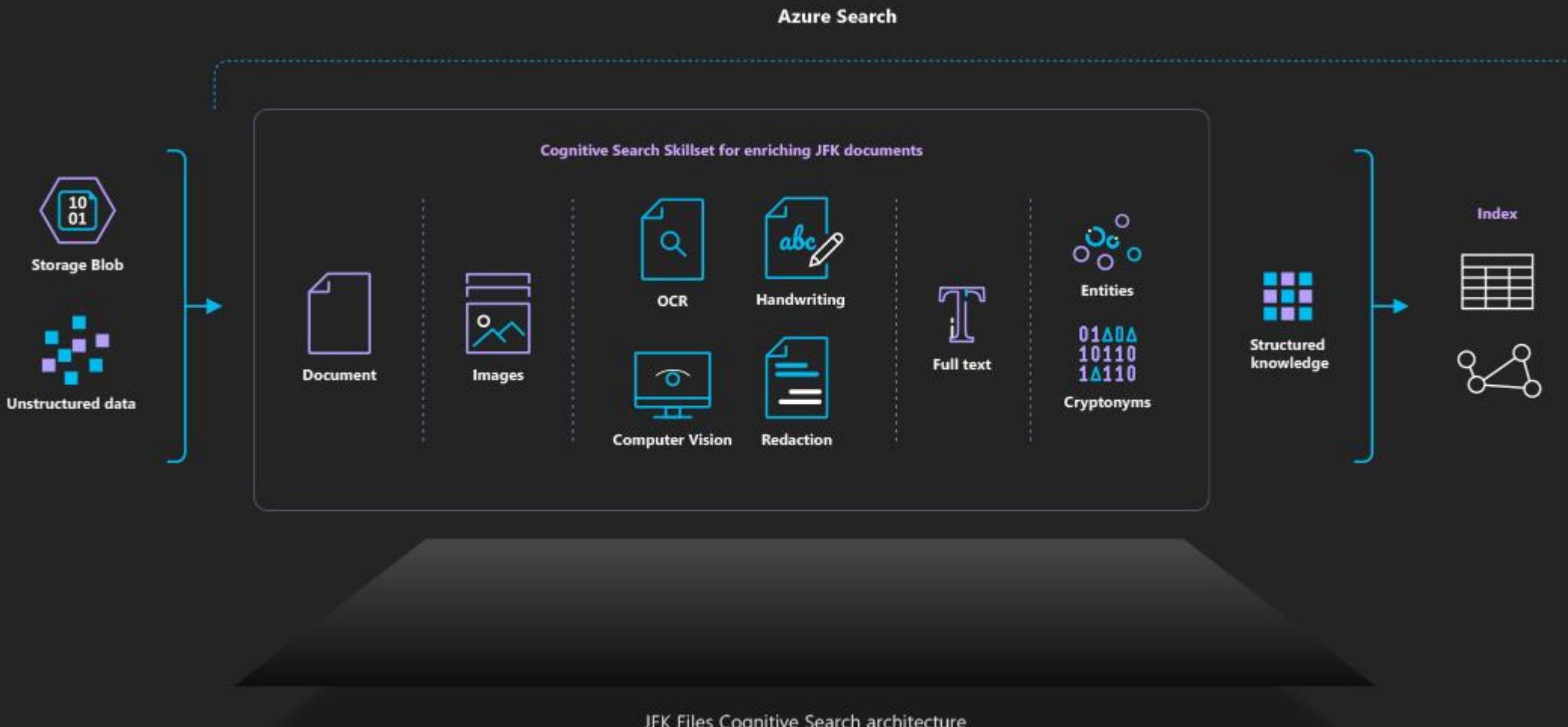
# **DEMO**

Automated Speech Recognition & Text To Speach

# JFK Files

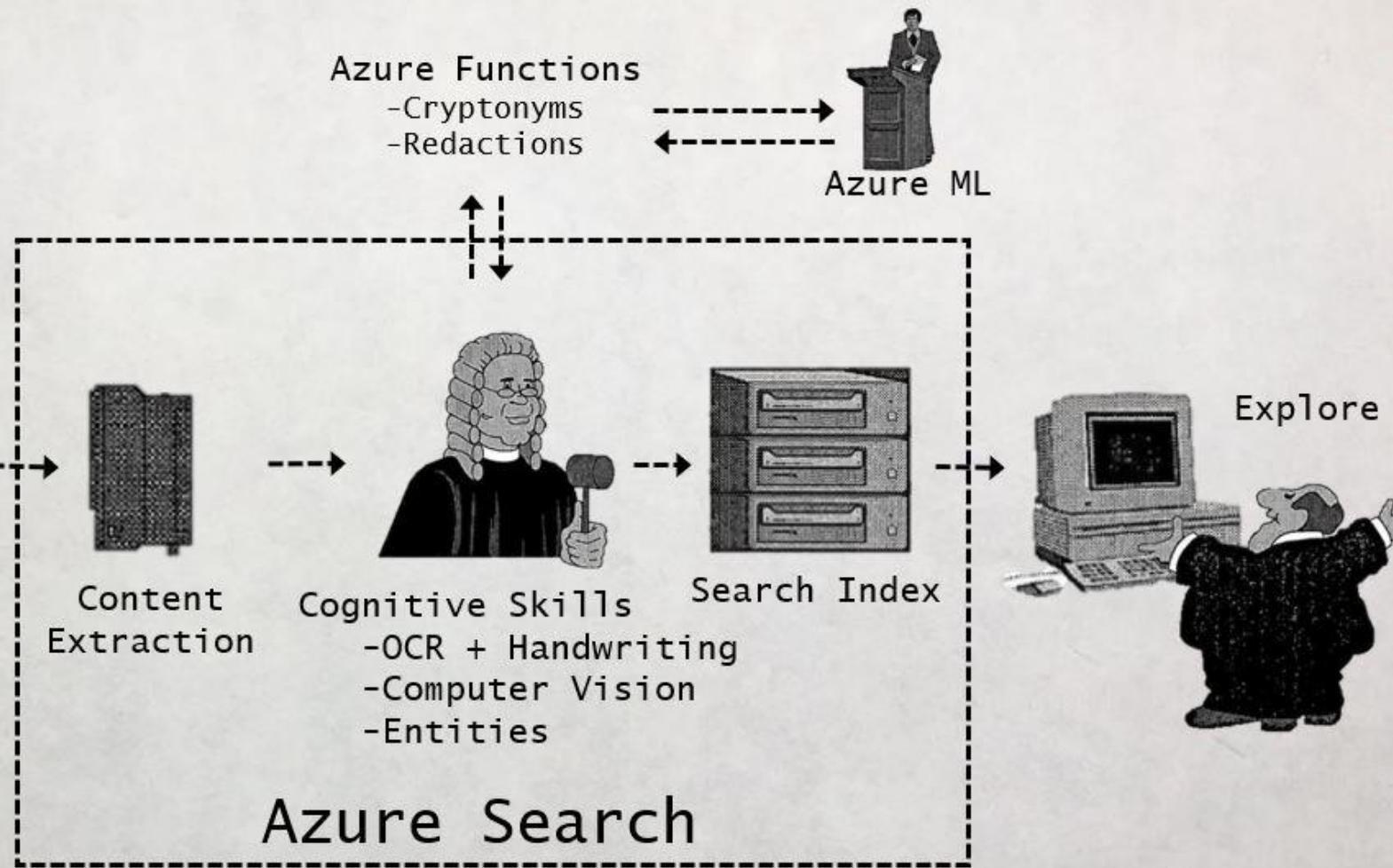
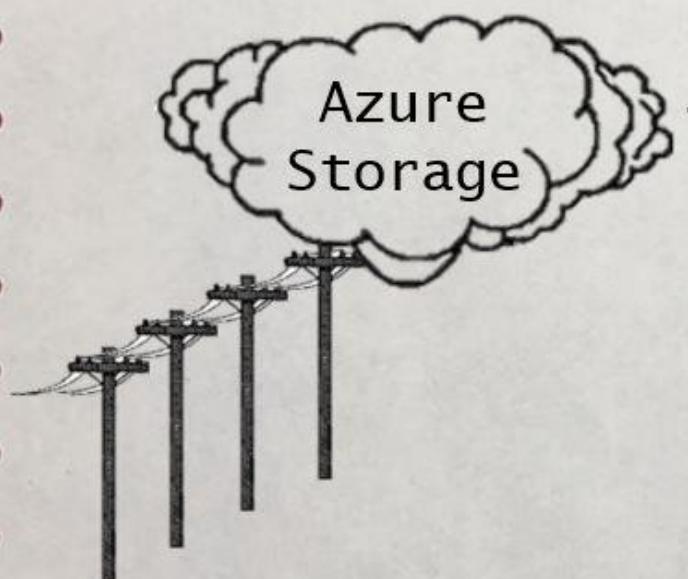


<https://www.microsoft.com/en-us/ai/ai-lab-jfk-files>

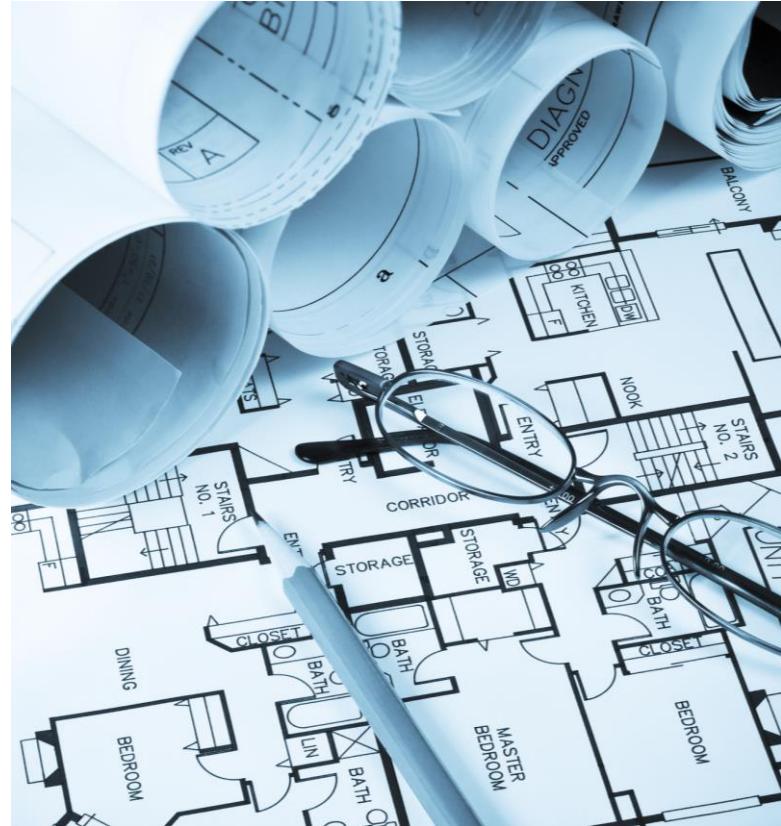


[https://github.com/Microsoft/AzureSearch\\_JFK\\_Files](https://github.com/Microsoft/AzureSearch_JFK_Files)

- JFK FILES
  - COGNITIVE SEARCH
  - ARCHITECTURE
- DECLASSIFIED**



Analyzing  
legal contracts



Understanding  
engineering plans



Extracting  
form information

<https://jfk-demo.azurewebsites.net/#/>

A professional office environment with large windows overlooking a city skyline. Four people are gathered around a white conference table. A woman in a black blazer and yellow patterned skirt stands behind a man in a dark suit who is seated and looking down at a document. Another man in a dark suit is seated across from him, also looking down. A fourth person's back is to the camera on the right. On the table are a smartphone, a water bottle, and some papers.

Making AI real for your Projects



You have more power at your  
fingertips than ever before.



The background of the slide is a collage of 12 images from various industries, each demonstrating a different application of cognitive services:

- Top-left: Two medical professionals in lab coats examining a chalkboard diagram.
- Top-center: An astronaut in a spacesuit inside a spacecraft module.
- Top-right: A medical professional in a white coat interacting with a patient in a hospital bed via a video call on a screen.
- Middle-left: A woman in a white lab coat working in a food processing facility.
- Middle-center: A man wearing a Microsoft HoloLens headset, overlaid with a 3D anatomical model of a human skeleton.
- Middle-right: A large rocket launching at night, with a person in a suit standing nearby.
- Bottom-left: A woman in a lab coat working in a laboratory.
- Bottom-center: A view from the Mars rover Perseverance on the surface of Mars.
- Bottom-right: A man in a striped shirt pointing at a large digital screen displaying a video game.
- Bottom-left: A female scientist in a lab coat using a microscope.
- Bottom-center: A satellite in space, with Earth visible in the background.
- Bottom-right: Two people in a clothing store looking at a virtual reality display showing a 3D model of a person trying on a dress.

Use Cognitive Services to  
change the world that you see

