



Discover AI with Microsoft Azure



About me...

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Software Engineer III @PayPal

- Microsoft Certified Trainer(MCT-2019 to 2023)
- Certified Multi-cloud Architect(6X Azure Certified, 1X GCP Certified)
- <https://www.linkedin.com/in/priyatharshini-s-75b002110/>

Agenda

- Introduction
- Overview of Microsoft Investments to AI
- Microsoft AI
 - Chat GPT vs DALL-E 2
- Azure AI
 - Cognitive Services
 - Azure Search
 - Bot Services
- Demo on Azure AI
- Azure ML



Microsoft and AI



Assigning human-like qualities to digital experiences



Perceives its environment



Mimics cognitive functions

What is AI?

010100
010101
010100
Learns from example in volumes of data

Program that writes itself based on examples

Classifies, recommends, predicts, groups, segments

Weak AI

Separate cognitive functions, seeing, natural language, vision

AI

ML

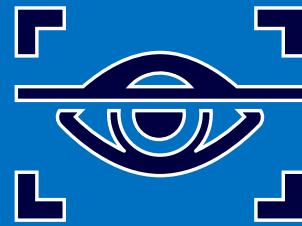
Strong AI

Combining weak AI with a consciousness or "mind"

What is Artificial Intelligence?

Creating applications that can See ,Hear ,Speak and Understand.

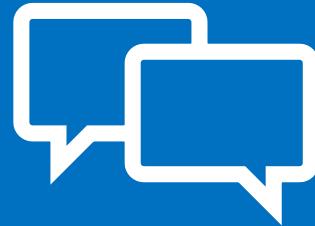
Software that exhibits human-like capabilities, such as:



Visual Perception



Text Analysis



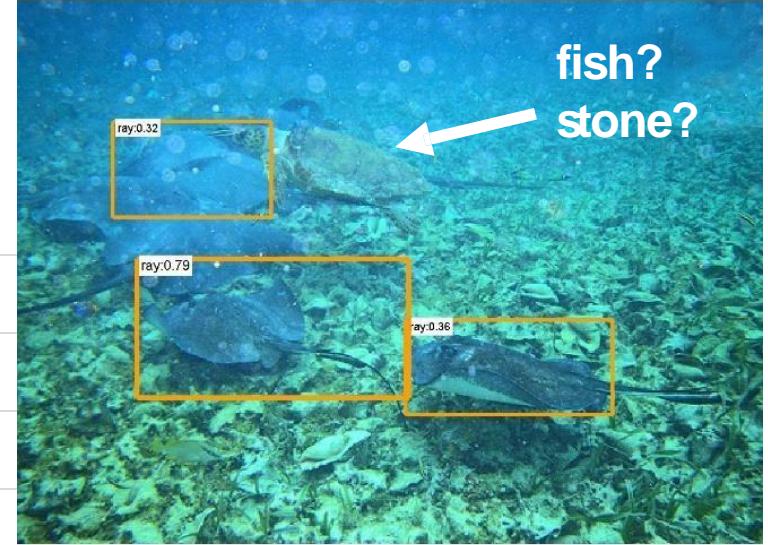
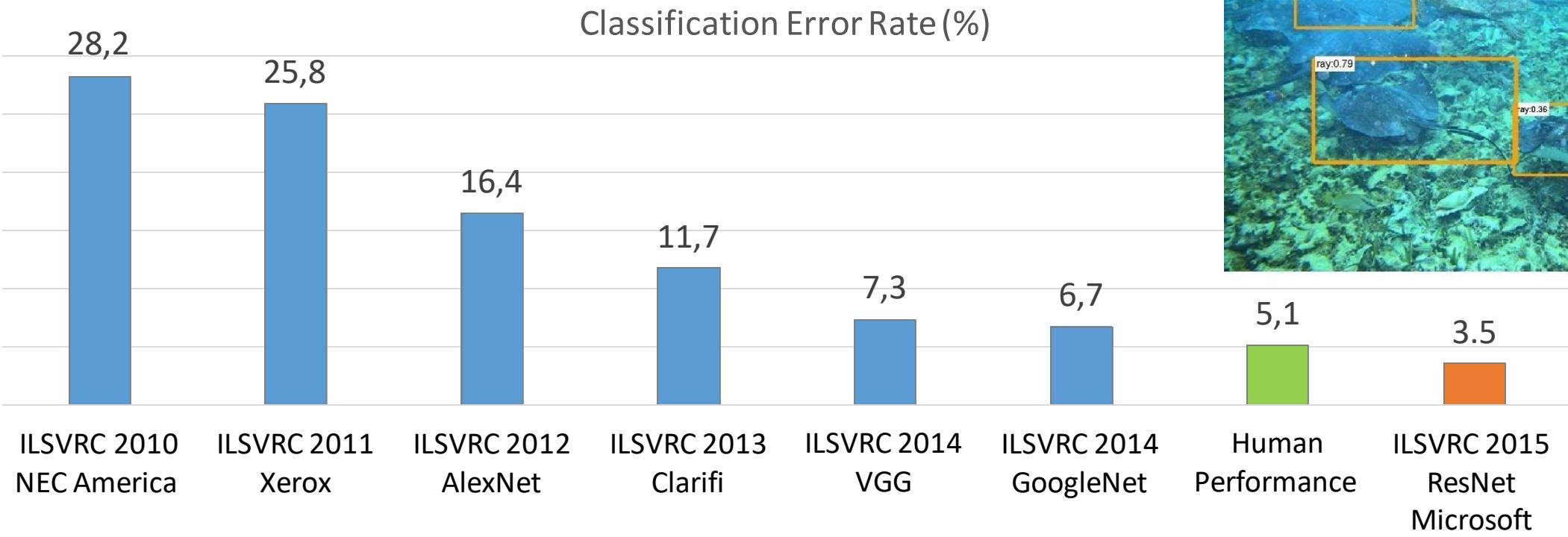
Speech



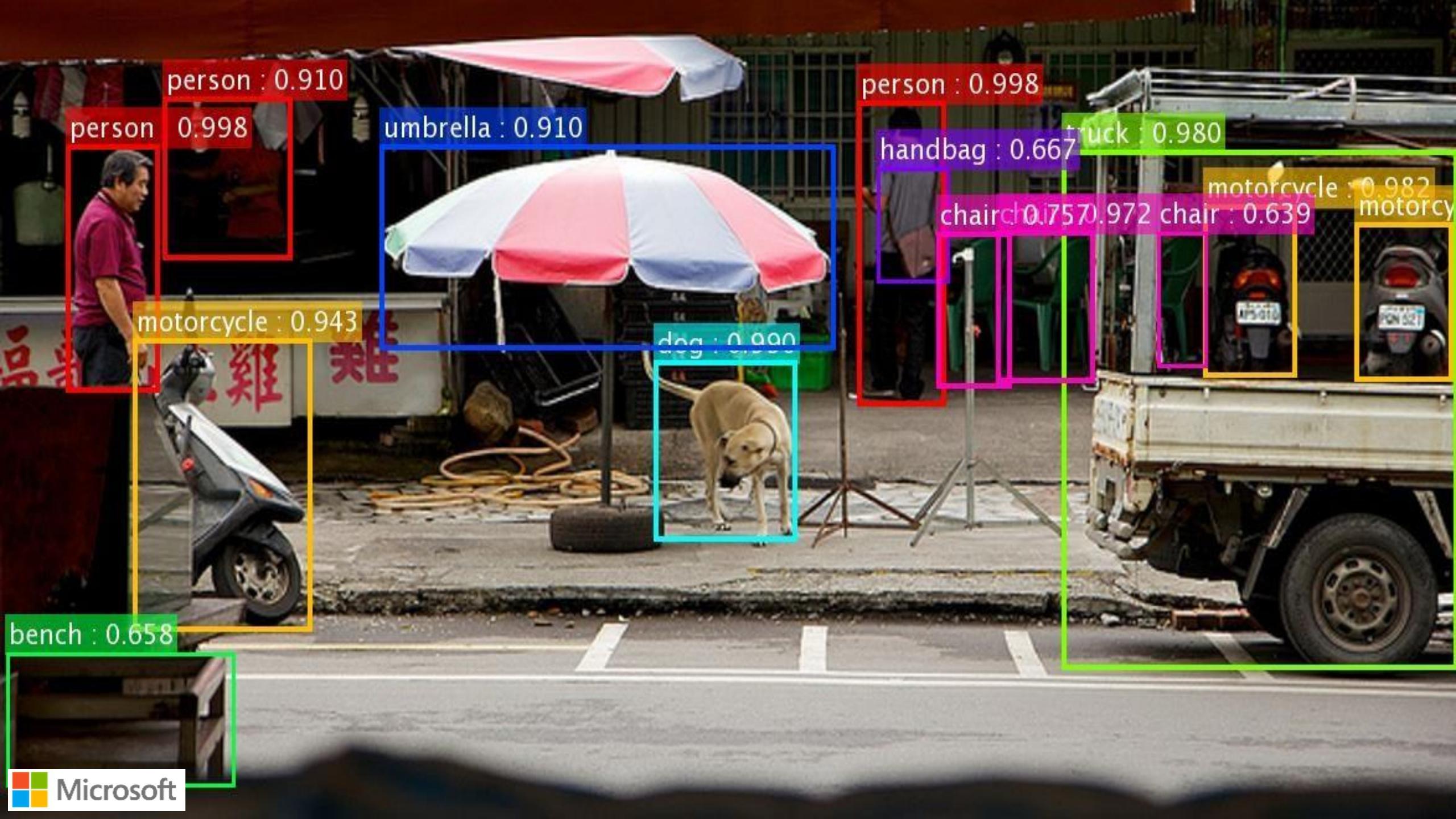
Decision Making

ImageNet ILSVRC

Worldwide Industry Competition for Object Recognition

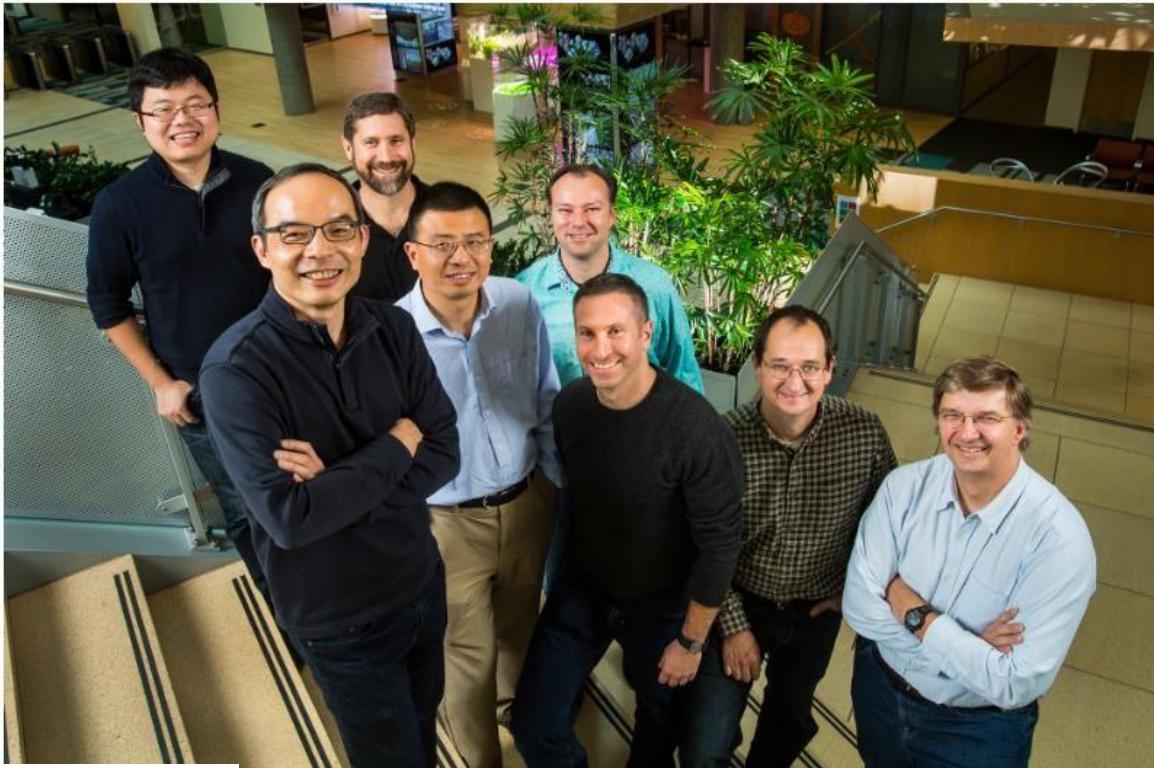


Microsoft Researchers win in all 5 entries of ImageNet 2015
Classification, Localization, Detection, COCO detection COCO segmentation



Microsoft's speech breakthrough

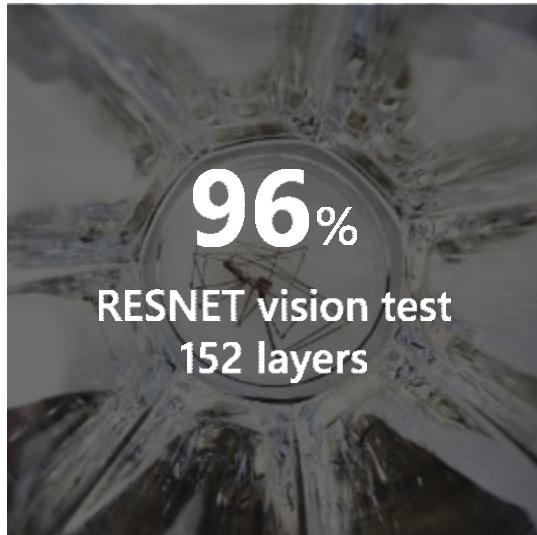
Historic Achievement: Microsoft researchers reach human parity in conversational speech recognition



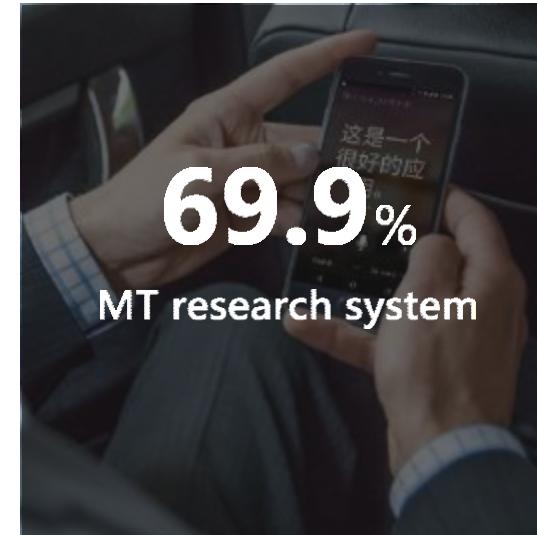
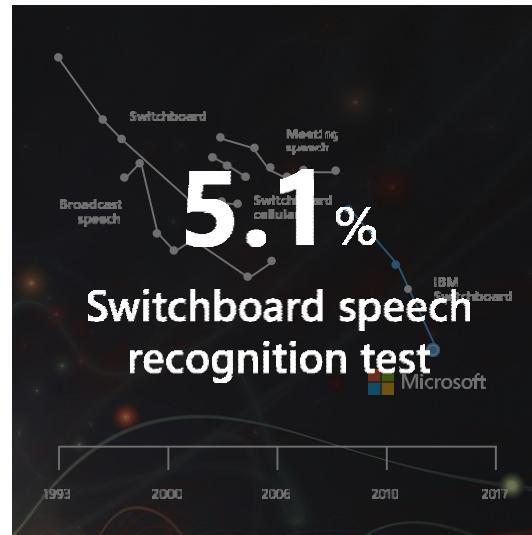
**Microsoft researchers from the
Speech & Dialogue research group
2017**

Microsoft AI breakthroughs

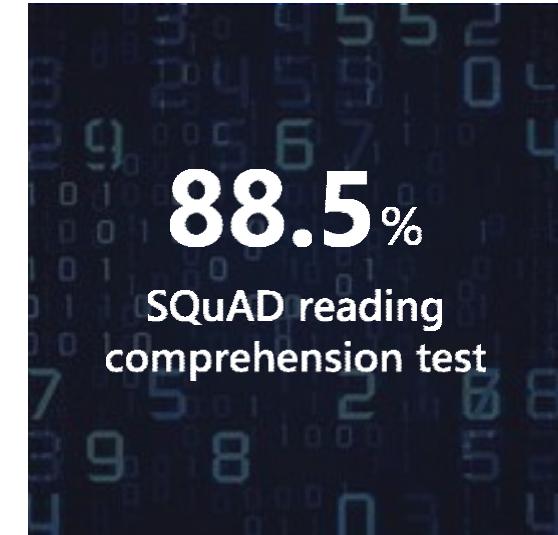
Vision



Speech



Language



2016

First to achieve
Object recognition
Human parity

2017

First to achieve
Speech recognition
Human parity

March 2018

First to achieve
Machine translation
Human parity

January 2018

First to achieve
Machine reading comprehension
Human parity

Microsoft AI breakthroughs (cont...)

Timeline of key Microsoft AI breakthroughs



OpenAI Microsoft



Microsoft

Project Turing
Making machines literate



GitHub Copilot
Visual Studio Code



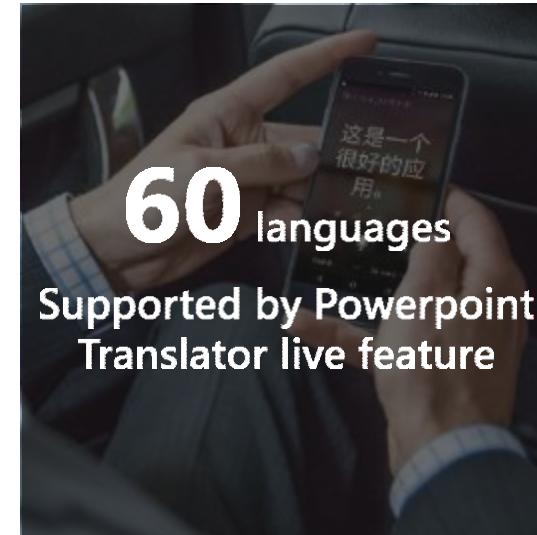
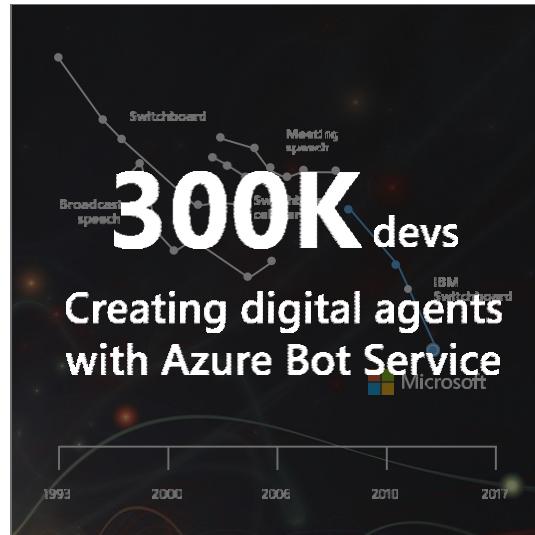
Microsoft

Ongoing Momentum

Vision



Speech



Language



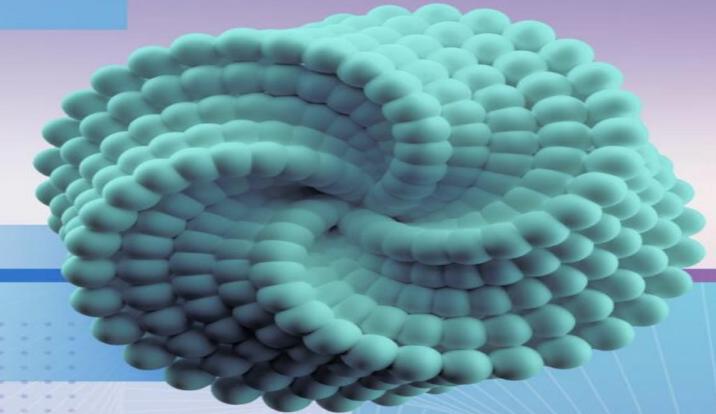
Research @ Microsoft 2022: A look back at a year of accelerating progress in AI

Published December 19, 2022

Share this page



2022
Microsoft Research
Year in review



Chat GPT vs DALL-E 2

- ChatGPT(Chat Generative Pre-trained Transformer) is an artificial intelligence chatbot developed by OpenAI and launched in November 2022.
- it is a combination of machine learning and deep learning.
- Chat GPT generates human like responses through texts. It holds the capability of answering questions in a lucid and conversational tone. It can generate codes, write stories, poems, etc.
- It is built on top of Open AI's GPT-3 family of large language models and has been fine-tuned and reinforcement learning techniques.

<https://openai.com/blog/chatgpt>

- DALL-E 2 is a new AI system that can create realistic images and art from a description in natural language. DALL-E was revealed by OpenAI in a blog post in January 2021, and uses a version of GPT-3 modified to generate images.
- Microsoft Designer help users to generate totally unique images that have never been seen before, simply by writing a clear AI image prompt—just type what you want to see.
- DALL-E 2 are deep learning models developed by OpenAI to generate digital images from natural language descriptions, called "prompts".

<https://openai.com/product/dall-e-2>



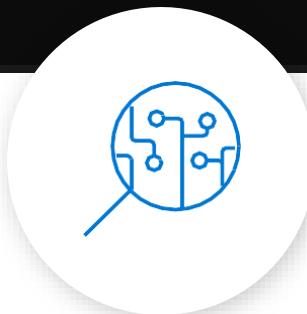
Azure AI & ML

Azure AI



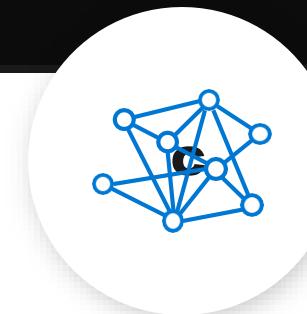
AI Apps & Agents

Azure Bot Service
Azure Cognitive Services



Knowledge Mining

Azure Cognitive Search



Machine learning

Azure Databricks
Azure Machine Learning
Azure AI Infrastructure

Data Science, Machine Learning, and AI

Artificial Intelligence

Intelligent software apps and agents

Machine Learning

Use of data and algorithms to train predictive models

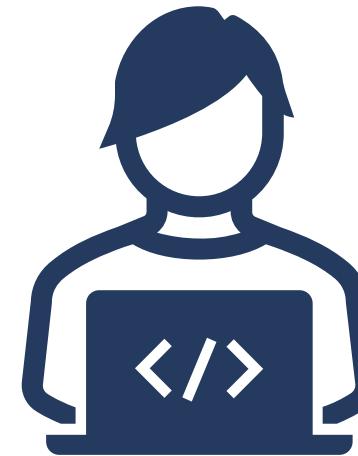
Data Science

Application of mathematical and statistical techniques to analyze data

AI for Software Engineers

Software Development Skills

- Coding (C#, Python, Node.js, ...)
- Consuming APIs (REST or SDKs)
- DevOps (source control, CI/CD)



Conceptual AI Understanding

- Model training and inferencing
- Probability and confidence scores
- Responsible AI and ethics

Considerations for Responsible AI



Fairness



Reliability & Safety



Privacy & Security



Inclusiveness



Transparency



Accountability

<https://www.microsoft.com/ai/responsible-ai>

Prepackaged AI services you can integrate into solutions

Capabilities include:

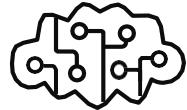
Language	Speech	Vision	Decision
<ul style="list-style-type: none">• Text analysis• Question answering• Language understanding• Translation 	<ul style="list-style-type: none">• Speech recognition• Speech synthesis• Speech Translation• Speaker Recognition	<ul style="list-style-type: none">• Image analysis• Video analysis• Image classification• Object detection• Facial analysis• Optical character recognition	<ul style="list-style-type: none">• Anomaly detection• Content moderation• Content personalization



Azure Applied AI Services

- Form Recognizer
- Metrics Advisor
- Video Analyzer for Media
- Immersive Reader
- Bot Service
- Cognitive Search

Easy, Flexible, and Tested: Leverage out-of-the-box AI tools and services



Cognitive services



Use pre-built AI services to solve business problems

101010
010101
101010

Map complex information and data



Allow your apps to process natural language



Azure search



Get up and running quickly



Reduce complexity with a fully-managed service



Use artificial intelligence to extract insights



Bot services



Speed development with a purpose-built environment for bot creation



Infuse intelligence into your bot using cognitive services



Integrate across multiple channels to reach more customers

Azure AI - Apps & Agents

Cognitive services: give your apps a human side



Vision

From faces to feelings, allow your apps to understand images and video



Speech

Hear and speak to your users by filtering noise, identifying speakers, and understanding intent



Language

Process text and learn how to recognize what users want



Knowledge

Map complex information and data in order to solve specific tasks



Search

Access billions of web pages, images, videos, and news with the power of Bing



Labs

An early look at emerging Cognitive Services technologies: discover, try, and give feedback on new technologies before general availability

Cognitive Services

Vision	Speech	Language	Knowledge	Search
Computer Vision	Custom Recognition	Bing Spell Check	Academic Knowledge	Bing Web Search
Emotion	Speaker Recognition	Linguistic Analysis	Entity Linking	Bing Image Search
Face	Speech	Language Understanding	Knowledge Exploration	Bing Video Search
Video	Translator	Text Analytics	Recommendations	Bing News Search
		WebLM		Bing Autosuggest

Computer Vision API



Computer Vision API

Distill actionable information from images



Face API

Detect, identify, analyze, organize, and tag faces in photos



Emotion API

Personalize experiences with emotion recognition



Video API

Analyze, edit, and process videos within your app



Content Moderator

Machine-assisted moderation of text and images, augmented with human review tools



Custom Vision Service

Customizable web service that learns to recognize specific content in imagery



Video Indexer

Process and extract smart insights from videos

Computer Vision API



Categories

```
v0: [{ "name": "animal", "score": 0.9765625 }]
V1: [{ "name": "grass", "confidence": 0.9999992847442627 },
{ "name": "outdoor", "confidence": 0.9999072551727295 },
{ "name": "cow", "confidence": 0.99954754114151 },
{ "name": "field", "confidence": 0.9976195693016052 },
{ "name": "brown", "confidence": 0.988935649394989 },
{ "name": "animal", "confidence": 0.97904372215271 },
{ "name": "standing", "confidence": 0.9632768630981445 },
{ "name": "mammal", "confidence": 0.9366017580032349, "hint": "animal" },
{ "name": "wire", "confidence": 0.8946959376335144 },
{ "name": "green", "confidence": 0.8844101428985596 },
{ "name": "pasture", "confidence": 0.8332059383392334 },
{ "name": "bovine", "confidence": 0.5618471503257751, "hint": "animal" },
{ "name": "grassy", "confidence": 0.48627158999443054 },
{ "name": "lush", "confidence": 0.1874018907546997 },
{ "name": "staring", "confidence": 0.165890634059906 }]
```

Describe

0.975 "a brown cow standing on top of a lush green field"
0.974 "a cow standing on top of a lush green field"
0.965 "a large brown cow standing on top of a lush green field"

Analyze image

- Type of image

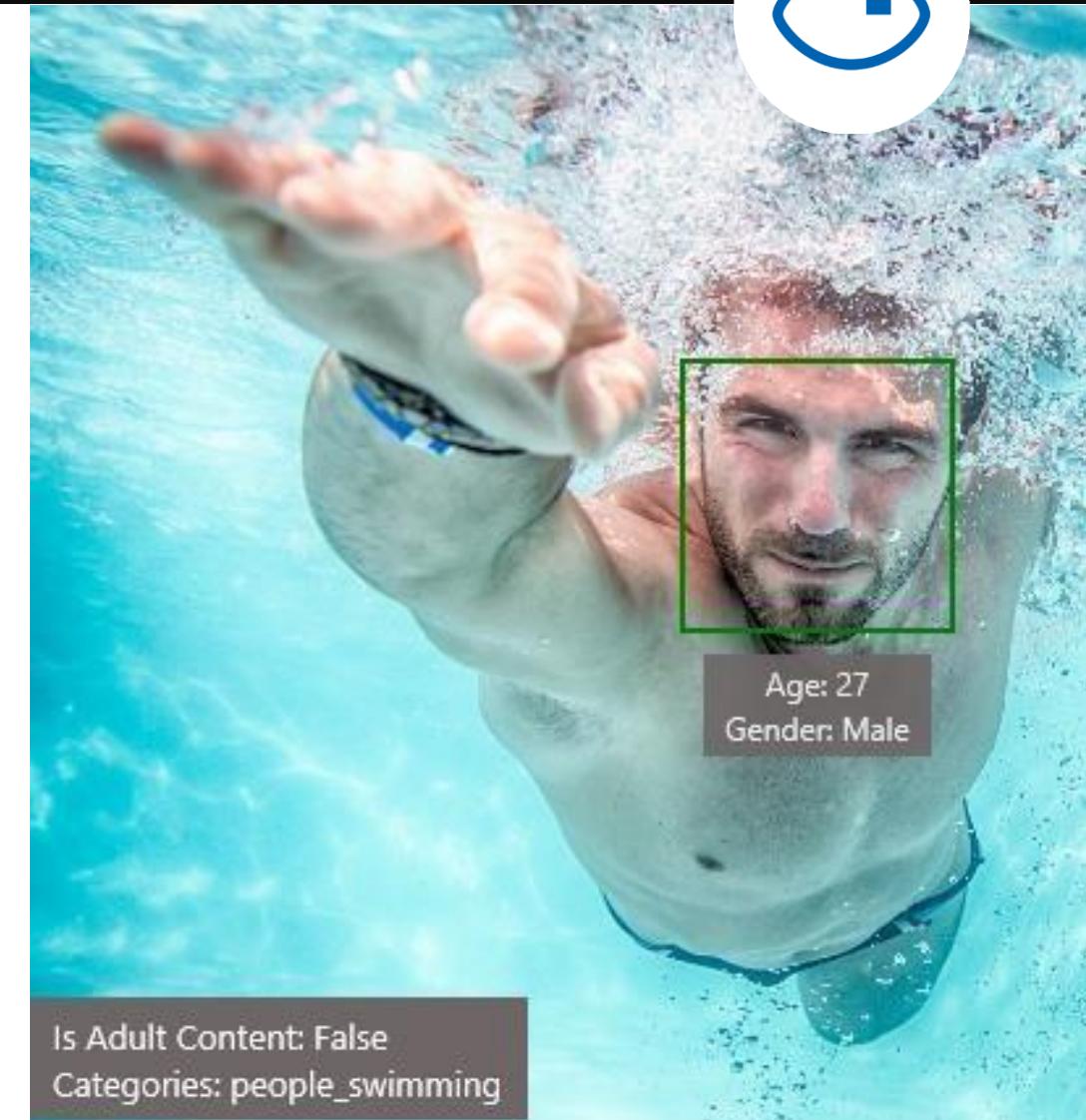
- Clip Art Type 0 Non-clipart
- Line Drawing Type 0 Non-Line Drawing
- Black & White Image False

- Content of image

- Categories [{ "name": "people_swimming", "score": 0.099609375 }]
- Adult Content False
- Adult Score 0.18533889949321747
- Faces [{ "age": 27, "gender": "Male", "faceRectangle": {"left": 472, "top": 258, "width": 199, "height": 199}}]

- Image colors

- Dominant Color Background White
- Dominant Color Foreground Grey
- Dominant Colors White



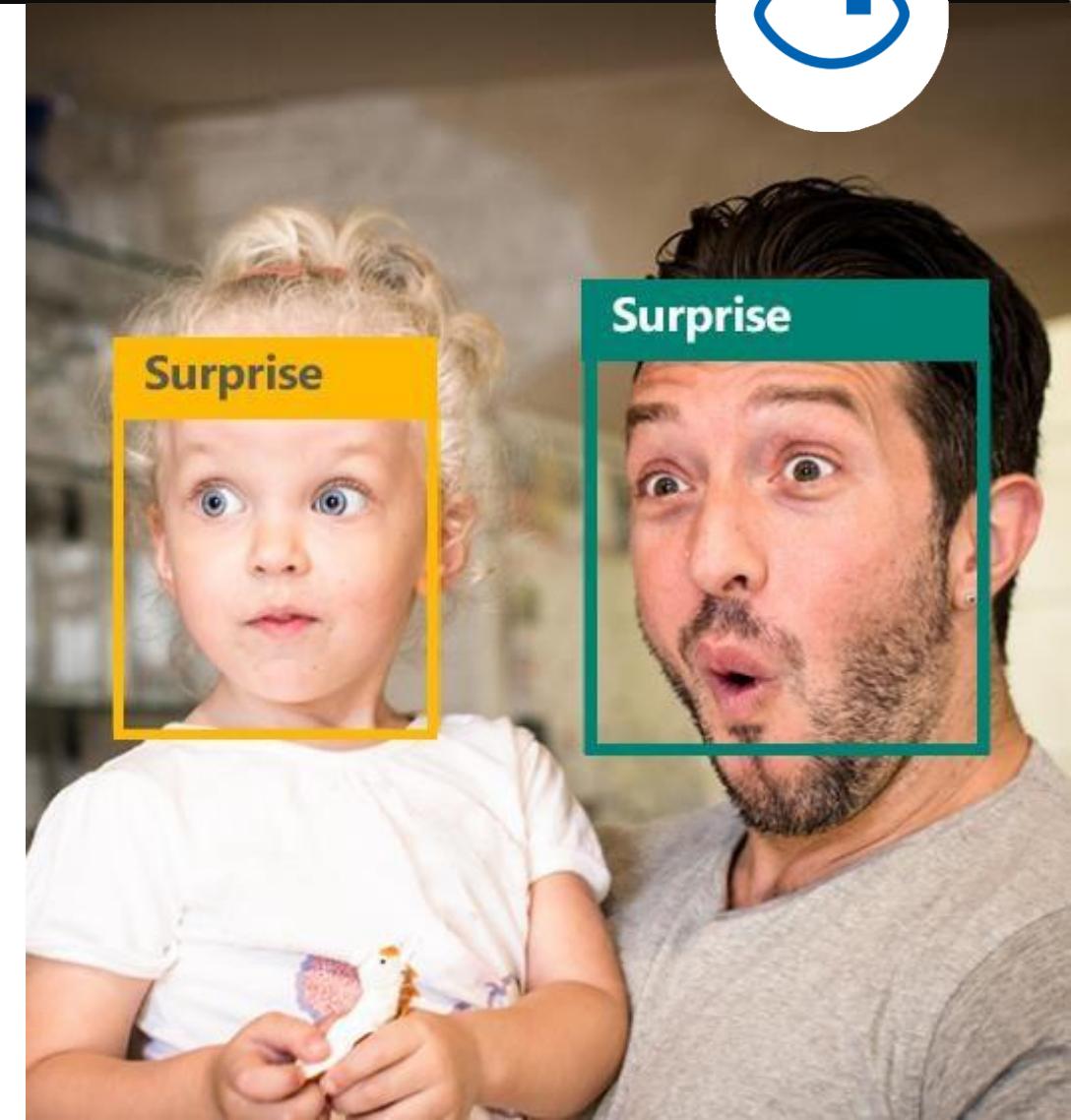
Emotion API

Face detection

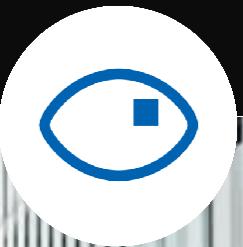
```
"faceRectangle": {"width": 193,  
                 "height": 193,  
                 "left": 326,  
                 "top": 204} ...
```

Emotion scores

```
"scores": { "anger": 5.182241e-8,  
            "contempt": 0.0000242813,  
            "disgust": 5.621025e-7,  
            "fear": 0.00115027453,  
            "happiness": 1.06114619e-8,  
            "neutral": 0.003540177,  
            "sadness": 9.30888746e-7,  
            "surprise": 0.9952837}
```



Face API



- Face detection
 - Detect faces and their attributes within an image
- Face verification
 - Check if two faces belong to the same person
- Similar face searching
 - Find similar faces within a set of images
- Face grouping
 - Organize many faces into groups
- Face identification
 - Search which person a face belongs to



Video Indexer

Video Indexer Preview | Connect to Azure | Account account-neu | NE | ⌂ | 🔍 | ⚙ | ⓘ



1:30
1:30 / 4:10

||

2018 KTM 450SXF Factory Edition - Dirt ... >Edit

Private

Share { } Chat Cloud Mail

Insights Transcript Search... English

People



John Doe

Appears for 4.28% of the video's duration.

Keywords Show all

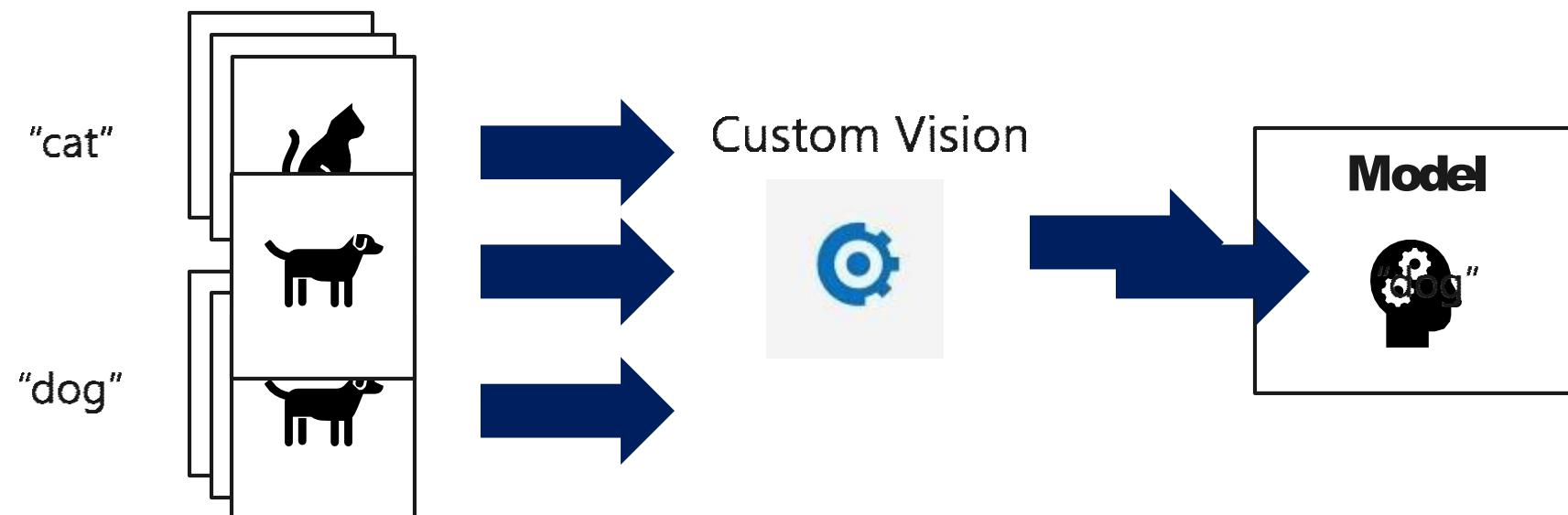
- test raeders
- added air
- dirt bi
- back
- compression
- bike
- protection
- motorcycle
- thing



Custom Vision Service



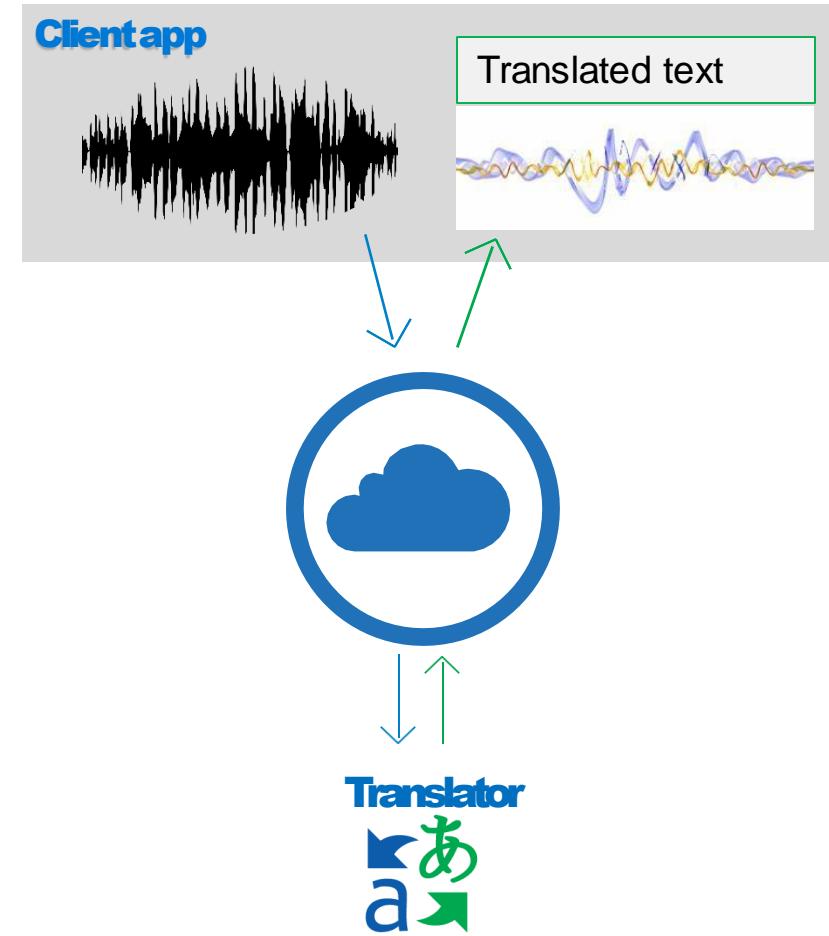
- Custom Vision Service is an easy-to-use tool for prototyping, improving, and deploying a custom image classifier to a cloud service, without any background in computer vision or deep learning required.



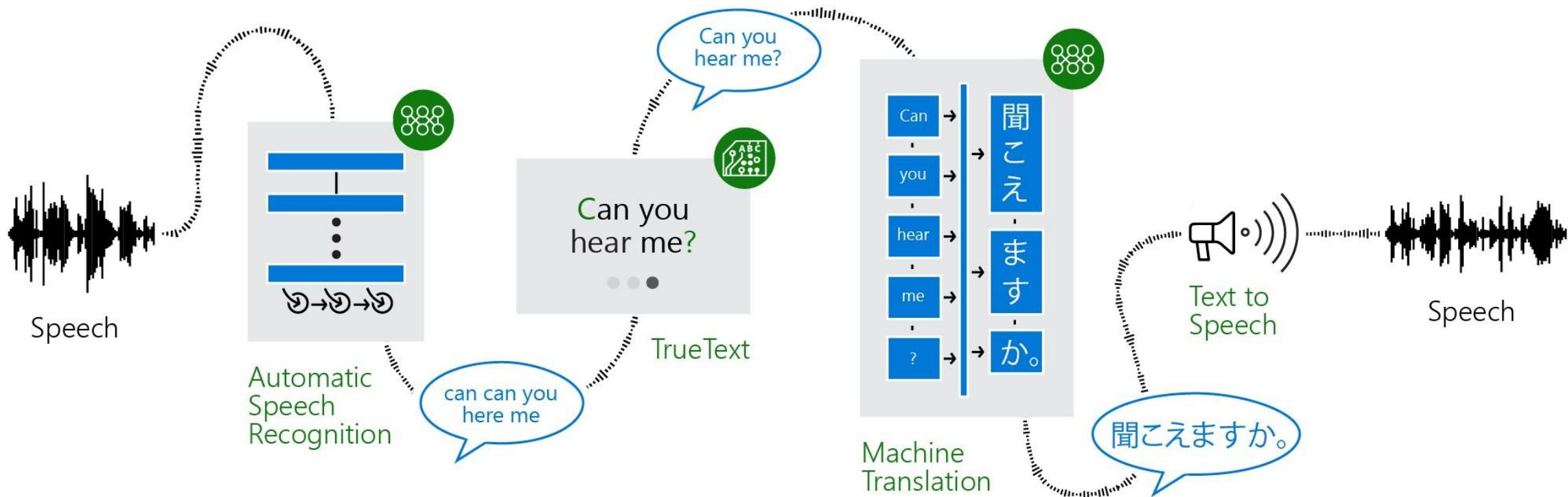
Speech Translation Service



- Machine Speech Translation
 - Send voice
 - Receive translated text
 - Receive text-to-speech translation
- Optimized for conversations
 - Full conversations handling
 - Not only simple utterances
- Languages supported
 - Speech languages: 10
 - Text languages: 60+
- Azure Service
 - Pay-per-second model

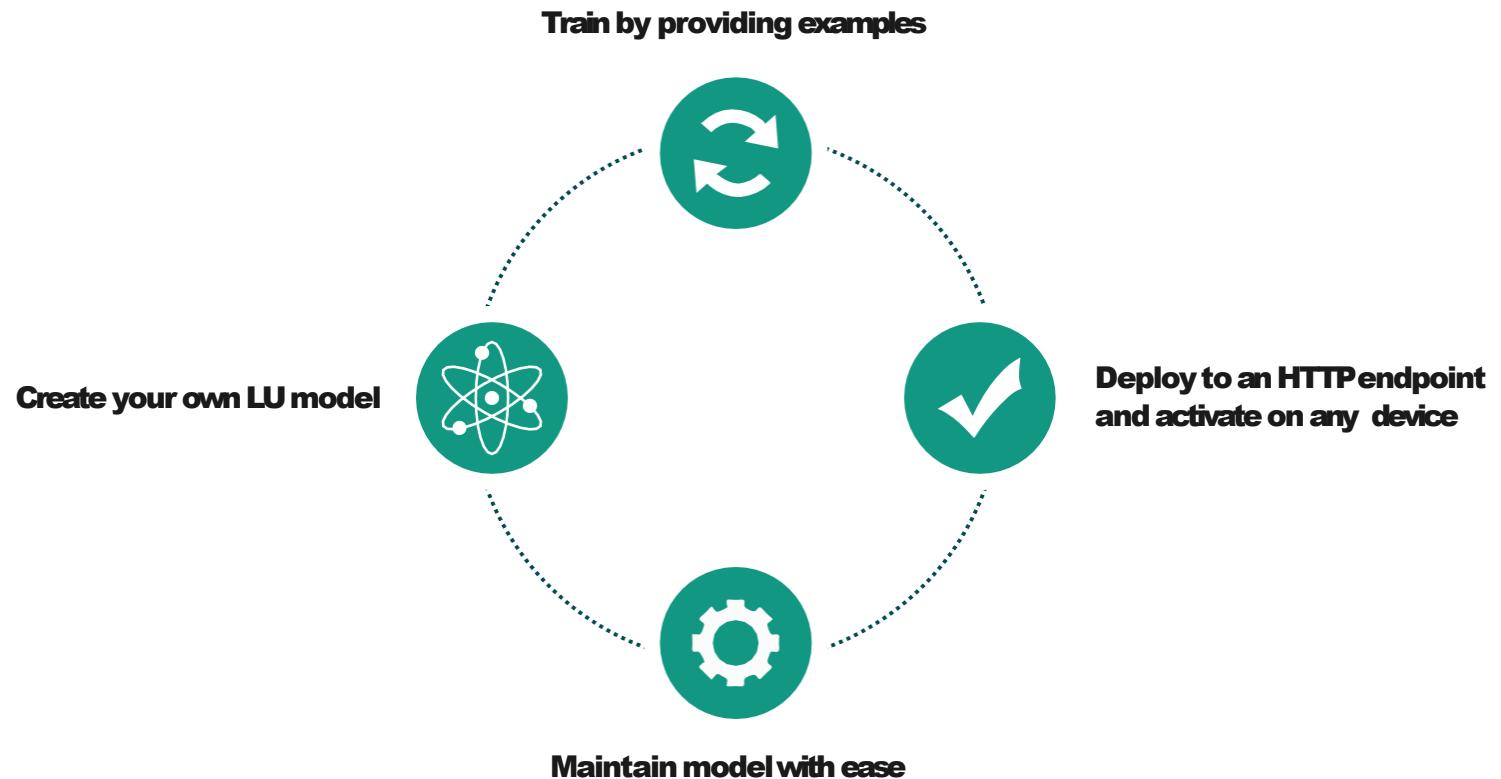


How Speech Translation works



LUIS [Language Understanding Intelligent Service]

99



<https://www.luis.ai/home>

Language Understanding Models

99

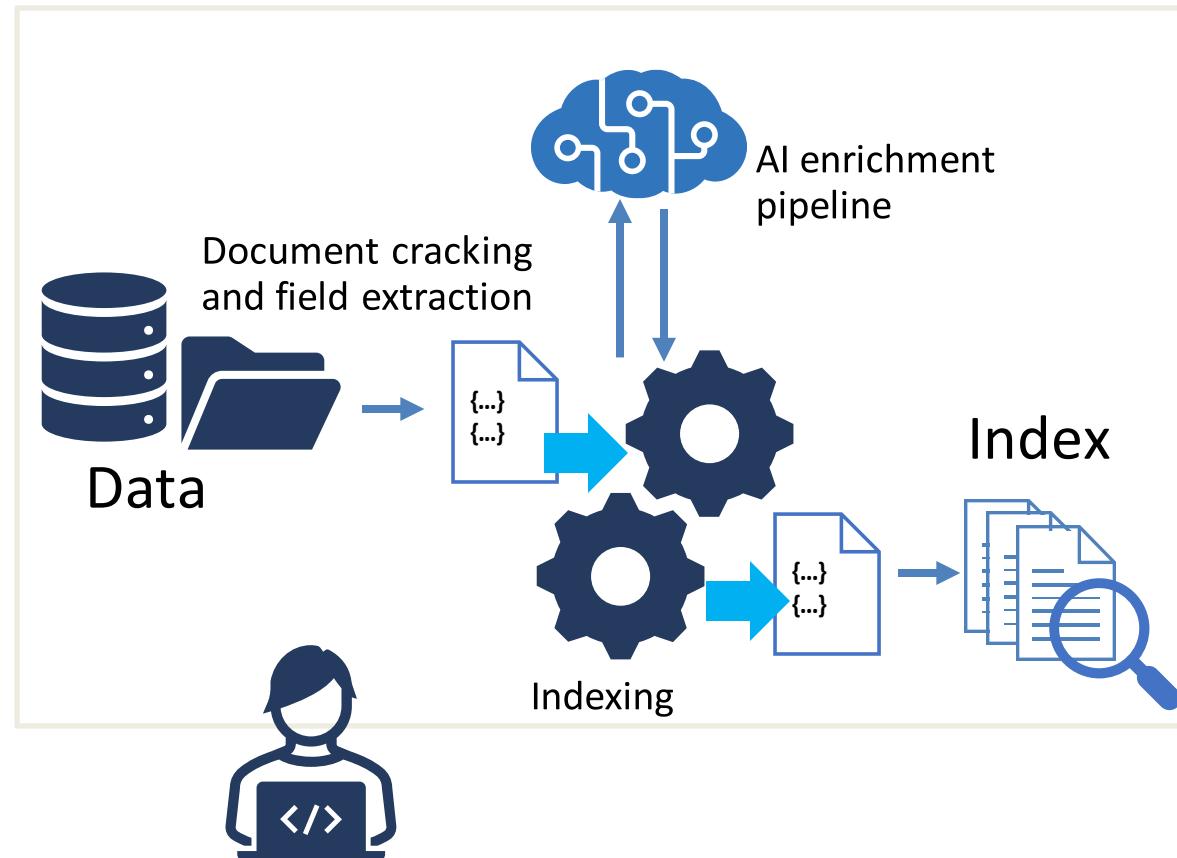


```
{  
  "entities": [  
    {  
      "entity": "flight_delays",  
      "type": "Topic"  
    }  
  ],  
  "intents": [  
    {  
      "intent": "FindNews",  
      "score": 0.99853384  
    },  
    {  
      "intent": "None",  
      "score": 0.07289317  
    },  
    {  
      "intent": "ReadNews",  
      "score": 0.0167122427  
    },  
    {  
      "intent": "ShareNews",  
      "score": 1.0919299E-06  
    }  
  ]  
}
```

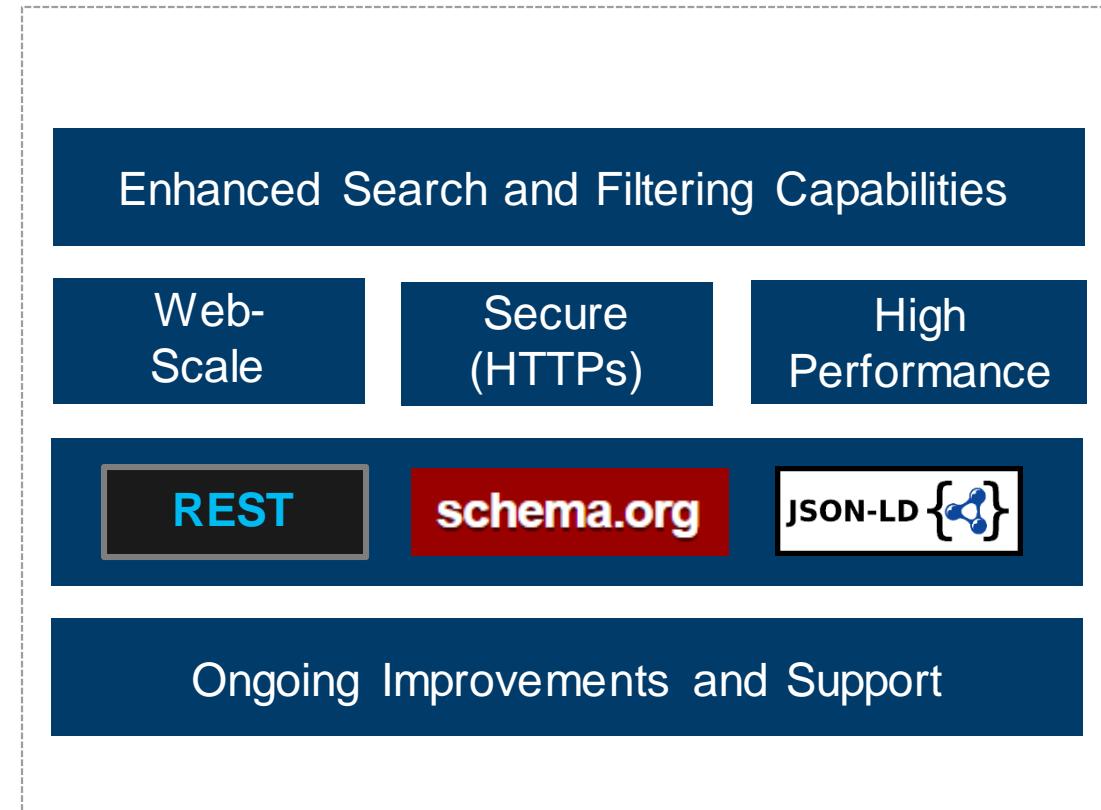
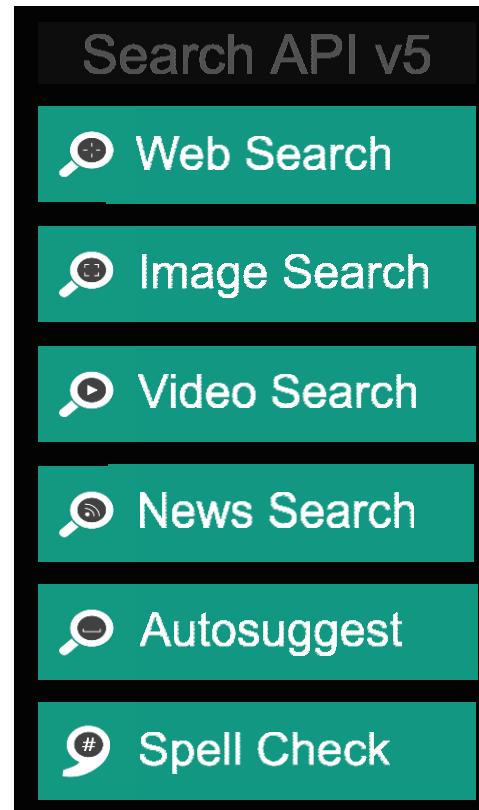
- Sentiment analysis (EN, FR, PT, ES)
 - Understand if a record has positive or negative sentiment
- Key phrase extraction (EN, DE, JA, ES)
 - Extract key phrases from a piece of text, and retrieve topics
- Topic detection (EN)
 - Use clustering techniques to identify the trending topics on a large set of text records
- Language detection
 - Identify the language, 120 supported languages

Azure Cognitive Search

AI-enriched indexing for search and knowledge mining



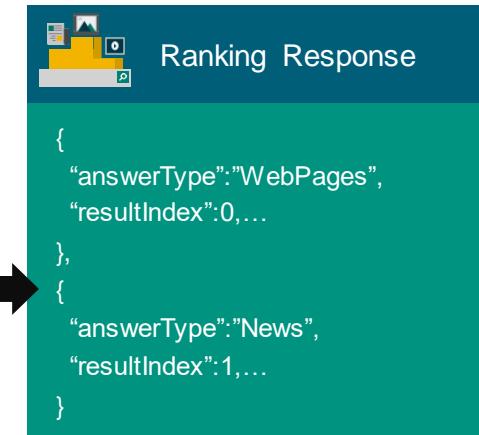
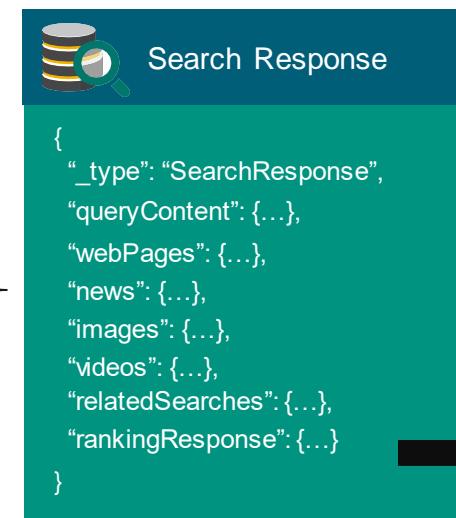
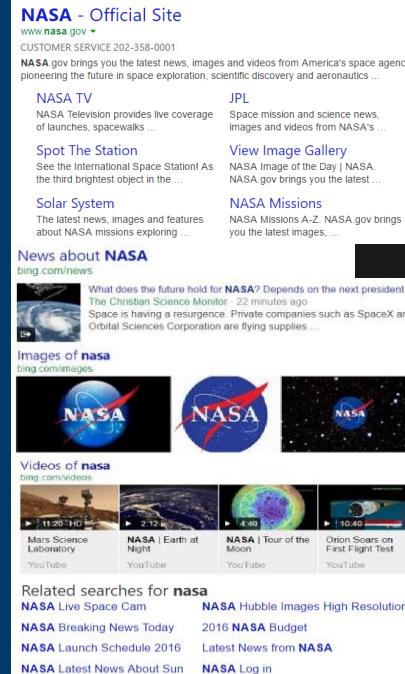
Bing Search API v5



Web Search API



<https://bingapis.azure-api.net/v5/search?q=nasa>



Vertical Search APIs



Image Search API



Video Search API



source: youtube.com

News Search API



source: cnn.com

<https://bingapis.azure-api.net/v5/images/search?q=shuttle+launch>

- Enhanced metadata and filters (size, license, style, freshness, color)
- Image insights (entity recognition, visually similar)

<https://bingapis.azure-api.net/v5/videos/search?q=viral+videos>

- Enhanced metadata and filters (price, resolution, length, freshness)
- Motion thumbnails (video preview)

<https://bingapis.azure-api.net/v5/news/search?q=cuba>

- News by category/market, and trending news
- Rich article metadata (featured entities)

- Identify errors and get suggestions
- Check a single word or a whole sentence



A new service from **microsoft!**
Microsoft

Word Breaks



I'm **gona** use this today!
gonna

Slang



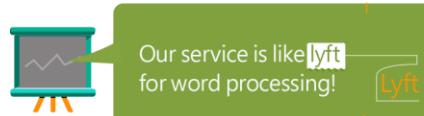
Director **stephen**,
Spielberg should use
in the next AI movie!
steven

Names



Our engineers developed
this **four** you! **for**

Homonyms



Our service is like **lyft**
for word processing!
Lyft

Brands

Spellcheck examples

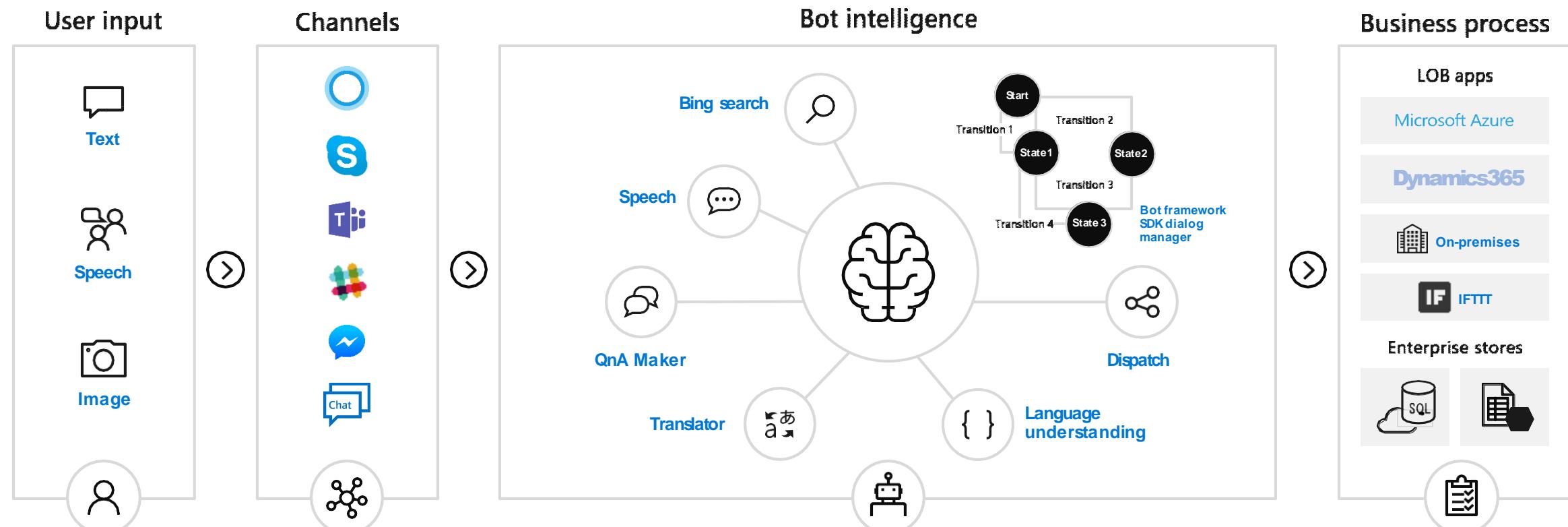
99

Hello Build! Welcome to Seattle. hope you have a grate week

```
{  
  "offset": 23,  
  "token": "Seattle. hope",  
  "type": "UnknownToken",  
  "suggestions": [  
    {  
      "suggestion": "Seattle. Hope",  
      "score": "0.875"  
    }]  
}  
  
{  
  "offset": 48,  
  "token": "grate",  
  "type": "UnknownToken",  
  "suggestions": [  
    {  
      "suggestion": "great",  
      "score": "0.949079025281377"  
    }]  
}
```

Azure AI – Apps & Agents

Azure Bot Service & Cognitive Services



Azure Tools

Security

Logging

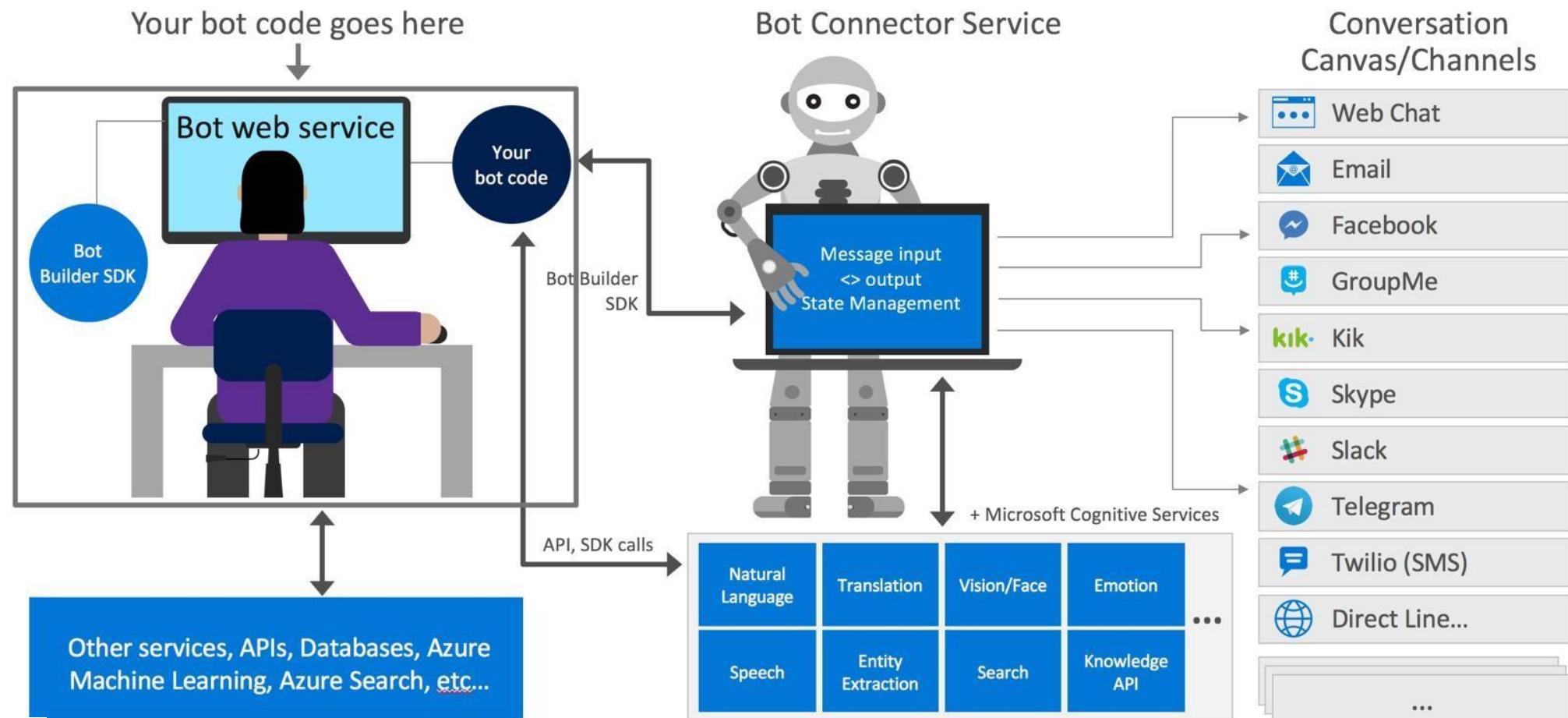
Auditing

Integration

Microsoft

Azure AI – Apps & Agents

Azure Bot Service & Cognitive Services





Demo

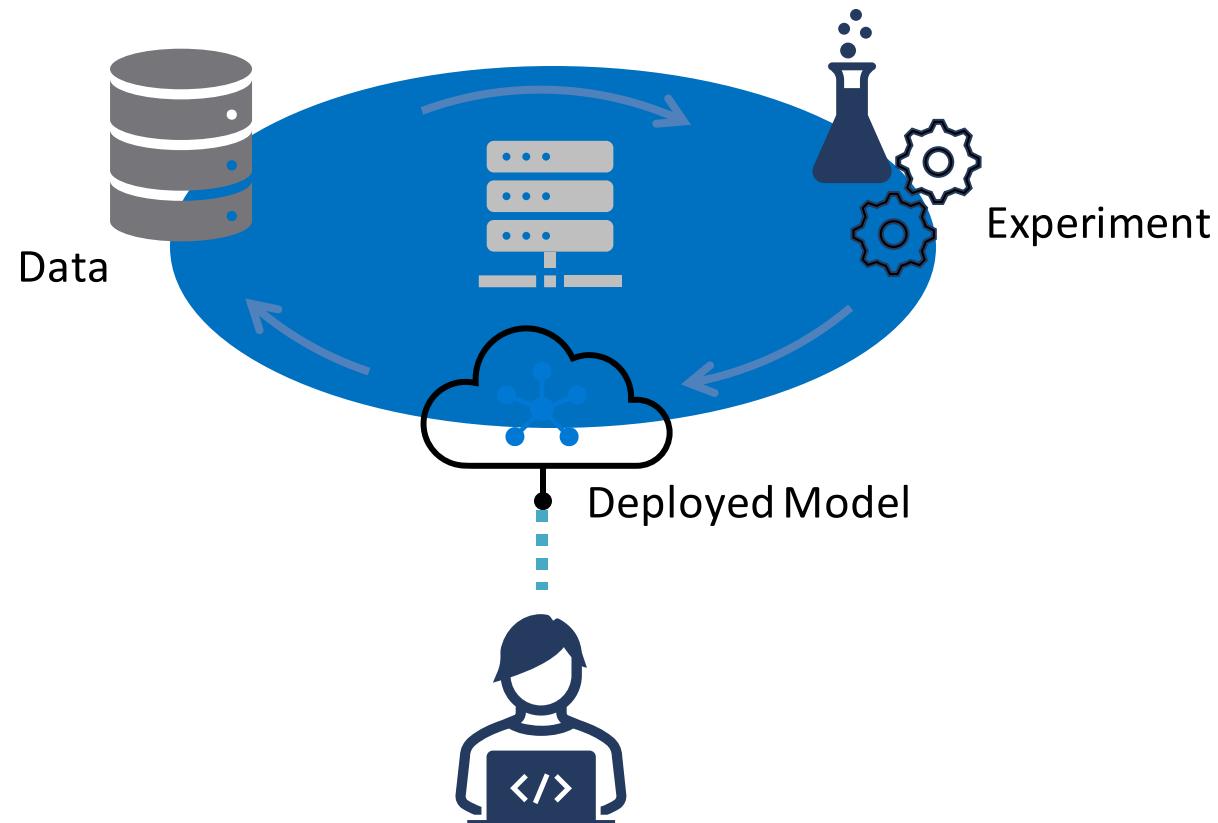
<https://aidemos.microsoft.com/>

<https://mobile-bert-demo.vercel.app/>



Azure Machine Learning

Cloud platform for creating and operating machine learning solutions



Azure AI Platform – Machine Learning

Domain specific pretrained models

To reduce time to market



Vision



Speech



Language



Search

Familiar Data Science tools

To simplify model development



PyCharm



Jupyter



Visual Studio Code



Command line

Popular frameworks

To build advanced deep learning solutions



Pytorch



TensorFlow



Scikit-Learn



Onnx

Productive services

To empower data science and development teams



Azure
Databricks



Azure
Machine
Learning



Machine
Learning VMs

Powerful infrastructure

To accelerate deep learning



CPU



GPU



FPGA

Azure AI Platform – Machine Learning

Easily build, deploy, and share predictive analytics solutions

Machine Learning and Analytics



Machine
Learning

Data Lake Analytics



Data Lake
Analytics

HDInsight (Hadoop and Spark)



HDInsight
(Hadoop and
Spark)

Stream Analytics



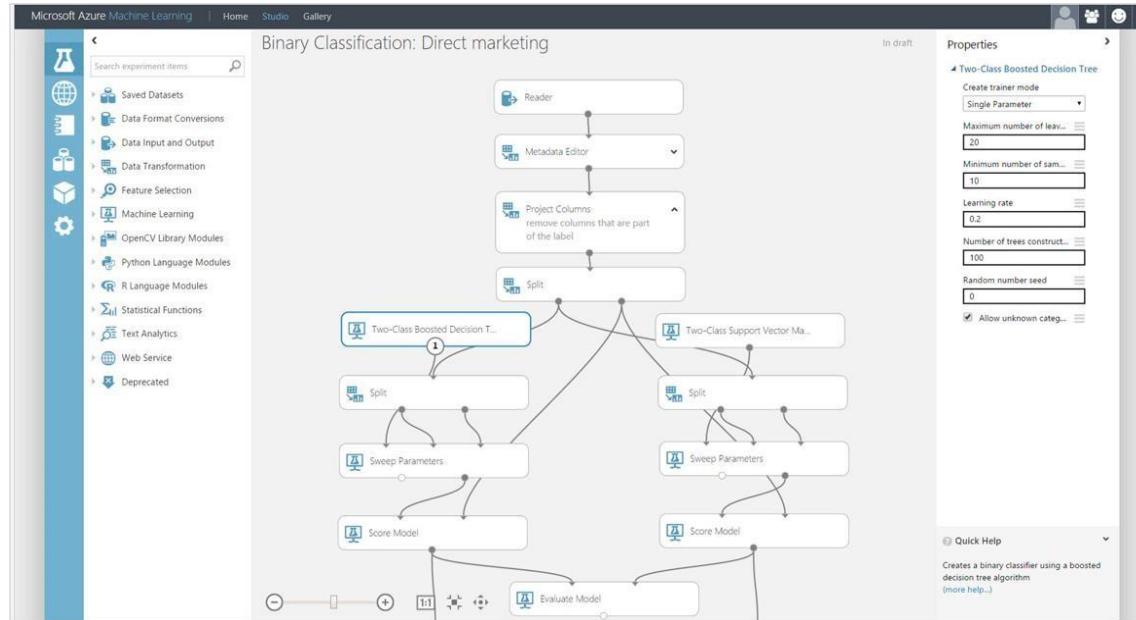
Stream
Analytics

The screenshot shows the Cortana Analytics Gallery interface. At the top, there are navigation links: 'Browse all' (highlighted in green), 'Solution Templates', and 'Experiments'. Below this is a 'Refine by' section with dropdown menus for 'CATEGORIES' and 'TAGS'. Under 'CATEGORIES', 'Machine Learning API' is selected, showing two items: 'Face APIs' and 'Text Analytics'. The 'Face APIs' item has a thumbnail image of two people's faces, a description about detecting and recognizing human faces in images, and a timestamp of '1071687, 7 months ago'. The 'Text Analytics' item has a thumbnail of a magnifying glass over text, a description about performing sentiment analysis and key phrase extraction, and a timestamp of '21354, 26 days ago'.



- Simple, scalable, cutting edge. A fully managed cloud service that enables you to easily build, deploy, and share predictive analytics solutions.
- Deploy in minutes. Azure Machine Learning means business. You can deploy your model into production as a web service that can be called from any device, anywhere and that can use any data source.
- Publish, share, monetize. Share your solution with the world in the Gallery or on the Azure Marketplace.

Azure AI Platform - Machine Learning for Engineers, Developers and Data Scientists



The screenshot shows the Azure Machine Learning Workbench (Preview) interface. The top navigation bar includes "File", "Edit", "Help", "DemoWorkspace", "iris", "Start Notebook Server", and "Stop Notebook Server". The main area is titled "jupyter iris (unsaved changes)". It shows a Jupyter Notebook environment with a sidebar containing icons for Home, Data, Notebooks, and Help. The notebook itself has a title "Classifying Iris Notebook" and instructions: "Please make sure you have `notebook` and `matplotlib` installed in the compute context you choose as kernel." It lists requirements for local and Docker kernels, including dependencies like Python 3.5.2, scikit-learn, and matplotlib. Below the instructions, there are two code cells. The first cell contains the command `matplotlib inline`. The second cell contains the following Python code:

```
In [3]: import pickle  
import sys  
import os  
import numpy as np
```

AZURE MACHINE LEARNING STUDIO
VISUAL DRAG- AND- DROP

AZURE MACHINE LEARNING SERVICES
CODE- FIRST (TENSORFLOW, CNTK, ETC.)

Azure AI – Machine Learning

Infuse apps with powerful, pre-trained AI models



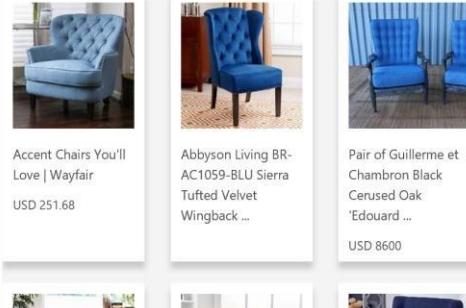
Vision



[Computer Vision](#) | [Video Indexer](#) | [Face](#) | [Content Moderator](#)



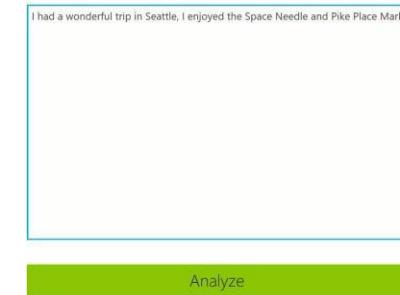
Bing
Search



[Big Web Search](#) | [Video Search](#) | [Image Search](#) | [Visual Search](#) | [Entity Search](#) |
[News Search](#) | [Autosuggest](#)



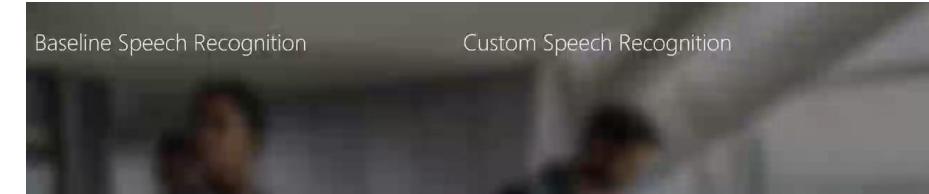
Language



[Text Analytics](#) | [Spell Check](#) | [Language Understanding](#) | [Text Translation](#) | [QnA Maker](#)



Speech



[Speech to Text](#) | [Text to Speech](#) | [Speech Translation](#) | [Speaker Recognition](#)

Azure AI – Machine Learning

Familiar Data Science tools



PyCharm



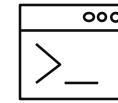
Jupyter



Visual Studio Code



Zeppelin



Command line

The screenshot shows the PyCharm IDE interface. On the left, there's a code editor with Python code. To its right is a Jupyter Notebook interface displaying a table of run details and a list of completed runs. The table includes columns for Run ID, Best Metric*, Status, Started, Duration, and Run ID. The list of completed runs shows various entries with metrics like 0.980133346636489 and 0.9799333214759827.

Interactive widgets for Jupyter Notebooks

The screenshot shows the Visual Studio Code interface with the 'Azure Machine Learning' extension installed. It displays a Python script named 'RiverDataScience.py' containing code for data loading and correlation analysis. To the right, there are several panes showing the output of the code execution, including a markdown preview, a data frame summary, and a heatmap visualization of correlation coefficients.

Azure Machine Learning for Visual Studio Code extension

Other Azure AI Examples

<https://aidemos.microsoft.com/>

- <https://github.com/microsoft/Azure-Analytics-and-AI-Engagement>
- <https://github.com/microsoft/AI-For-Beginners>
- <https://github.com/topics/azure-ai>
- <https://github.com/sollancoren/ai-in-a-day>
- <https://github.com/Azure-Samples/AI-Developer-Resources>

Other Azure ML Examples

[**https://github.com/topics/azure-machine-learning**](https://github.com/topics/azure-machine-learning)

- https://github.com/AzureLearnAnalytics/doingMachineLearningwithAzureMLStudio/tree/master/instructor_resources
- [Image clustering using Python and Azure Machine Learning Studio](#)
- [Workshop Azure ML Studio](#)
- https://academy.datachangers.com/courses/coursev1:Microsoft+DAT275x+2018_T4/about
- <https://github.com/MicrosoftLearning/Principles-of-Machine-Learning-Python>

- Azure ML Studio <https://studio.azureml.net/>
 - [QuickStartTutorial](#)
 - [Tutorial](#)
 - [DataScientistGuide](#)
- Azure Notebooks <https://notebooks.azure.com/>
 - [Quidkguide](#)
 - [Tutorial](#)
 - [RunAzureNotebookwithPython](#)
 - [Sample Notebooks](#)



Questions ?





Thanks for your active participation

Keep learning & keep glowing ☺