

Microsoft ve Yapay Zekâ (AI)

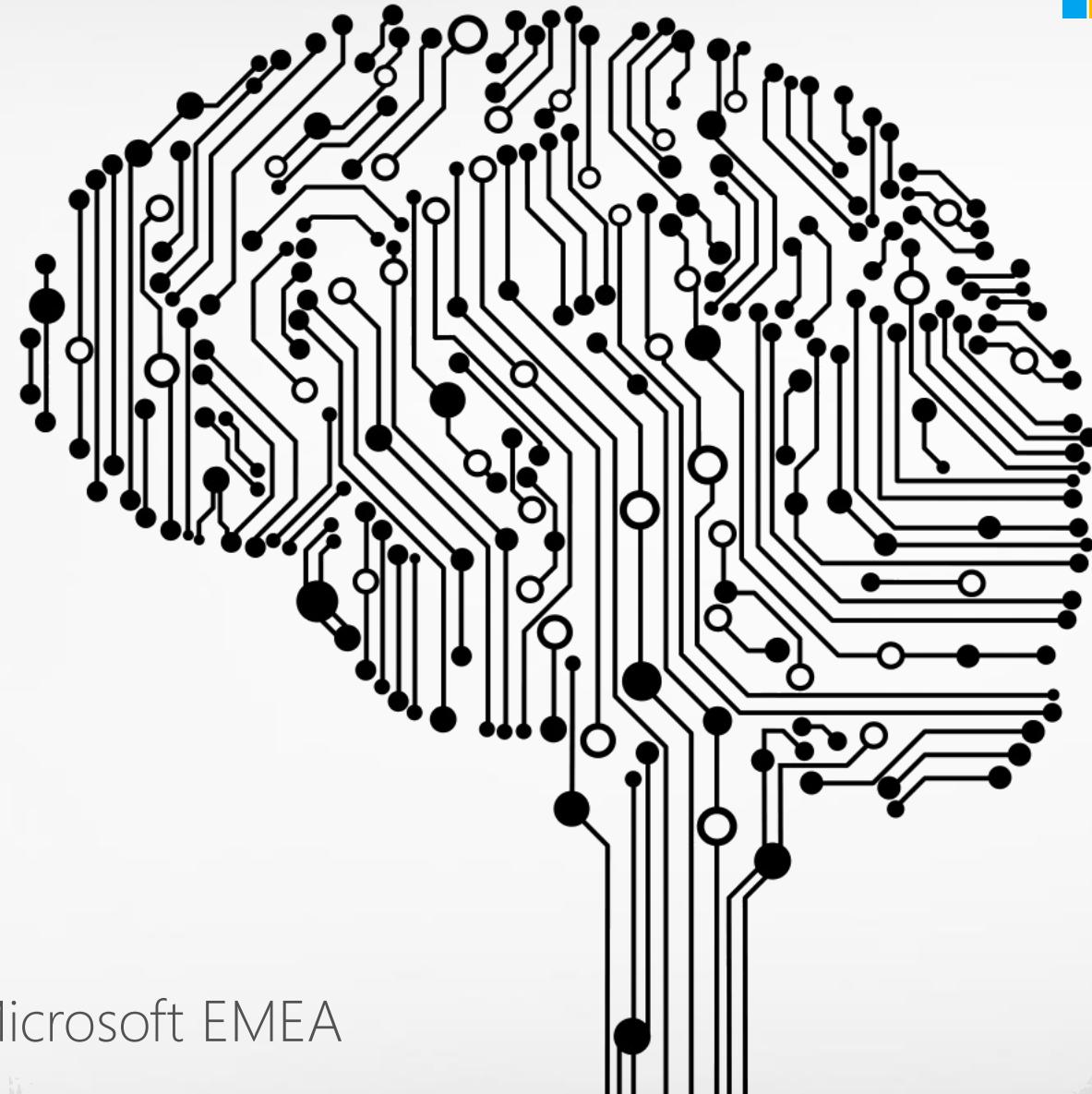
Ibrahim Kivanç

Software Development Engineer

Commercial Software Engineering @Microsoft EMEA

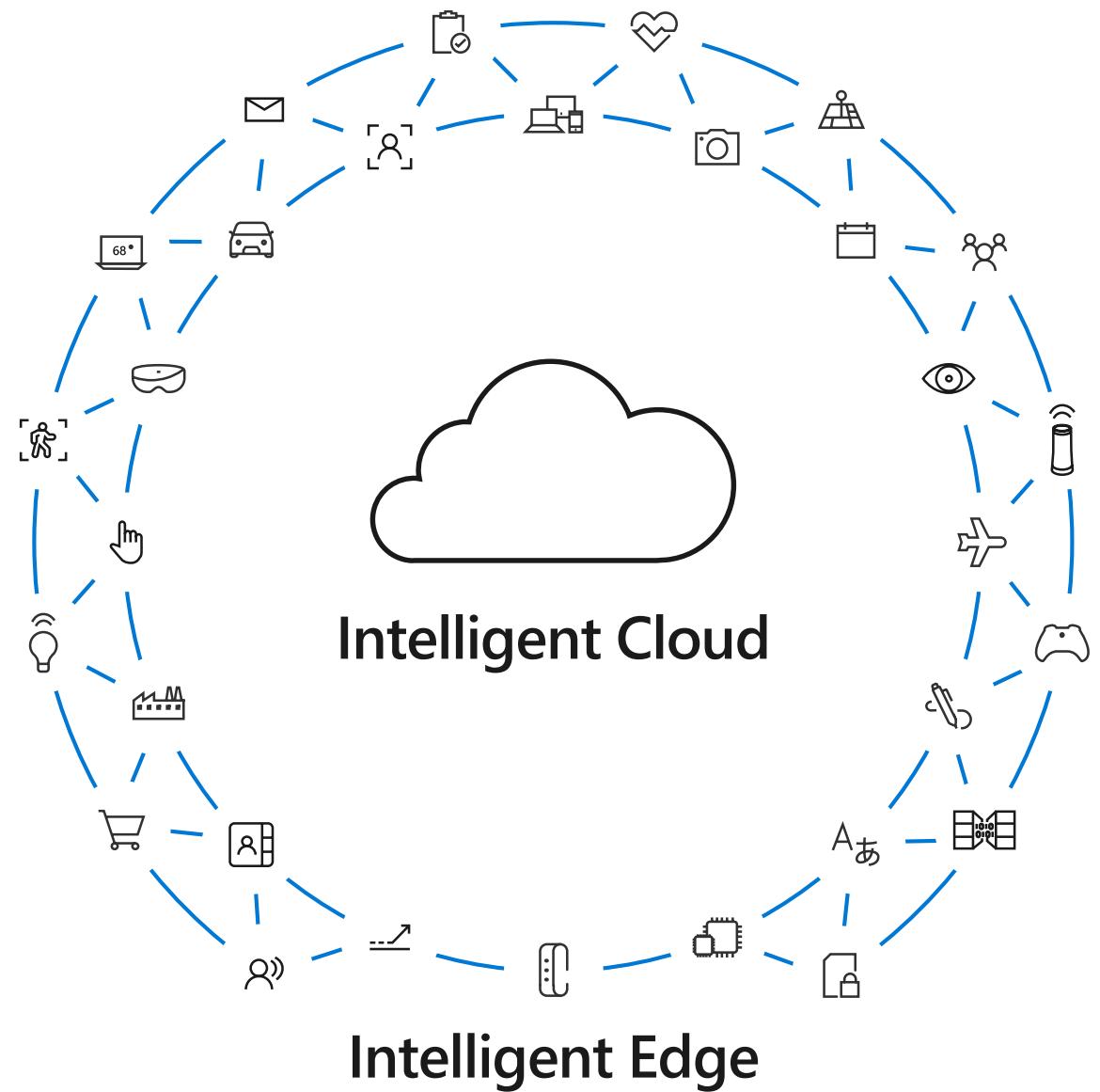
ikivanc@microsoft.com

Twitter: @ikivanc



Agenda

- 1 - Microsoft & AI
- 2 - Cognitive Services
- 3 - Machine Learning & Deep Learning



Hands on Labs

Microsoft Cognitive Services - Vision & Artificial Intelligence

1. Computer Vision ile Fotoğraf Analizi ve OCR

<https://github.com/ikivanc/Microsoft-Cognitive-Services---Computer-Vision>

2. Custom Vision Services Uygulama Örneği

<https://github.com/ikivanc/Custom-Vision-Prediction-Ornegin>

Bot Framework & LUIS.AI - Conversations as Platform

1. Şehir-Plaka Kodu Arama

<https://github.com/ikivanc/TRPlateBot>

2. Şehir-Plaka Kodu Arama ve LUIS ile Doğal Dil Anlama Ekleme

<https://github.com/ikivanc/TRPlateBot-LUIS>

3. Şehir-Plaka Kodu Arama - LUIS'e TÜRKÇE Doğal Dil Anlama Özelliği Ekleme

<https://github.com/ikivanc/TRPlateBot-LUIS-Translator>

Hands on Labs

Microsoft Azure Artificial Intelligence / Machine Learning

1.Azure AI/ML Resources

<https://github.com/ikivanc/Azure-ML-Resources>

2.Azure Machine Learning Workbench - Classifying Iris

<https://github.com/ikivanc/Azure-ML-Workbench-Iris-Dataset-Classification>

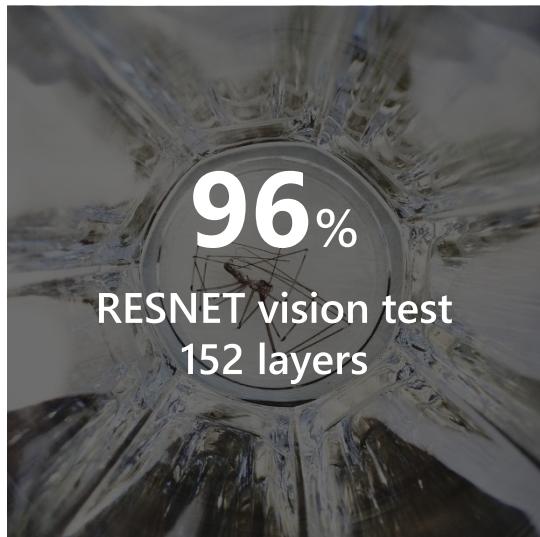
3.Introduction to Python Data Science with Jupyter Notebook

<https://notebooks.azure.com/jakevdp/libraries/PythonDataScienceHandbook/tree/notebooks?page=2>

Breakthroughs Enabling Intelligence

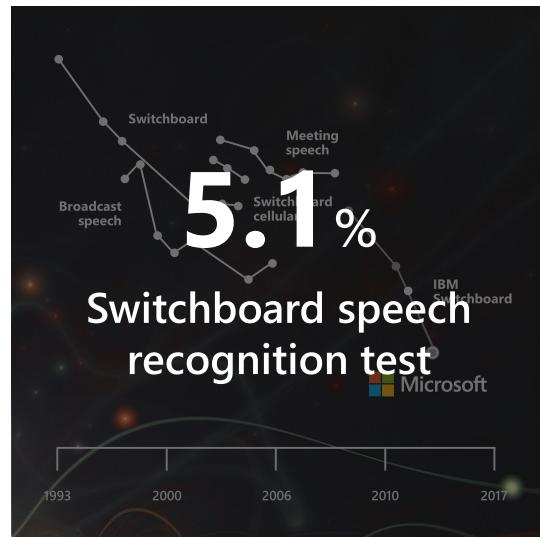


Microsoft AI breakthroughs



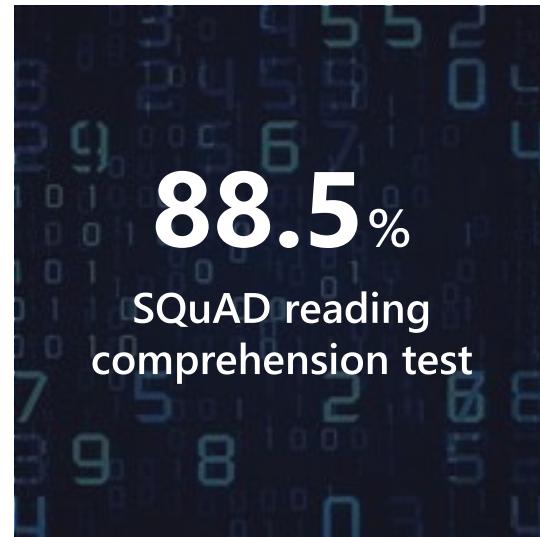
2016

Object recognition
Human parity



2017

Speech recognition
Human parity



January 2018

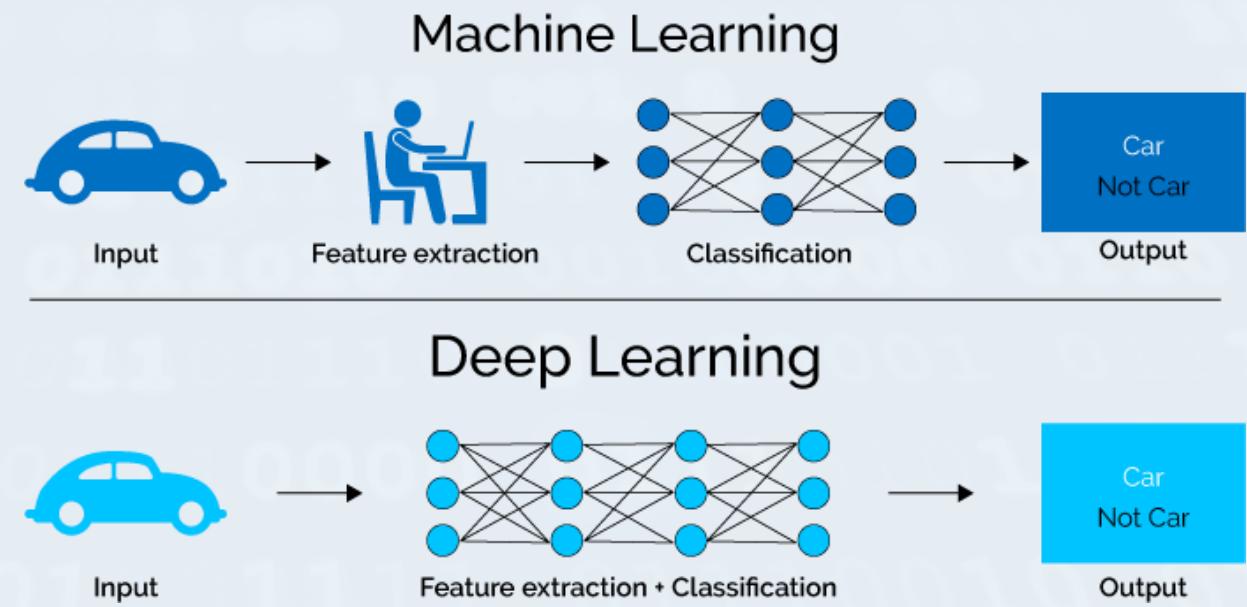
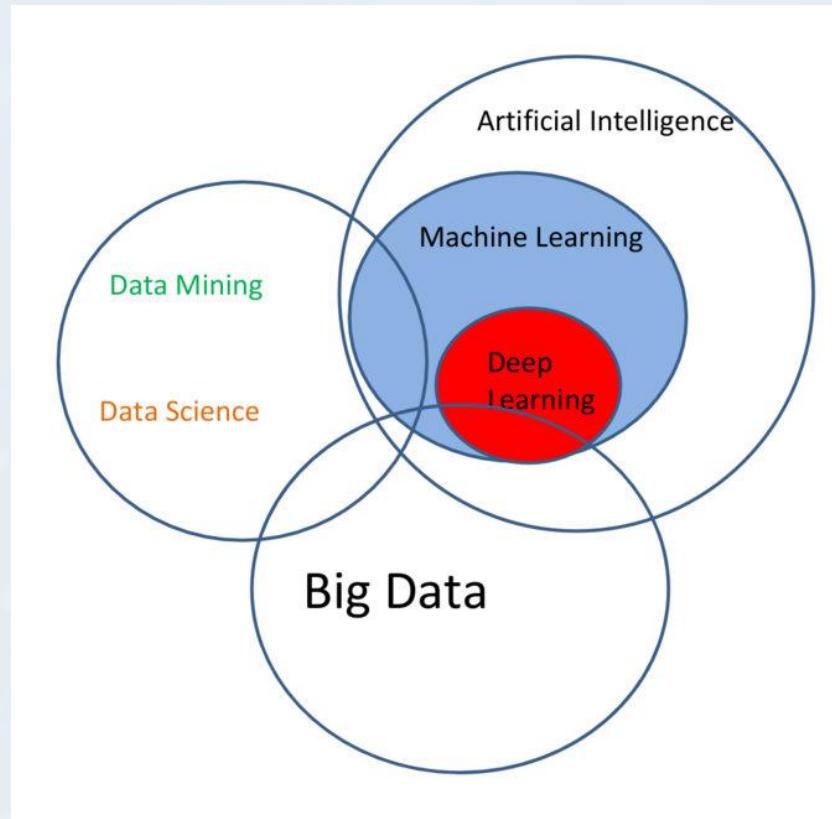
Machine reading comprehension
Human parity



March 2018

Machine translation
Human parity

Machine Learning / Deep Learning



Microsoft AI Portfolio

People



Agent

Cortana



Applications

Office 365

Dynamics 365

SwiftKey

Pix

Customer Service
and Support

Skype

Calendar.help



Services

Cortana Intelligence

Cognitive Services

Bot Framework

Cortana Devices SDK

Cognitive Toolkit



Infrastructure

Azure Machine
Learning

Azure Notebooks

Azure N Series

FPGA

Azure AI

Vision

Speech

Language

Customized language **Text-to-speech**
understanding Content moderation **Spell
Speech translation check**
Custom image classification
Speaker recognition Entity linking
Sentiment analysis, & augmentation
key phrase extraction **Image tagging**
Custom Object detection Text translation **Intend**
voice **OCR handwriting analysis**
Emotion detection **recognition** Custom translation
Video insights **Face** Custom speech Assisted text moderation
identification Speech transcription

Microsoft Cognitive Services

Give your apps a human side



Vision

Computer Vision

Content Moderator

Emotion

Face

Video

Video Indexer

Speech

Bing Speech

Speaker
Recognition

Language

Bing Spell Check

Linguistic Analysis

Text Analytics

Translator Text
& Speech

Web Language
Model

Knowledge

Academic
Knowledge

Entity Linking

Knowledge
Exploration

Recommendations

QnA Maker

Search

Bing
Autosuggest

Bing Image
Search

Bing News
Search

Bing Video
Search

Bing Web Search

Bing Entity
Search

Bing Custom
Search

Labs

Project Prague
(gesture)

Project Cuzco
(events)

Project Johannesburg
(routing)

Project Nanjing
(isochrones)

Project Abu Dhabi
(distance matrix)

Project Wollongong

CUSTOMIZATION

Custom Vision
Service

Custom Speech
Service

Language
Understanding

Custom Decision
Service

Microsoft AI Portfolio

People



Agent

Cortana



Applications

Office 365

Dynamics 365

SwiftKey

Pix

Customer Service
and Support

Skype

Calendar.help



Services

Cortana Intelligence

Cognitive Services

Bot Framework

Cortana Devices SDK

Cognitive Toolkit



Infrastructure

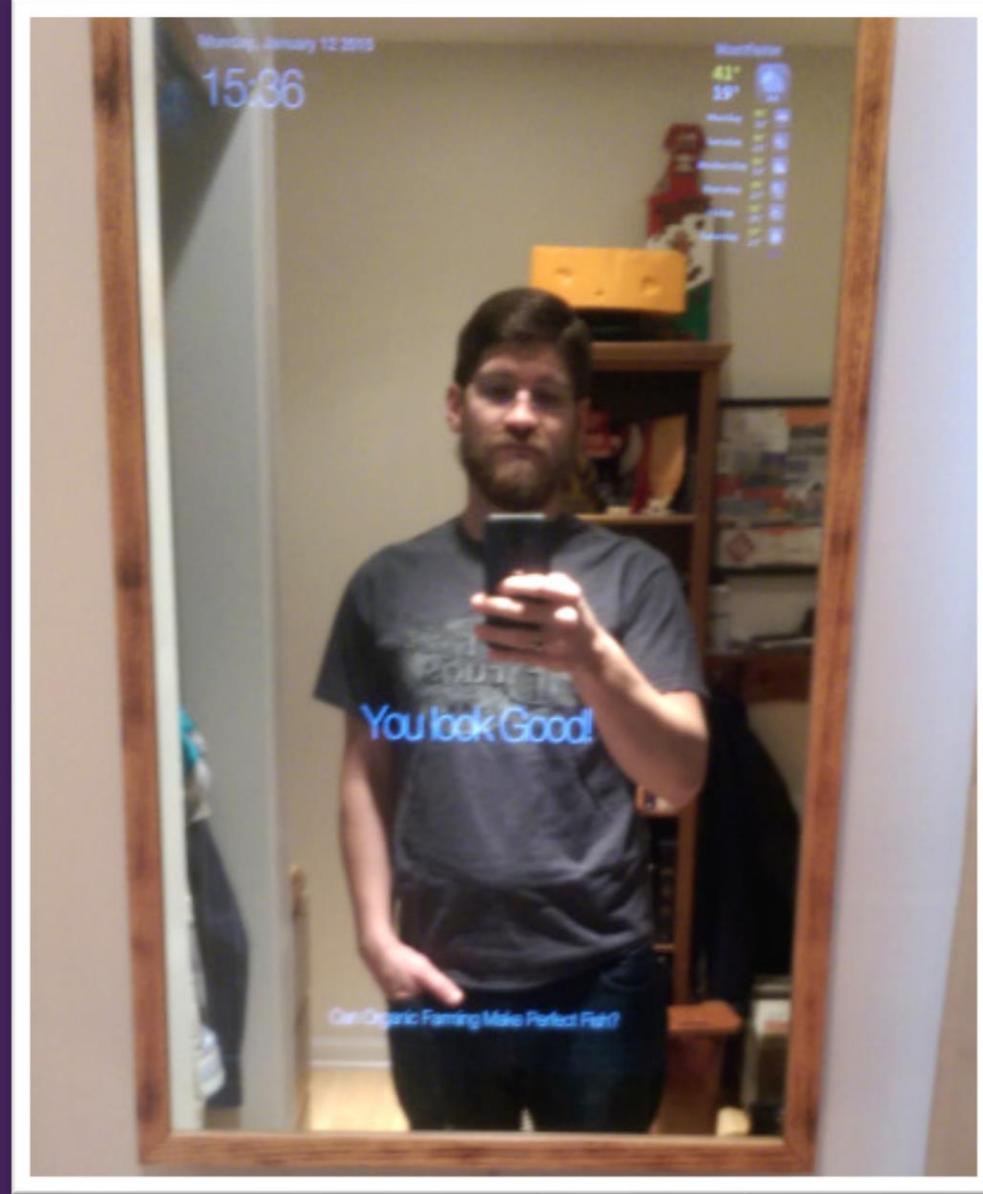
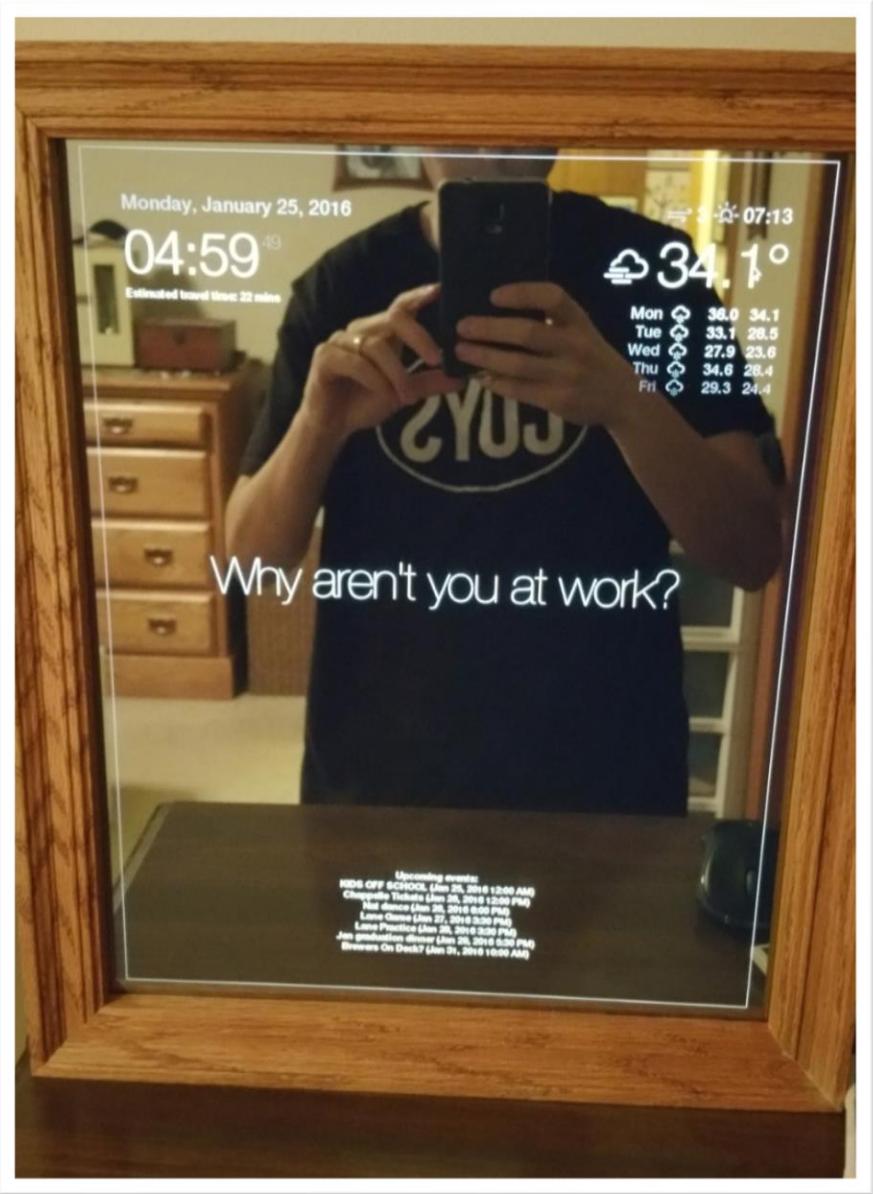
Azure Machine
Learning

Azure Notebooks

Azure N Series

FPGA





Export Text with Computer Vision OCR (works great with Turkish)

The screenshot shows the Microsoft Cognitive Services interface for Computer Vision OCR. On the left, a scanned document from the 'TÜRKİYE DİYANET VAKFI KOZAN ŞUBESİ' is displayed. The document is dated 10/02/2017 and contains text in Turkish. On the right, the 'JSON' tab is selected, showing the extracted text content in JSON format. The JSON output includes the date, the address of the land plot, the name of the landowner, and the purpose of the donation.

10/02/2017

İlçemiz Merkez Akçahusağl Mahallesinde bulunan Ada 143 parsel 383 de bulunan 867,04m² gayrimenkulün sahibi Osman AKILLIOĞLU bu gayrimenkulüne Türkiye Diyanet Vakfına bağışlamak istemektedir.

Söz konusu gayrimenkul Gölér yaylası Hasan AVCI Yaz Kur'an Kursumuzun bitiştiği olduguundan Vakfımıza alınmasının yararı olacagi kanaatine varılmıştır.

Belirtilen gayrimenkulün Vakfımıza alınabilmesi için bağışlamak isteyene ait dilekçe, inceleme raporu ve bağışlanacak gayrimenkulün Tapu Senedinin bir fotokopisi ilişkide sunulmuştur.

Yetki belgesinin Türkiye Diyanet Vakfi Şube Başkanı Bilal BAŞOĞLU adına gönderilmesini, arz ederim.

Bilal BAŞOĞLU
TDV Şube Başkanı

EKLER :
EK- 1 (1) Adet Dilekçe.
EK-2(1) Adet İnceleme Raporu
EK-3 (1) Adet Tapu Senedi Fotokopisi.

10.02.2017 Memur : Ö.F.GÜNEY

Adres: Mutfaklık 01310 Kozan
TİF: 0 (322) 515 82 85 Fax: 0 (322) 515 01 54
e-posta : kozanmu@diyanet.gov.tr

Ayrıntılı bilgi ve irtibat: Ö.F.GÜNEY

Preview JSON

10/02/2017

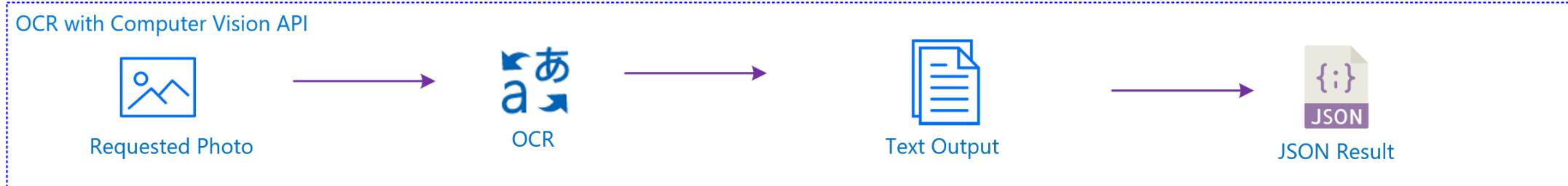
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EKLER



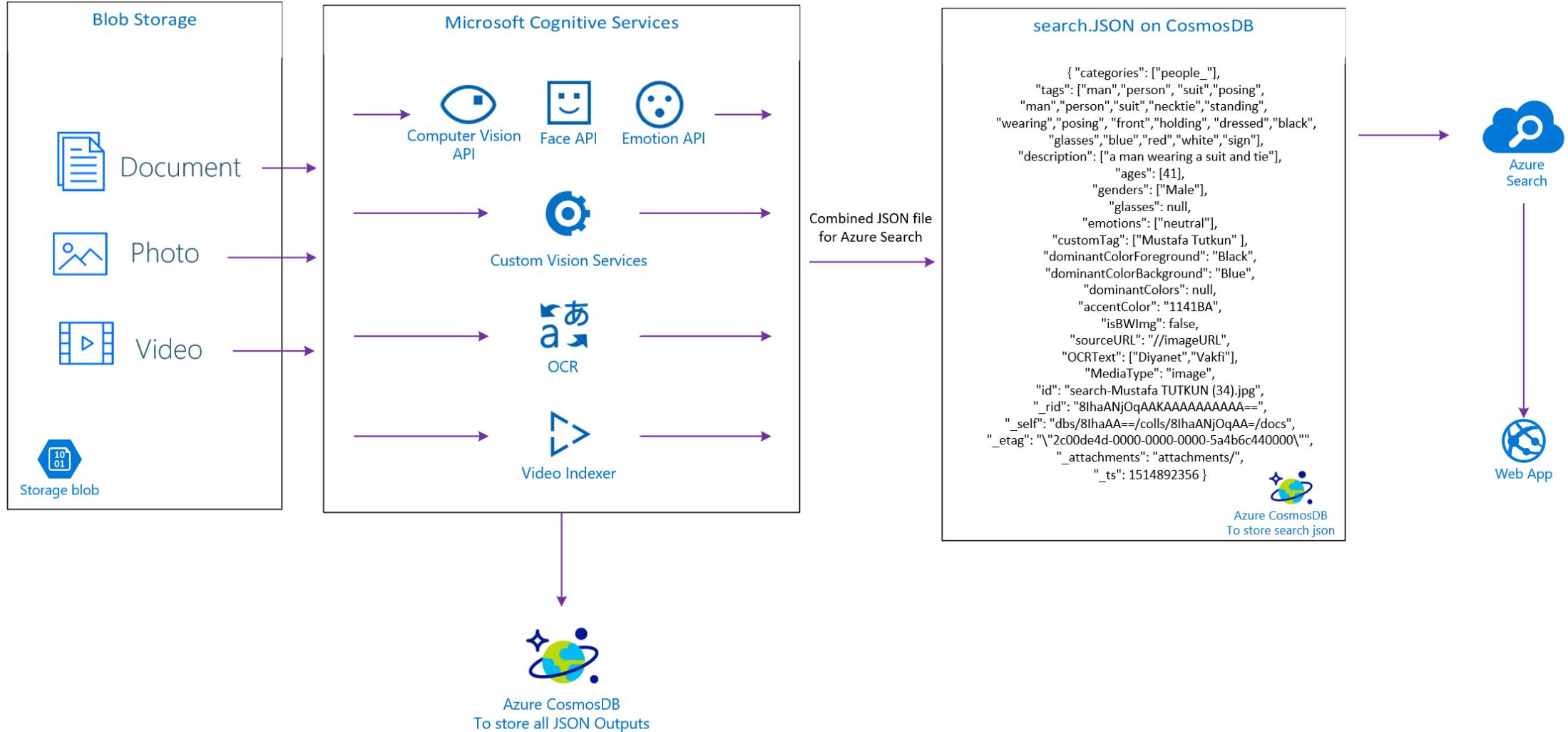
Tag Export from Photos & Images

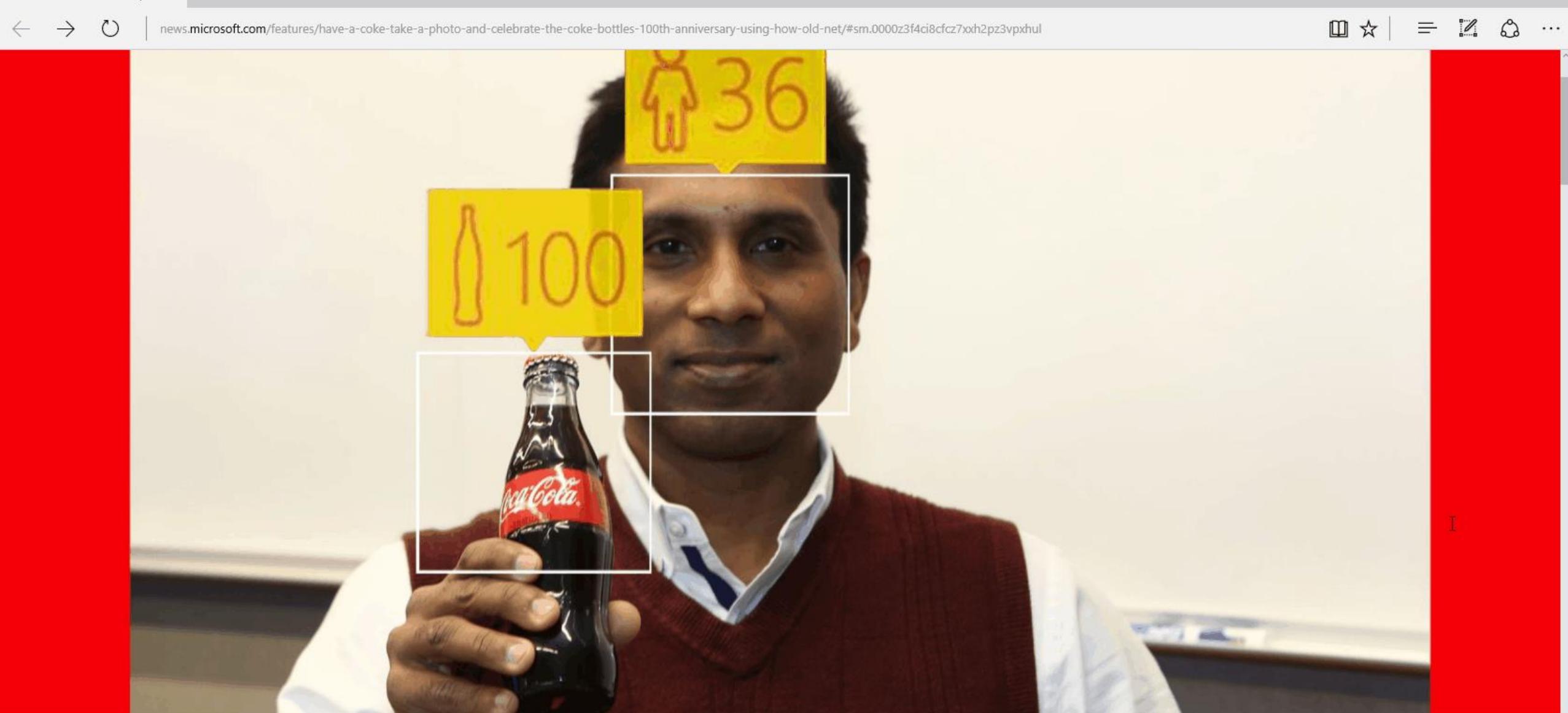


FEATURE	VALUE
NAME:	
Description	{ "tags": ["person", "man", "necktie", "suit", "indoor", "wearing", "clothing", "standing", "posing", "looking", "front", "glasses", "holding", "camera", "photo", "striped", "shirt", "dressed", "smiling", "mirror", "young", "room", "white"], "captions": [{ "text": "a man wearing a suit and tie", "confidence": 0.989332438 }] }
Tags	[{ "name": "person", "confidence": 0.9997235 }, { "name": "man", "confidence": 0.999683857 }, { "name": "necktie", "confidence": 0.9905702 }, { "name": "suit", "confidence": 0.975641549 }, { "name": "indoor", "confidence": 0.927588642 }, { "name": "wearing", "confidence": 0.8903499 }, { "name": "posing", "confidence": 0.6132479 }, { "name": "male", "confidence": 0.15457508 }]

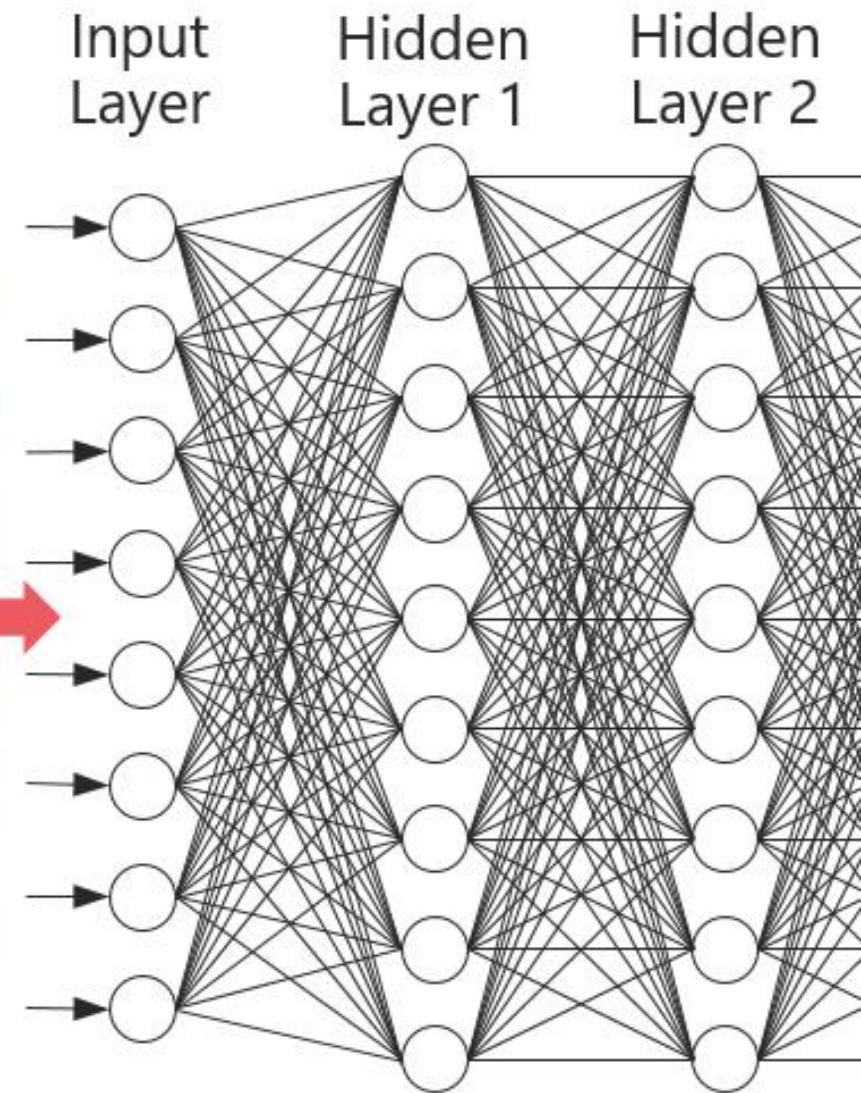
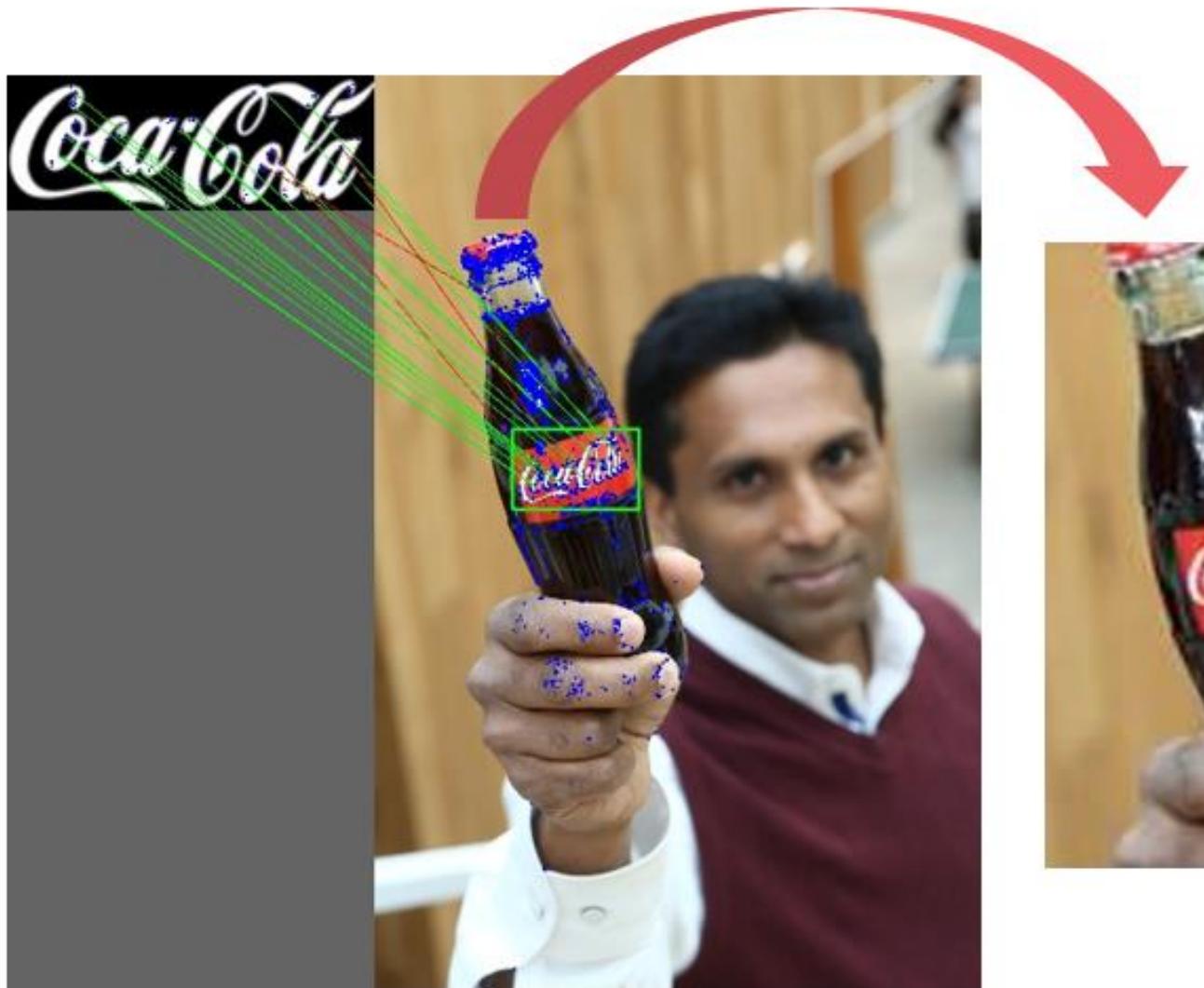


Türkiye Diyanet Vakfı – Intelligent Archive Project





Have a Coke, take a photo and celebrate the Coke
bottle's 100th anniversary using How-Old.net



Custom Vision: Interactive

Secure | https://www.customvision.ai/projects/87e2a975-7aa9-48bd-86a0-282659fd200e#/manage

Bookmarks for info Performance & Maint. Health ChatEver IT Learn To Be Upgrade to an SSD: T İstanbul'da mutlaka ki Garbage Collection a c# - How to debug co Nothing is loaded aft. Memory Dump Analy. workflow foundation Other bookmarks

Custom Vision InteractiveAssistant TRAINING IMAGES PERFORMANCE PREDICTIONS Train Quick Test Sign out

Refine Add images Delete Tag images Select all 1 2 3 4

Workspace Iteration History

Tags +

All (182)

- CarBrand: AUDI (131) ...
- CarBrand: VOLKSWAGEN (50) ...
- CarModel: A3 (48) ...
- CarModel: A4 (35) ...
- CarModel: A5 (49) ...
- CarModel: GOLF (44) ...
- CarModel: JETTA (6) ...

Untagged (0)

11:26
26.05.2017

Hands on Labs

Microsoft Cognitive Services - Vision & Artificial Intelligence

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THE ML & AI PLATFORM

DEVELOPER TOOLS & SERVICES



AI Applications (1st & 3rd party)

Cognitive Services

Bot Framework

OPEN PLATFORM FOR DATA SCIENCE

Azure Machine Learning



Experimentation management,
data prep, & collaboration



Model deployment & management



Machine Learning toolkits

CNTK

Scikit-Learn

Tensorflow

Other Libs.

ML Server

PROSE

Docker

Cloud – Spark, SQL, other engines

ML Server – Spark, SQL, VMs

Edge

HYPERSCALE, ENTERPRISE-GRADE INFRASTRUCTURE

Software

Spark

AI Batch Training

DS VM

SQL Server

ACS

Storage management

BLOB

Cosmos DB

SQL DB/DW

ADLS

Hardware

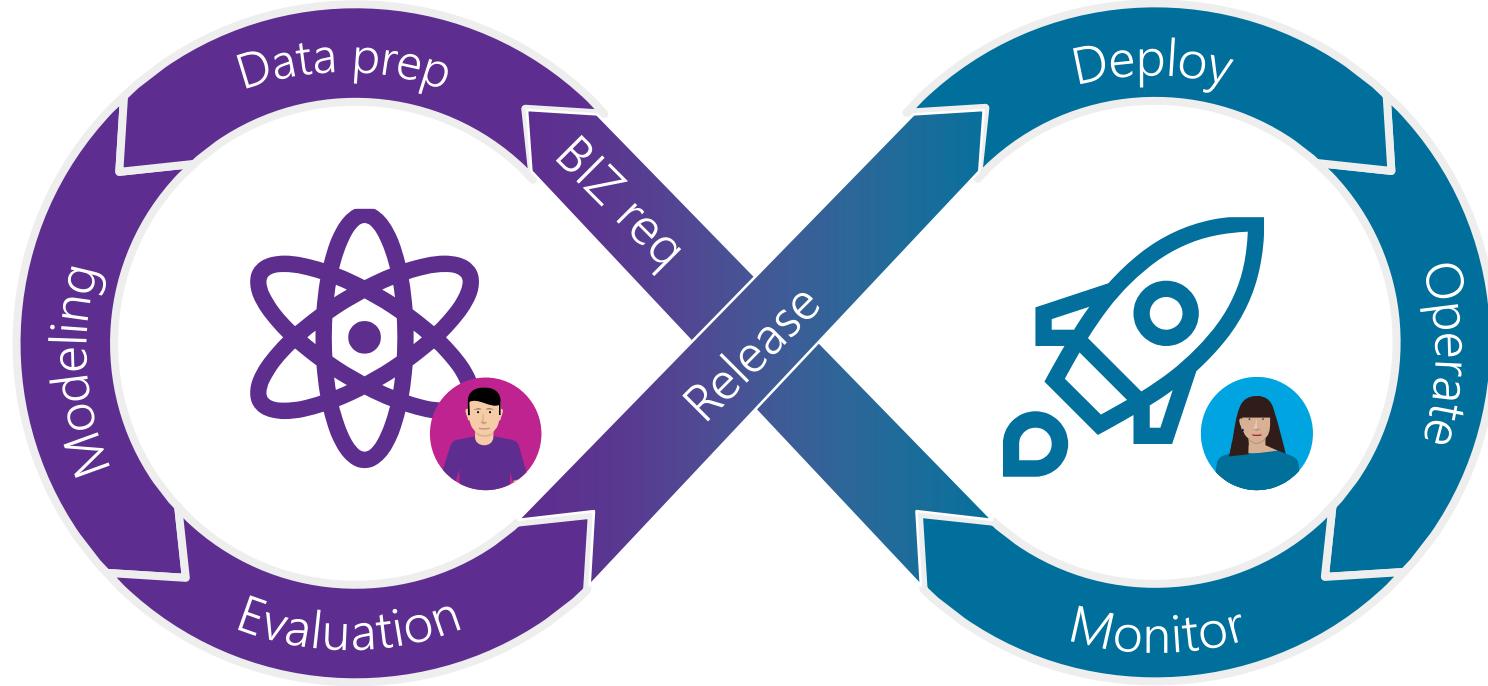
CPUs

FPGA

GPUs

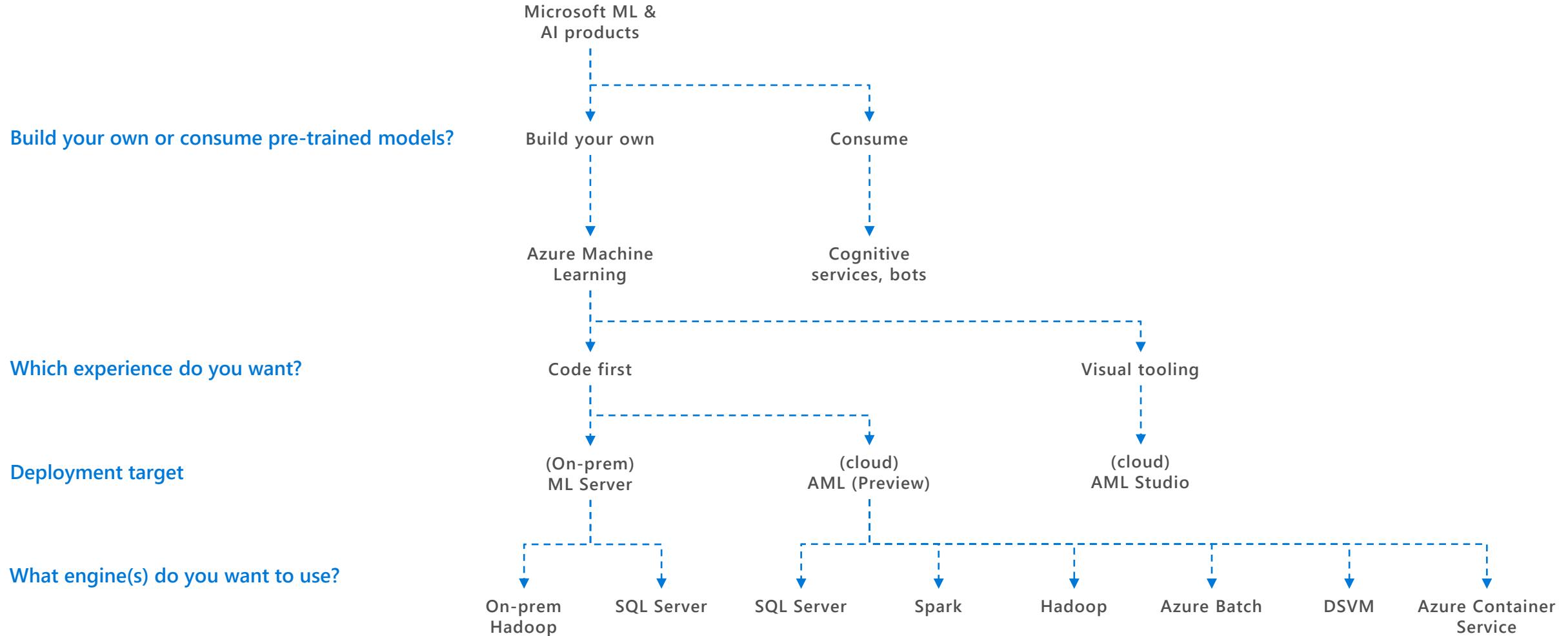
IoT

AI Development Life Cycle

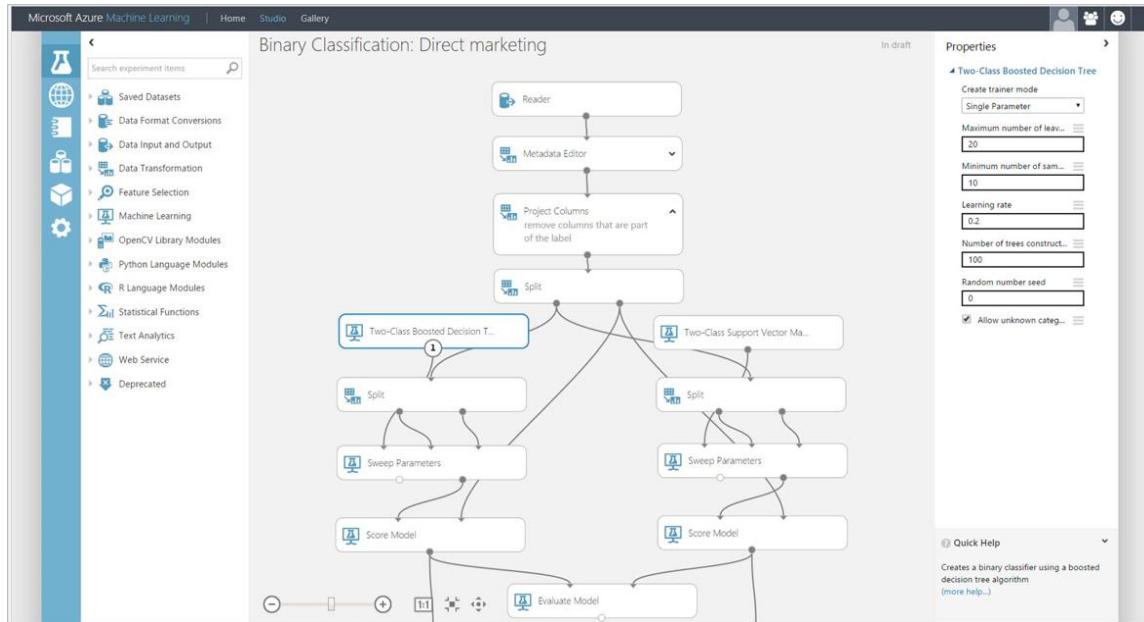


Machine Learning & AI Portfolio

When to use what?



Azure Machine Learning Studio & Workbench



VISUAL DRAG-AND-DROP

The screenshot shows the Azure Machine Learning Workbench interface. The top navigation bar includes "File", "Edit", "Help", "Project Dashboard", "iris", "Start Notebook Server", and "Stop Notebook Server". The main area is titled "jupyter iris (unsaved changes)". It features a Jupyter notebook interface with a sidebar containing icons for file operations and a "Classifying Iris Notebook" guide. The notebook itself has a cell containing the command `import matplotlib`. Below the notebook, a terminal window shows the command `matplotlib inline`.

CODE-FIRST

Azure Notebooks

The image displays two side-by-side screenshots of the Azure Notebooks interface, illustrating its features for data science and machine learning tasks.

Left Notebook (305 - Flowers ImageFeaturizer):

- Code:**

```
print subprocess.check_output(  
    "rm -rf {}".format(localDataFile),  
    stderr=subprocess.STDOUT, shell=True)  
  
In [ ]: modelName = "ResNet50"  
modelDir = "wasb:///models/"  
  
In [ ]: d = ModelDownloader(spark, modelDir)  
model = d.downloadByName(modelName)  
  
In [ ]: dataFile = "flowers_and_labels.parquet"  
localDataDir = "/tmp/Flowers/"  
localDataFile = join(localDataDir, dataFile)  
  
In [ ]: # Load the images  
imagesWithLabels = spark.read.parquet(localDataFile)  
imagesWithLabels.printSchema()
```
- Data Visualization:** Below the code cell, there is a grid of flower images labeled with their names: Bluebell, Crocus, Tigerlily, Tulip, and Cowslip. Each label has a row of five images corresponding to that flower type.

Right Notebook (firsttest):

- Code:**

```
Simple Linear Model Prediction  
  
This is a simple example of linear model prediction.  
  
In [1]: 3*4  
Out[1]: 12  
  
In [6]: print("Hey")  
Hey  
  
In [5]: def predict(m,b,x):  
    return m*x + b  
  
    import numpy as np  
    x = np.array([3,6,8])  
    x  
  
    predict (3,2,x)  
  
Out[5]: array([11, 20, 26])  
  
In [2]: import pandas as pd  
  
In [ ]: # -----  
# Copyright (c) Microsoft. All rights reserved.  
# Licensed under the MIT License. See LICENSE.md file in the project root  
# for full license information.  
# -----  
  
# This example demonstrates how to train a model, showcasing a range of training  
# - checkpointing  
# - testing after each minibatch  
# - cross-validation based learning-rate control and early stopping in user code  
# - data-parallel distributed training using MPI  
# This is shown along the task of recognizing handwritten digits on the MNIST cor  
  
from __future__ import print_function  
import os  
import cntk as C  
import numpy as np  
import scipy.sparse
```

Use what you want



Use your favorite IDE

Leverage all types of data

USE ANY FRAMEWORK OR LIBRARY



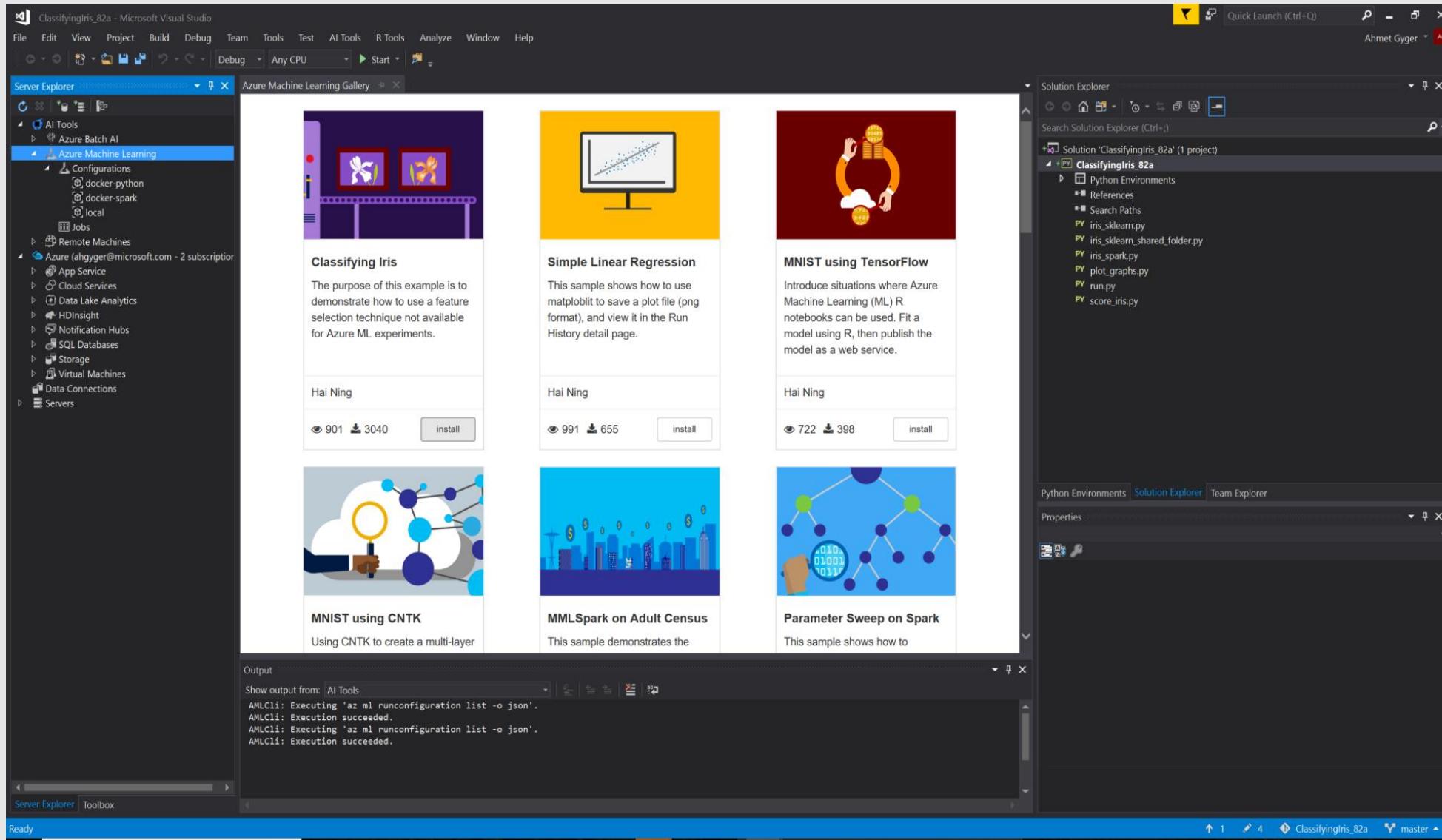
USE ANY TOOL



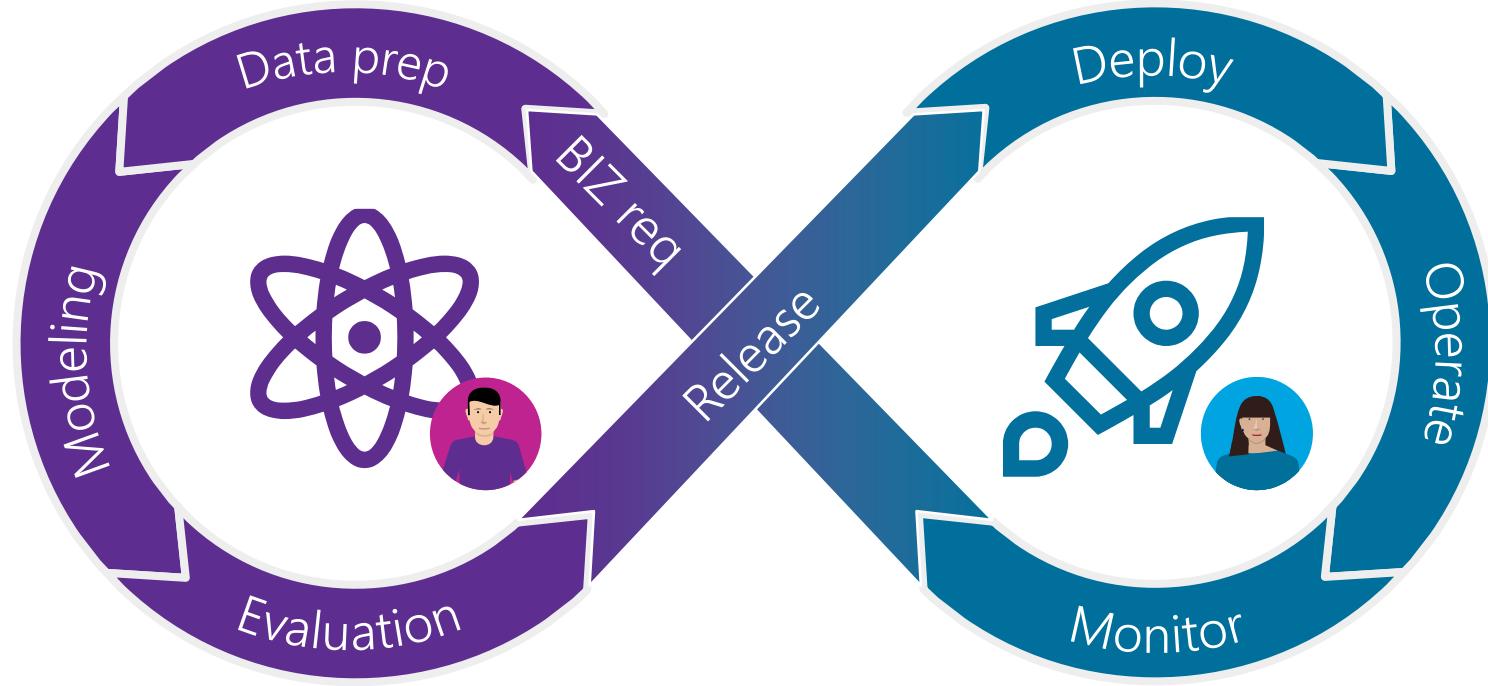
USE THE MOST POPULAR INNOVATIONS



Where you are...



AI Development Life Cycle



AML Workbench

Sample, understand, and prep data rapidly

Support for Spark + Python + R (roadmap)

Execute jobs locally, on remote VMs, Spark clusters, SQL on-premises

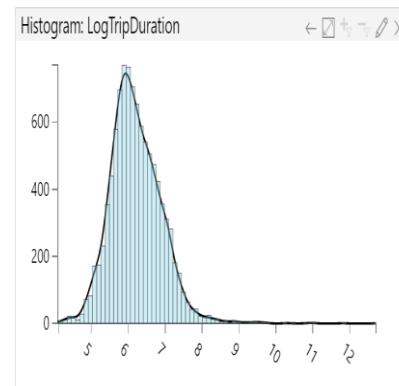
Git-backed tracking of code, config, parameters, data, run history

The screenshot displays the Azure Machine Learning Workbench interface, which includes:

- Jupyter Notebook:** A "Classifying Iris Notebook" is open, showing code snippets for installing dependencies and importing modules like pickle, sys, and numpy.
- Metrics Visualization:** A dashboard showing various performance metrics over time, including Iteration Time, Added Phrases, c_v Coherence, c_ncpmi Coherence, Perplexity, and Per Word Bound.
- Data Preparation:** A section showing column metrics for current samples across five columns (Column1 to Column5), including histograms and numerical values.
- Run History:** A list of recent runs and their details, such as "Model_Visualizations.ipynb" and "Topic_Model_Training.ipynb".
- Visualizations:** Three plots showing coherence metrics (c_ncpmi, c_v, c_uci) versus the number of topics.

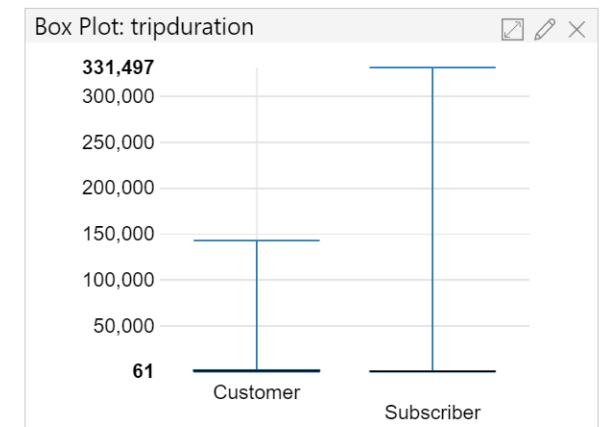
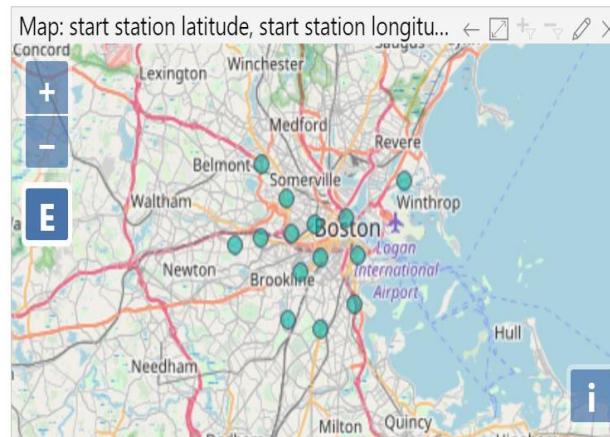
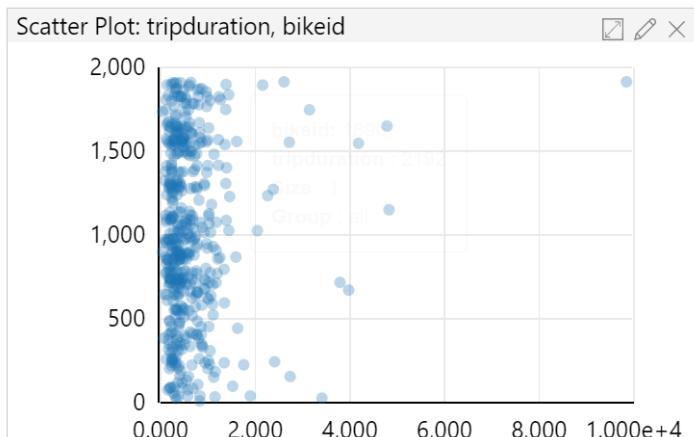
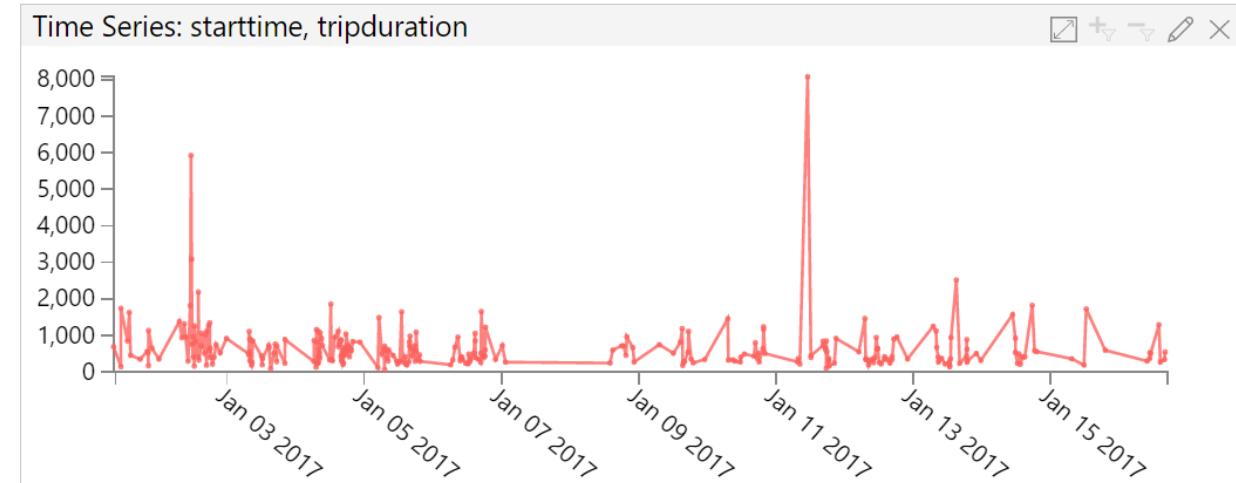
Inspectors

- Column statistics : Numeric
- Histogram
- Value Counts
- Box Plot
- Scatter Plot
- Time Series
- Map



tripduration Statistics

STATISTICS	
Minimum	61.00
Lower Quartile	320.00
Median	470.00
Upper Quartile	772.00
Maximum	331497.00
Average	765.12
Standard Deviation	4175.55

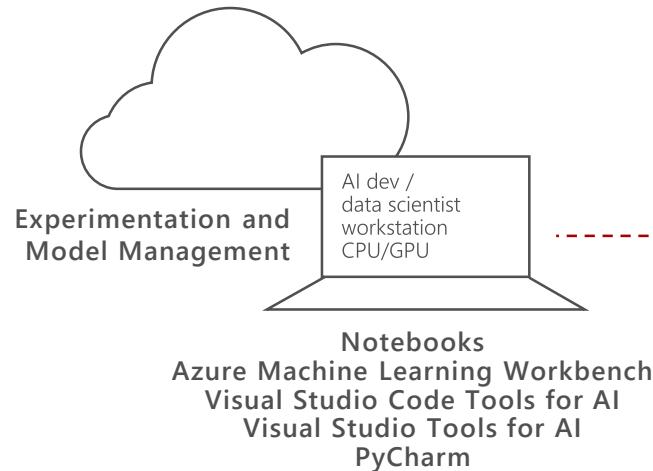


Demo

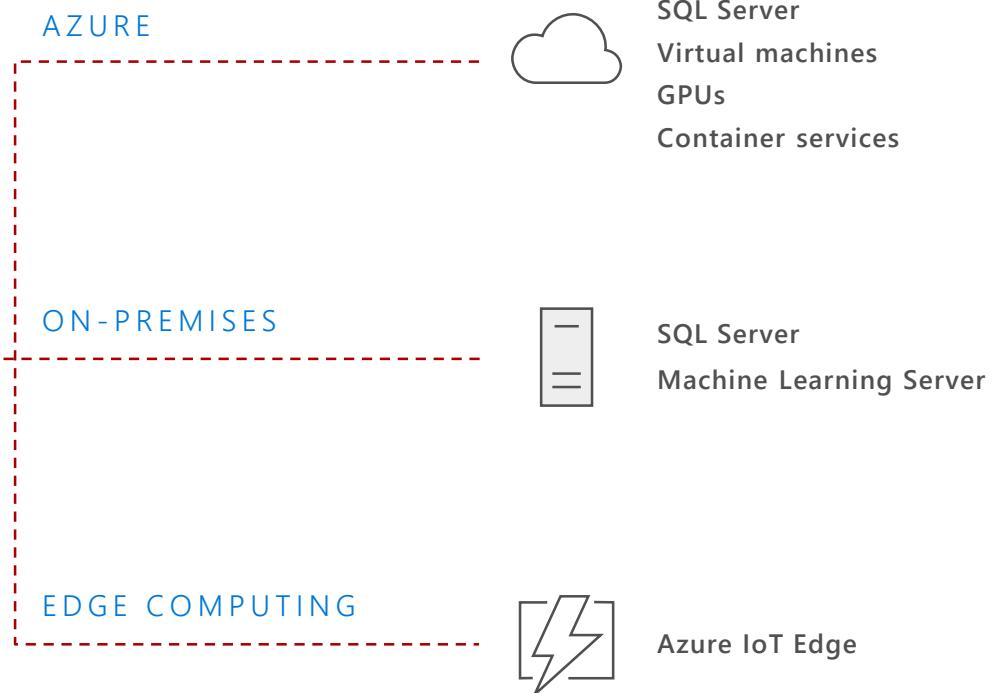
Azure Machine Learning Workbench

Azure Machine Learning Services - Overview

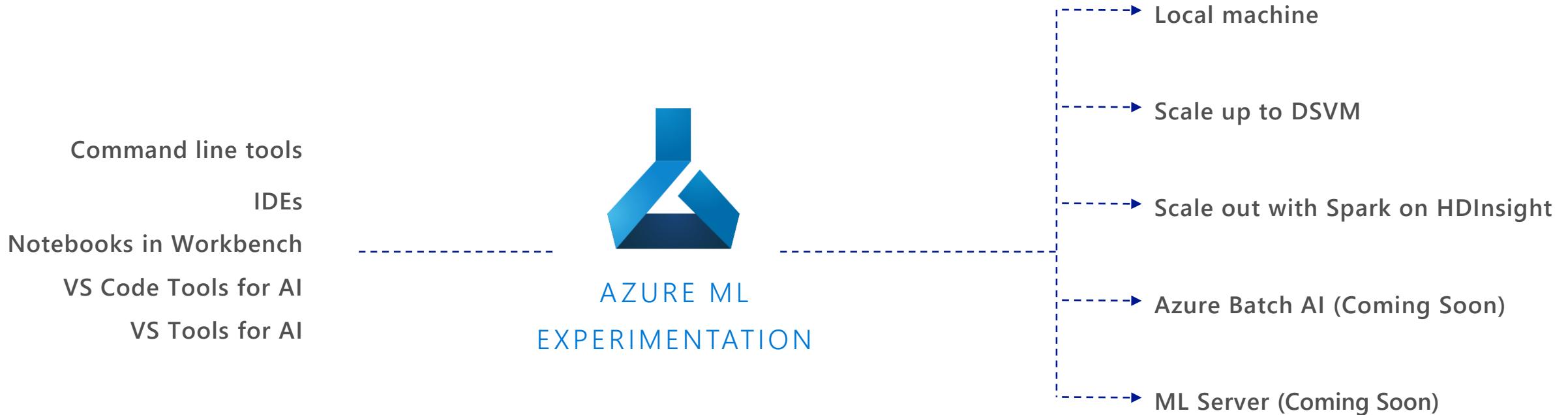
AZURE MACHINE LEARNING SERVICES



TRAIN & DEPLOY OPTIONS



Experimentation Services

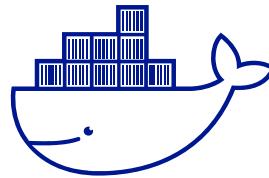


Model Management Services



AZURE ML

MODEL MANAGEMENT



DOCKER

- ▶ Single node deployment (cloud/on-prem)
- ▶ Azure Container Service
- ▶ Azure IoT Edge
- ▶ Microsoft ML Server
- ▶ Spark clusters
- ▶ SQL Server (Coming Soon)

Hands on Labs

Microsoft Azure Artificial Intelligence / Machine Learning

1.Azure AI/ML Resources

<https://github.com/ikivanc/Azure-ML-Resources>

2.Azure Machine Learning Workbench - Classifying Iris

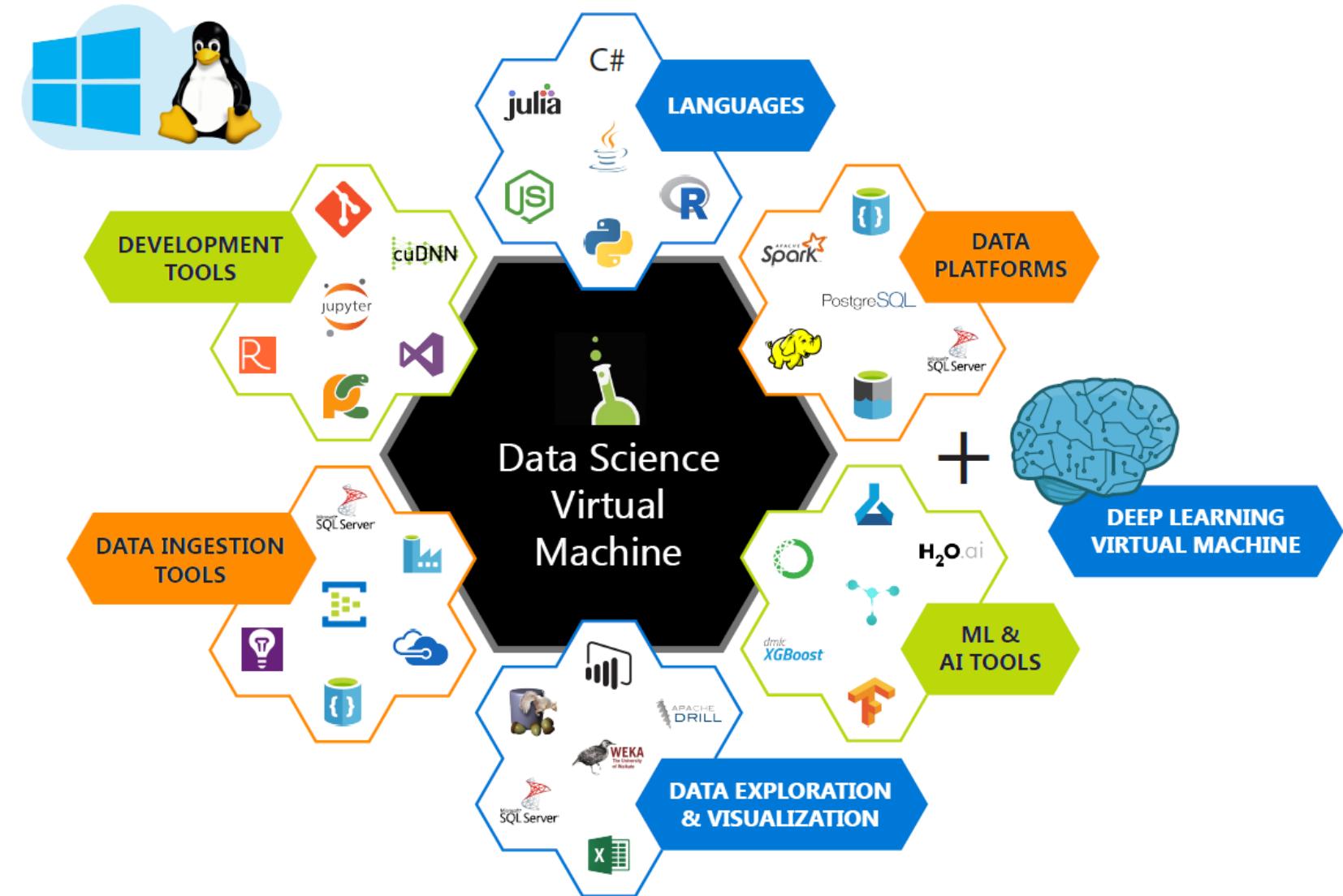
<https://github.com/ikivanc/Azure-ML-Workbench-Iris-Dataset-Classification>

3.Introduction to Python Data Science with Jupyter Notebook

<https://notebooks.azure.com/jakevdp/libraries/PythonDataScienceHandbook/tree/notebooks?page=2>

Data Science Virtual Machines (DSVM)

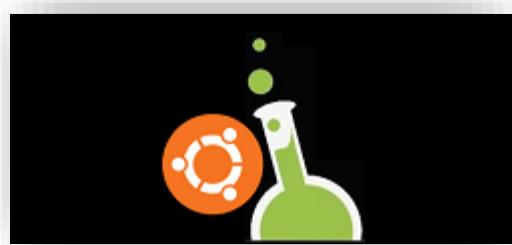
<http://aka.ms/dsvm>



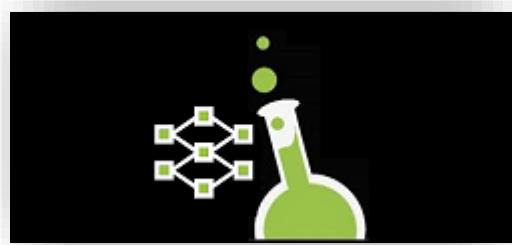
Data Science Virtual Machines (DSVM)



DSVM – Windows Server 2016



DSVM – Linux – Ubuntu



Deep Learning Virtual Machines

Demo

DSVM - Data Science Virtual Machine

Computer Vision Tasks

Image Classification

- Is there a deer in the image?



Object detection

- Where in the image is the deer?



Image segmentation

- Where exactly is the deer? What pixels?

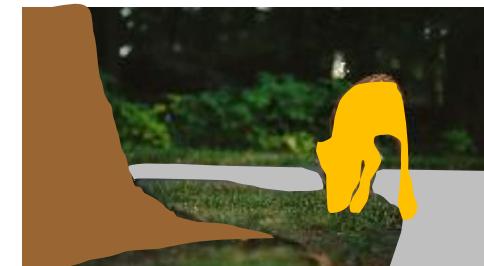
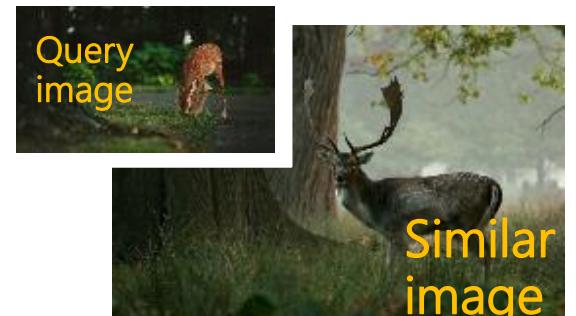


Image Similarity

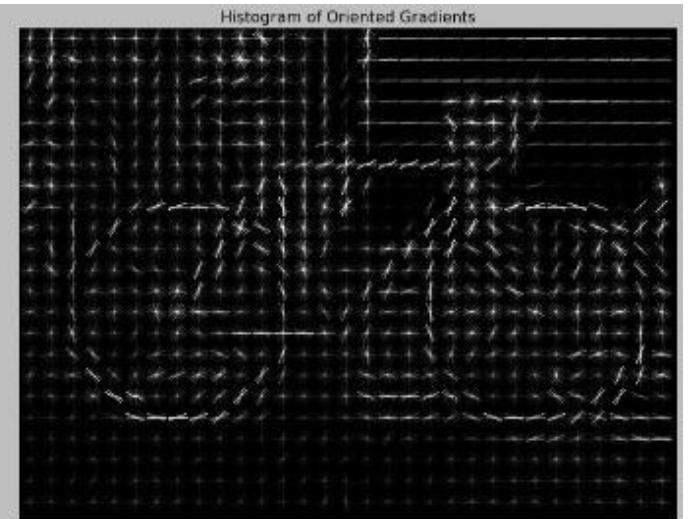
- Which images are similar to the query image?



Before Deep Learning

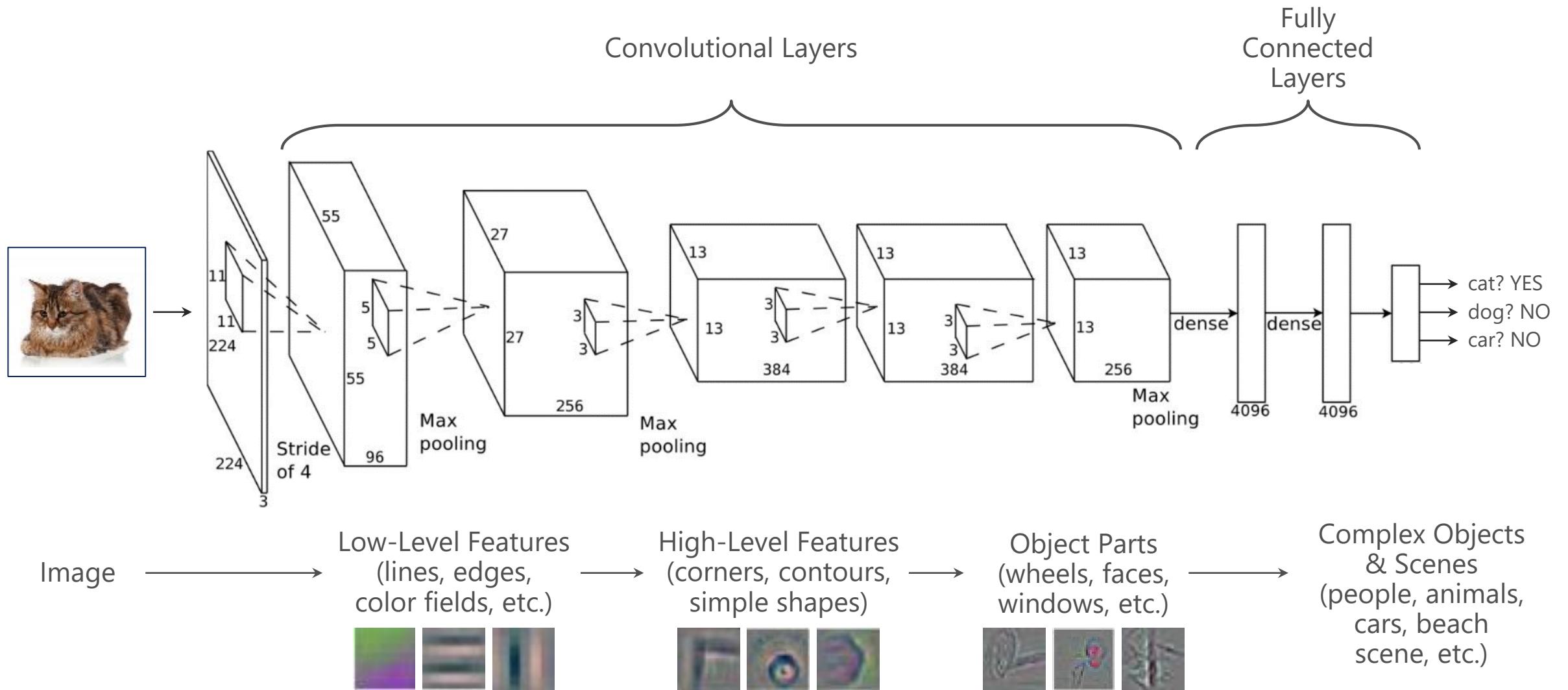
- Researchers took a traditional machine learning approach
 - Manual creation of a variety of different visual feature extractors
 - Followed by traditional ML classifiers

- Example: HoG Detectors
 - Histogram of oriented gradients (HoG) features
 - Sliding window detector
 - SVM Classifier
 - Very fast OpenCV implementation (<100ms)



Deep Learning for Image Classification

Deep Neural Network for Computer Vision



Deep Learning

Open environment

Cognitive Toolkit: performance, scale

Full support for TensorFlow, Caffe

Productive tools

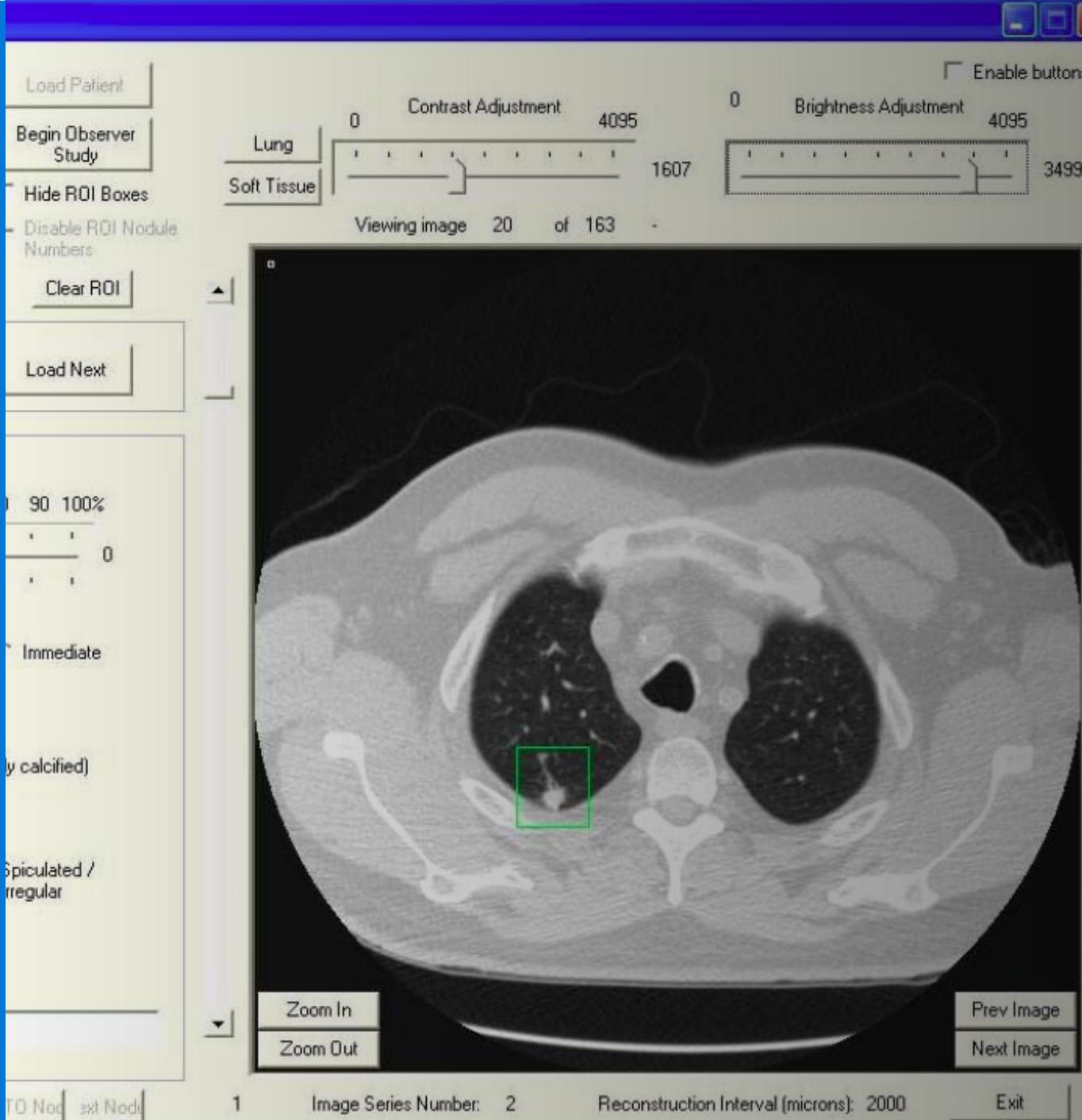
Visual Studio

Jupyter Notebook

Azure AI infrastructure

The AI supercomputer: CPU, GPU, and
(coming next) FPGA

Managed service with Batch AI Training



Cognitive Toolkit

Unlock deeper learning

A free, easy-to-use, open-source toolkit that trains deep learning algorithms to learn like the human brain.

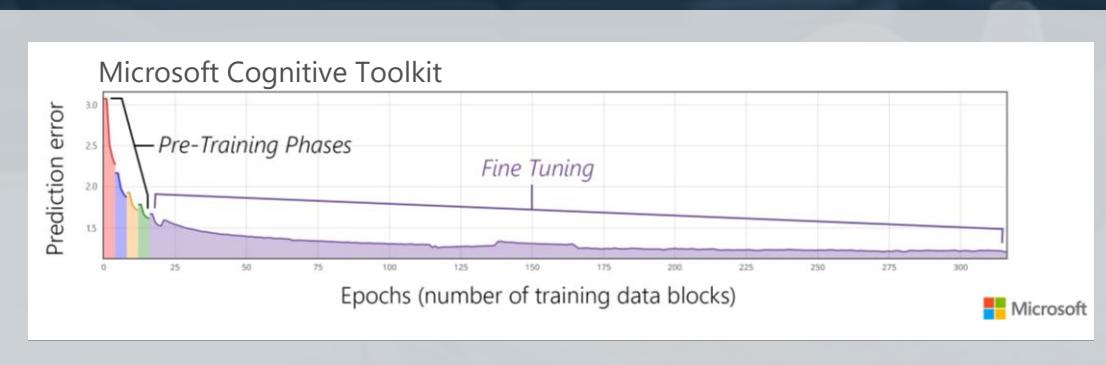


Image Classification Demo

Clothing texture dataset:

Striped



Dotted

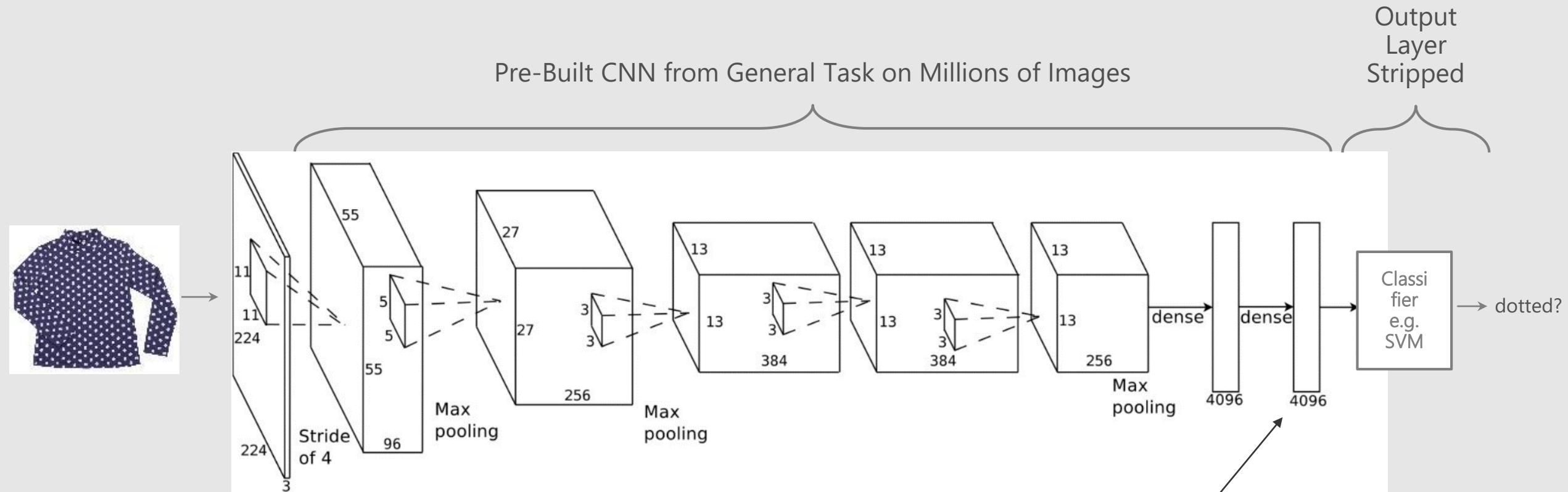


Leopard



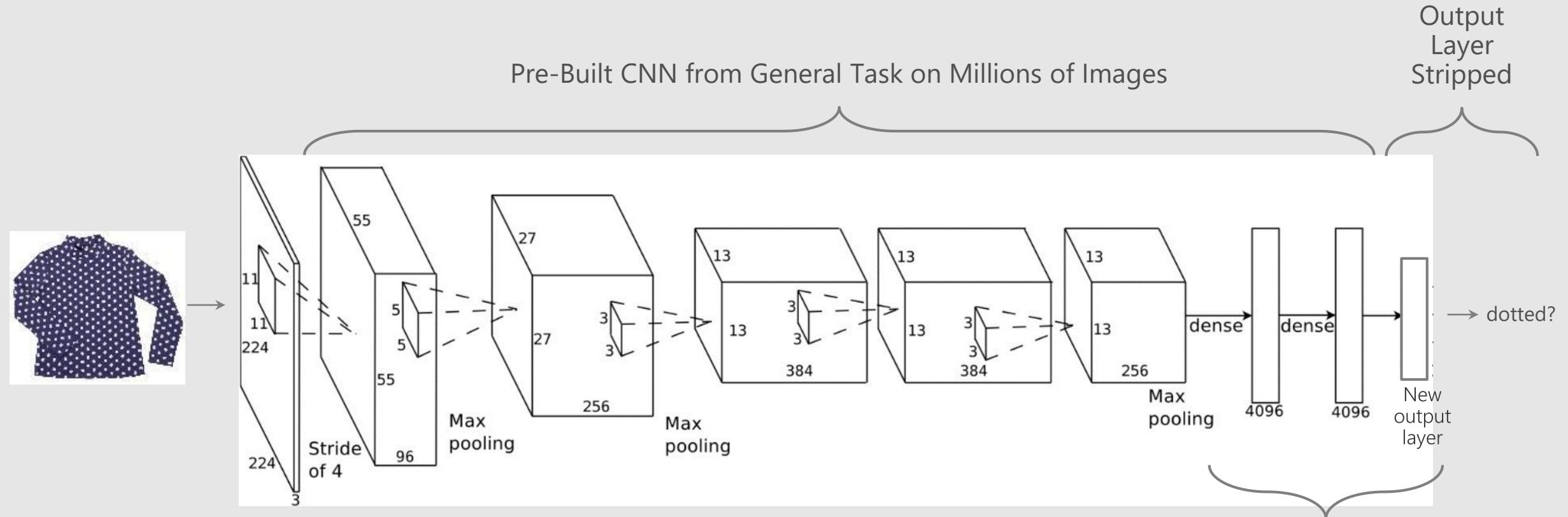
Can we apply transfer learning to accurately classify clothing texture?

Using a Pre-Trained CNN as a Featurizer



Outputs of penultimate layer of ImageNet Trained CNN provide excellent general purpose image features

Using a Pre-Trained CNN and Finetune



microsoft.com/ai



Thanks!

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