

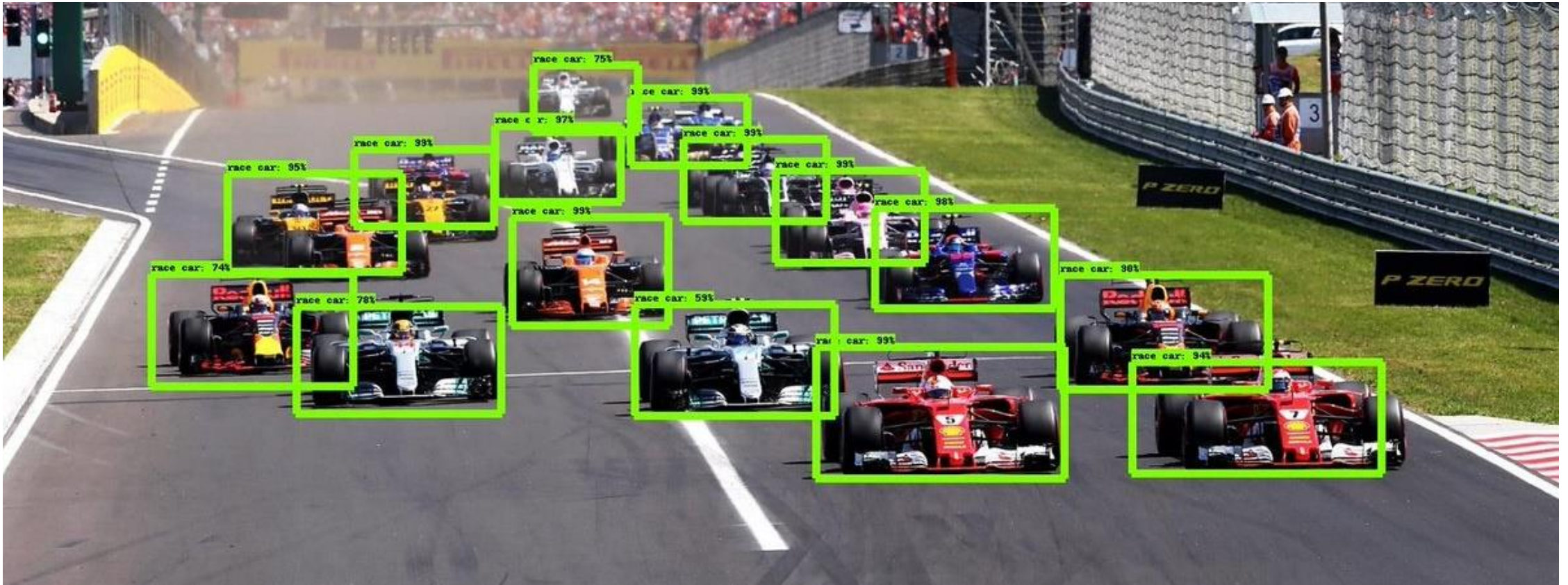


Workshop: Using Computer Vision for Object Classification and Detection

bit.ly/BucharestAIBootcamp

Sorin Pește

Data & AI Evangelist @ Microsoft



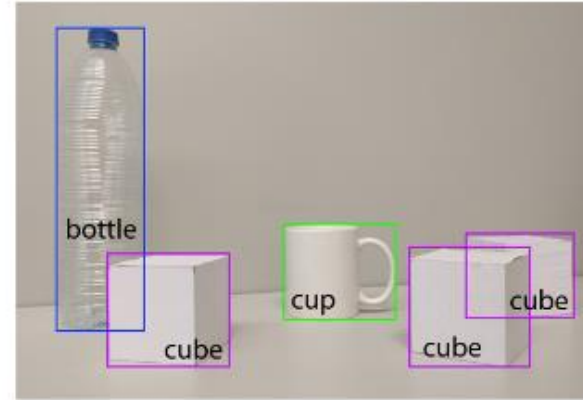
Computer Vision

The science and technology of **machines that see**.

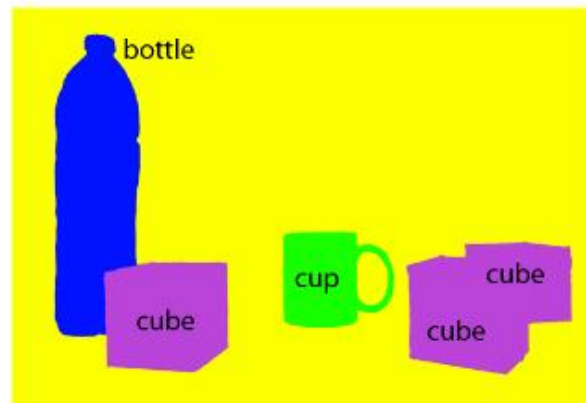
What Can Computer Vision Do Today?



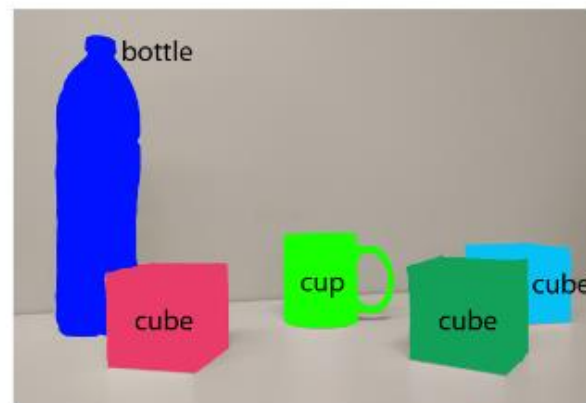
(a) Image classification



(b) Object localization

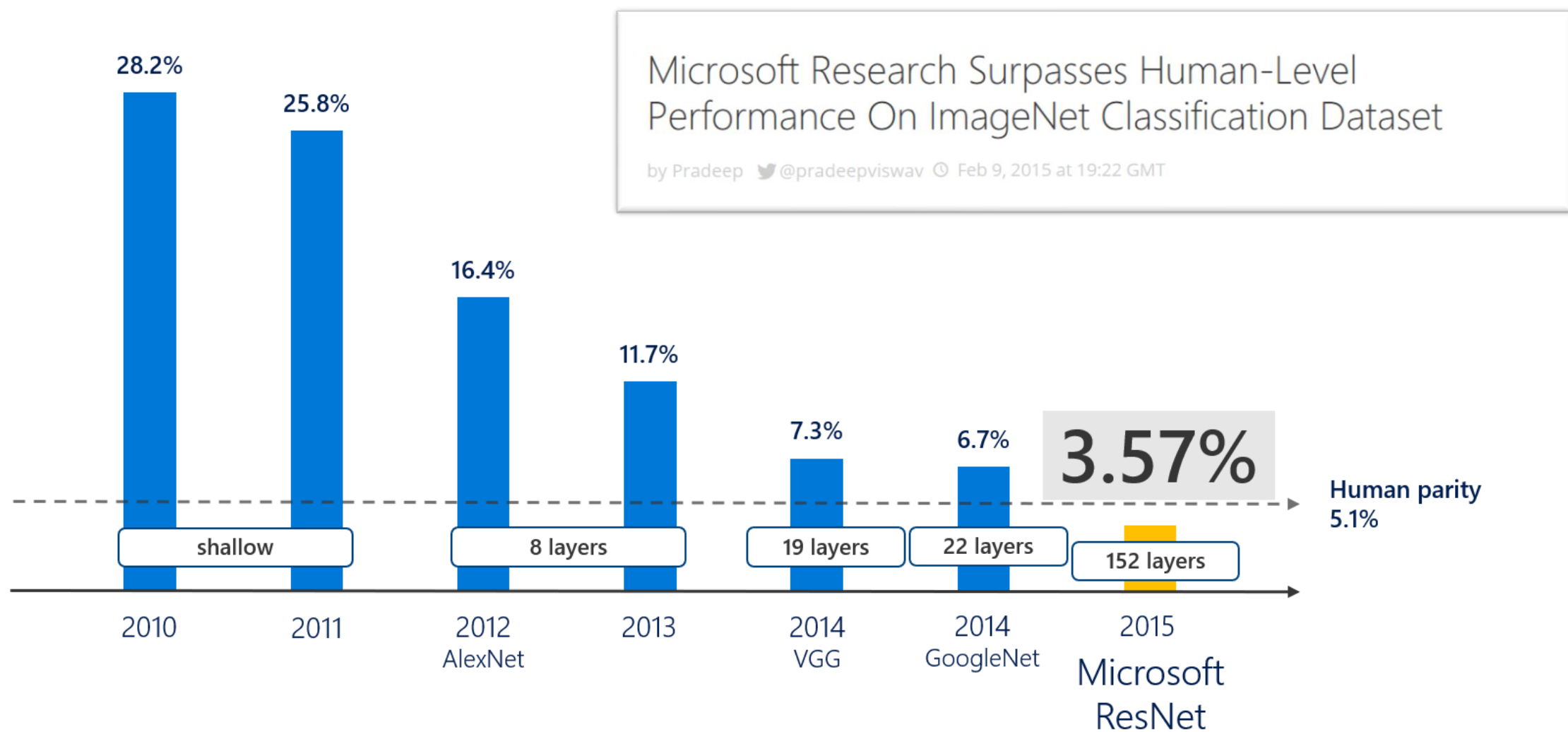


(c) Semantic segmentation



(d) Instance segmentation

Human Parity on Image Classification Task





Applications of Computer Vision

Metropolitan Police

09/06/2016 10:49:34 THU



Camera 2



Vehicle identification



PETROM

TERMOIZOLAT WARMEISOLIERT
THERMO-INSULATED

33 RIV

53 RO-CFR

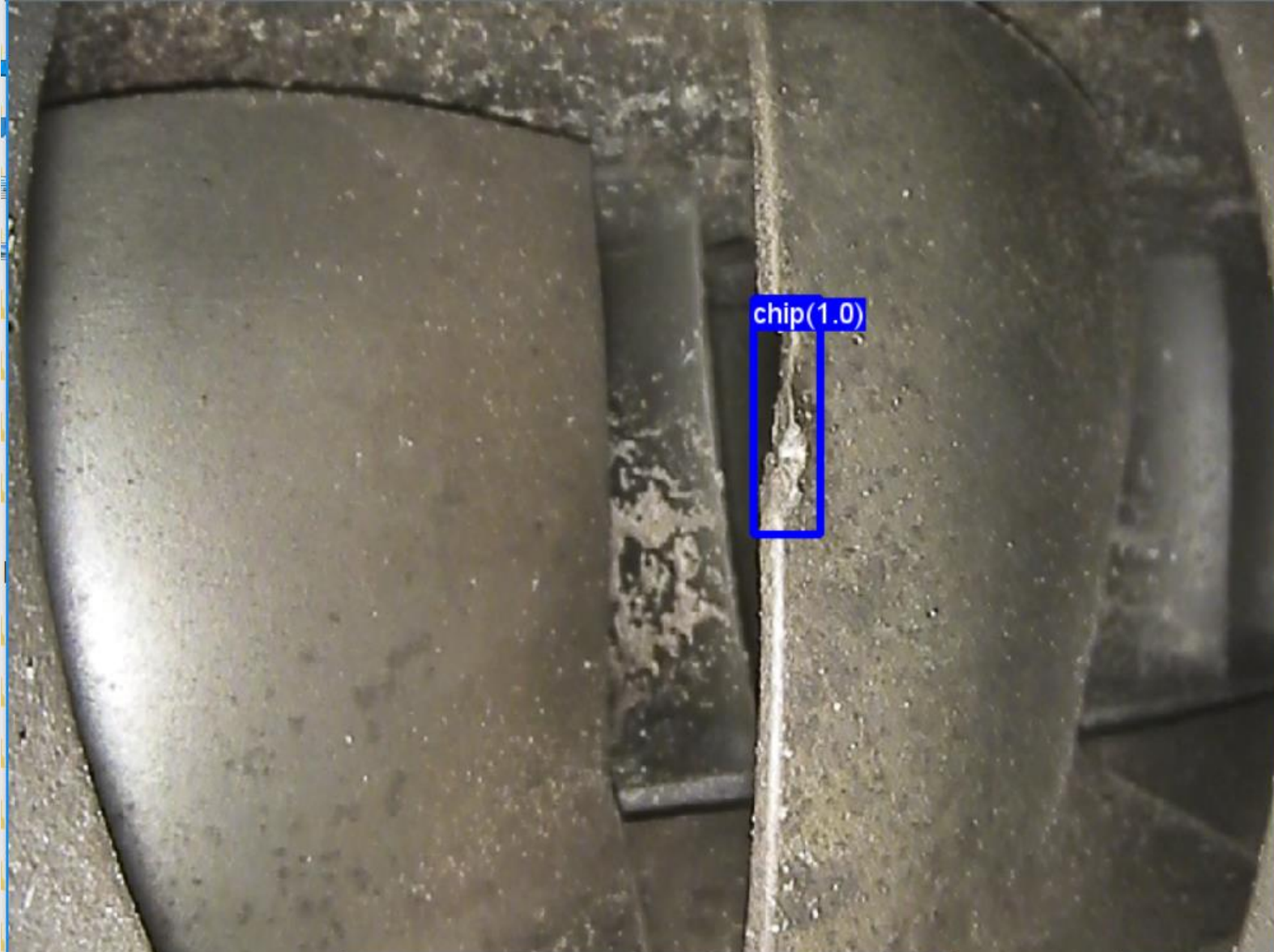
7921 030-5

Zagkks

268

1005

Visual Inspection of Equipment



Visual Inspection of Infrastructure

eSmart Connected Drone

Observations | IMAGE DETAIL: L_A13C.JPG | Image Quality 1 2 3 4 5 6 | Submit

L_A13C.JPG

L6322 ✓
ISOLATOR
Needs repair in next service round

GPS LAT: 61.71054 LONG: 9.69190
COORDS X: 208 Y: 724

Fault [L6322]:
Beskrivelse: Bendsling er løs eller skadet.
Løsning: Bendsles om.
Notes: No notes

Mark as checked ✓ Save fault +


MAST TOPOLOGY
Type 1 - Single Mast Edit
Type Unknown Type 1

FAULTS

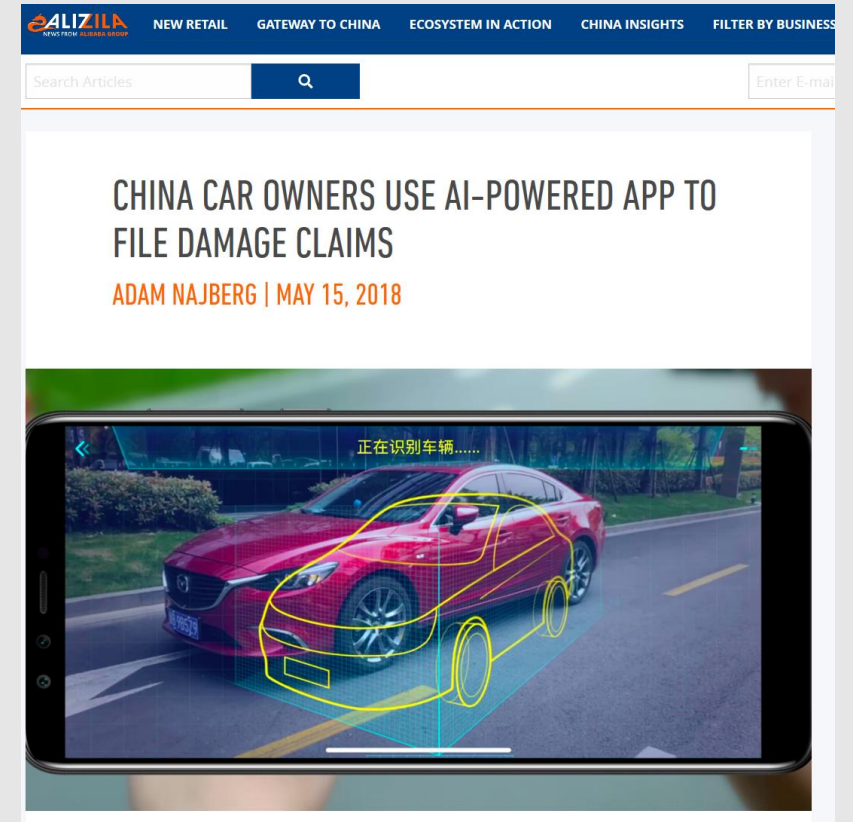
MAST INVENTORY
L_A13C.jpg 4
Insulator 2
☐ Insulator
☒ Insulator
Power Line Tower 2
☐ Pole
☐ Crossarm

DETAILS

#2 0.67



Visual Inspection of Vehicles



<https://www.alizila.com/ai-powered-app-car-insurance/>

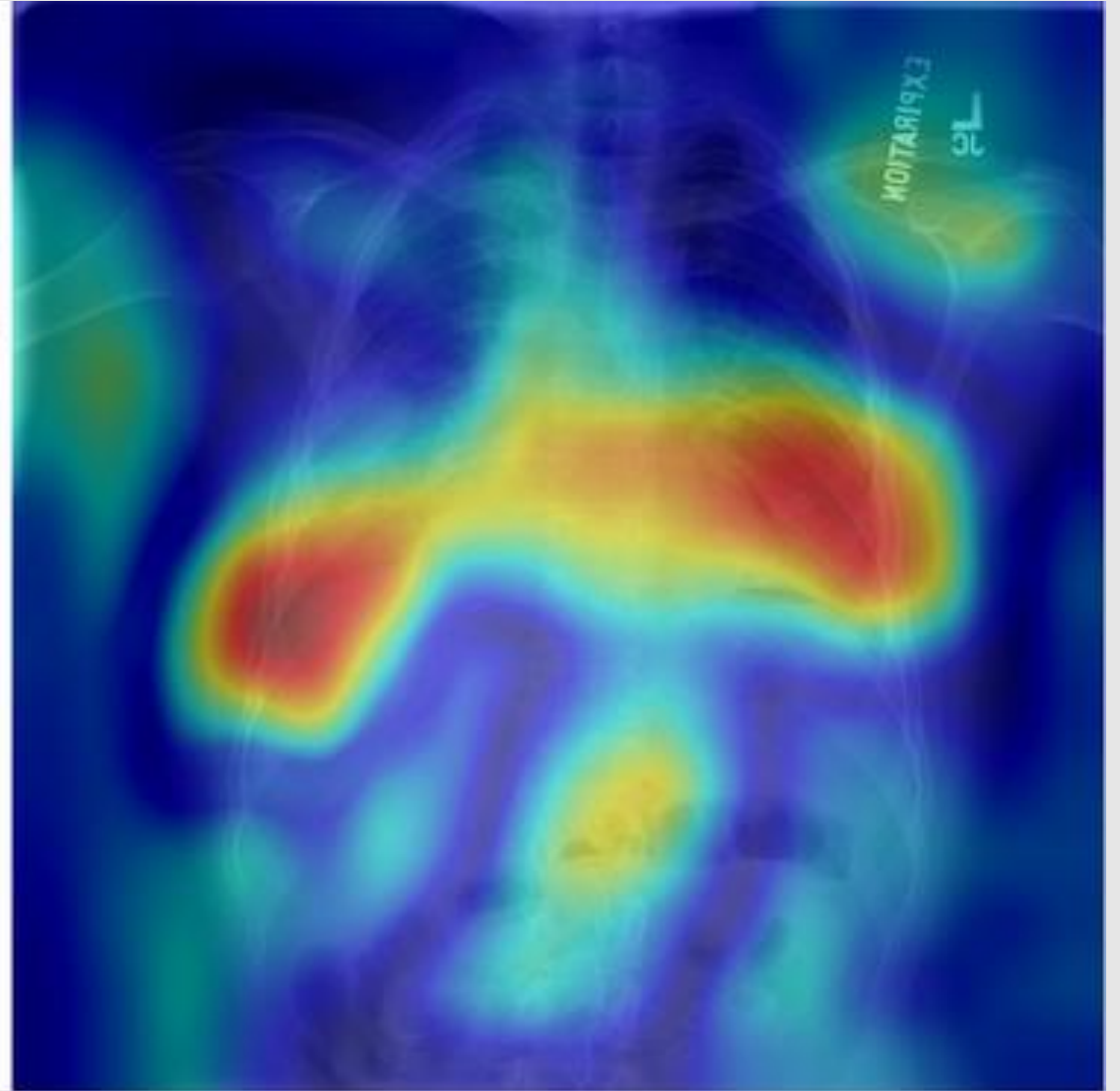
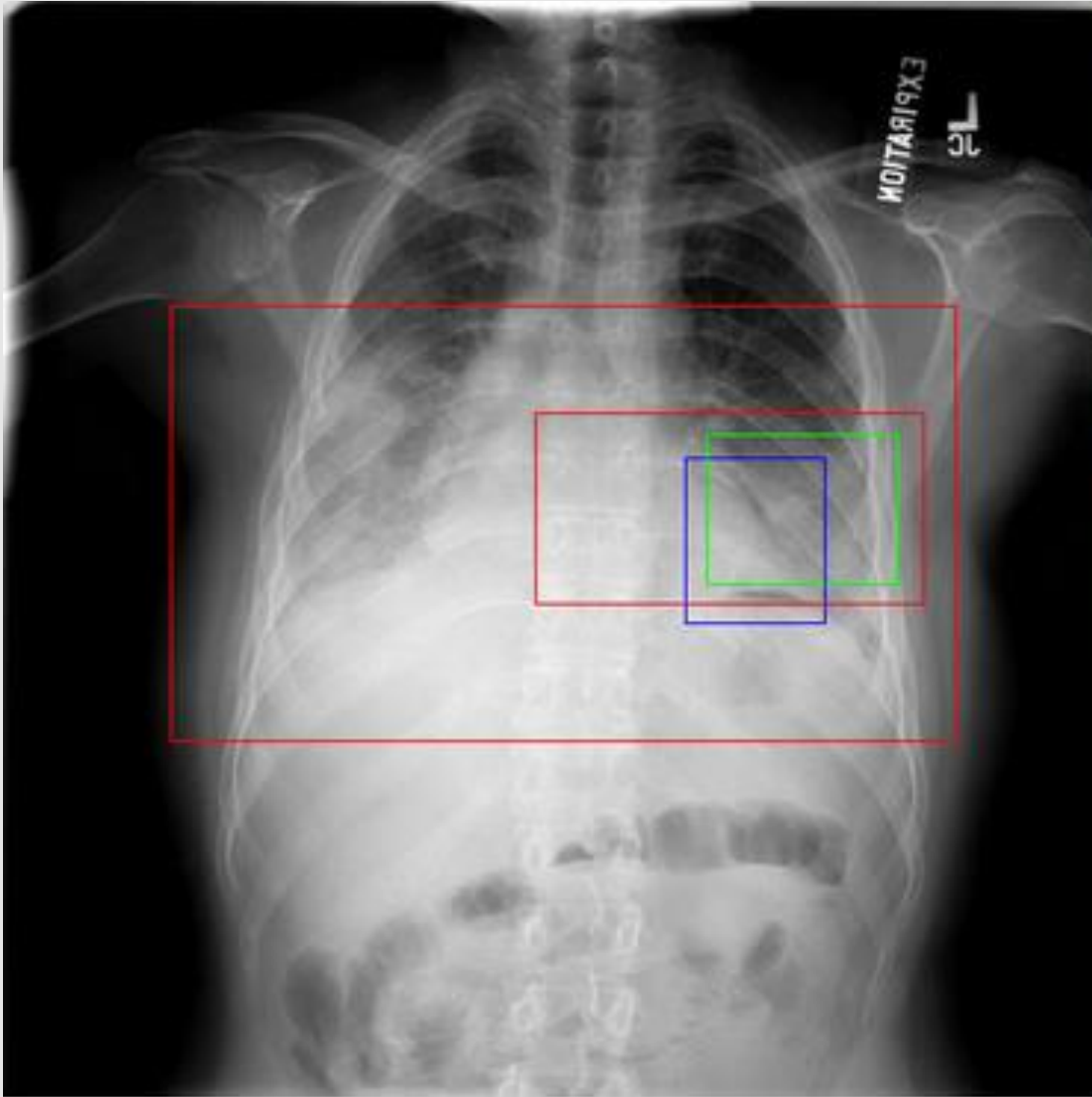
People Counting



Retail Space Monitoring

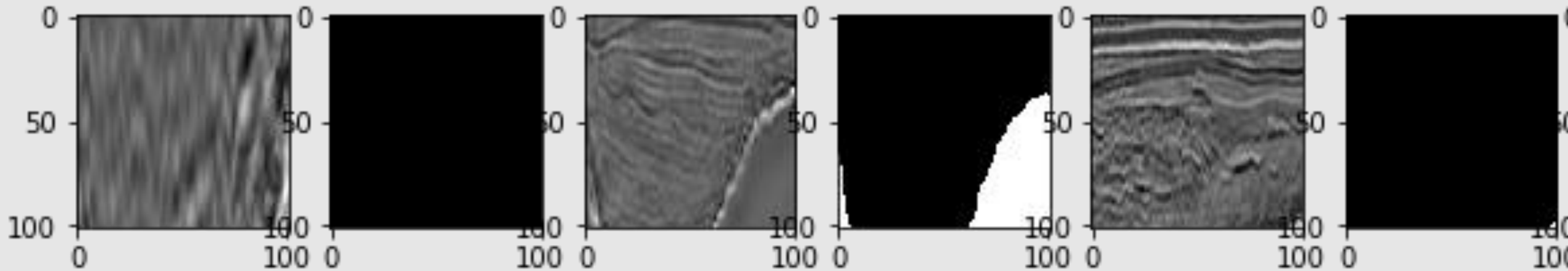


Medical Imaging Analysis



Geological and Seismic Imaging Analysis

<https://www.kaggle.com/c/tgs-salt-identification-challenge>



Document Digitization + Cognitive Search

<https://aka.ms/jfkfiles>

THE JFK FILES

Oswald

learn more

tags

☐ John F. Kennedy (843)

☐ Central Intelligence Agency (CIA) (831)

☐ Document (811)

☐ Information (673)

☐ Lee Harvey Oswald (569)

☐ Northwest, Washington, D.C. (547)

☐ Act of Congress (543)

☐ Emmett Hudson (520)

☐ Federal Bureau of Investigation (507)

☐ Classified information (562)

☐ United States (457)

☐ Numbers (407)

☐ Dallas (384)

☐ New York City (343)

☐ United States Congress (341)

☐ System (331)

☐ Cuba (291)

☐ President of the United States (276)

☐ Special Agent (206)

☐ Washington, D.C. (192)

type

☐ PHOTO (1)

date

1945-01-28T20:01:31.582Z

< 0 <

2018-01-28T20:01:31.582Z <

104-10177-10057:


SUBJECT

OSWALD CASE

22

The attached document, Attachment No. 3 of ²² ~~MEMO~~-2582 of 28 April 1962, indicates that a Lt. Col. PRUSAKOV was attached to the Soviet Embassy in New Delhi, India in 1962. There were no further references to this individual in RIF/ain Index. A check will be made in SR.

photo_oswald:

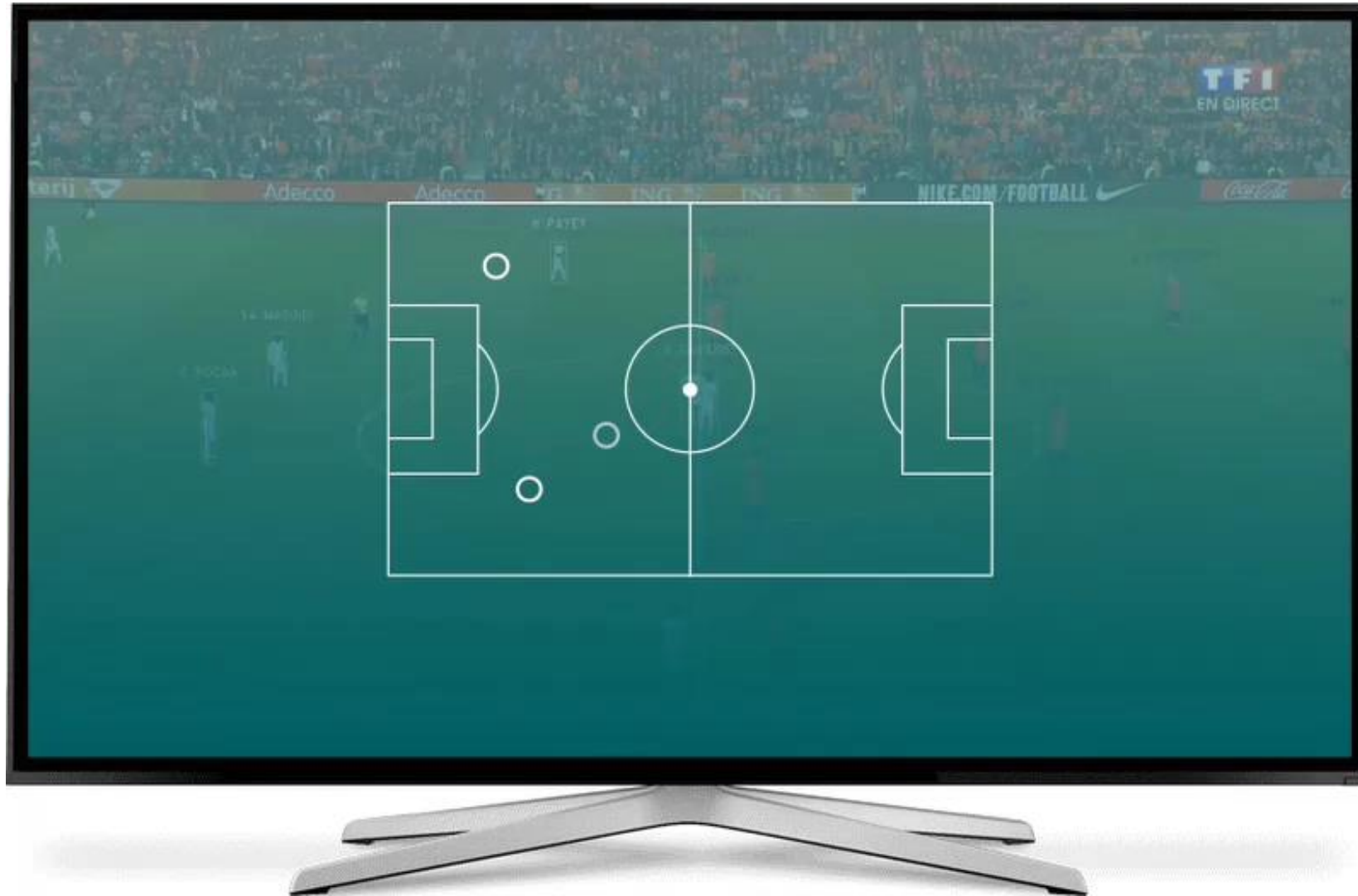


180-10142-10110:

at 6:00 pm (see previous section) At that time her pertinent statements about the assassination and Lee Harvey Oswald were written down by the Mexican government and Sylvia signed the statement. They were ^{separate} Upon learning about the assassination she and her husband

Sports Analytics

<https://www.footovision.com/>



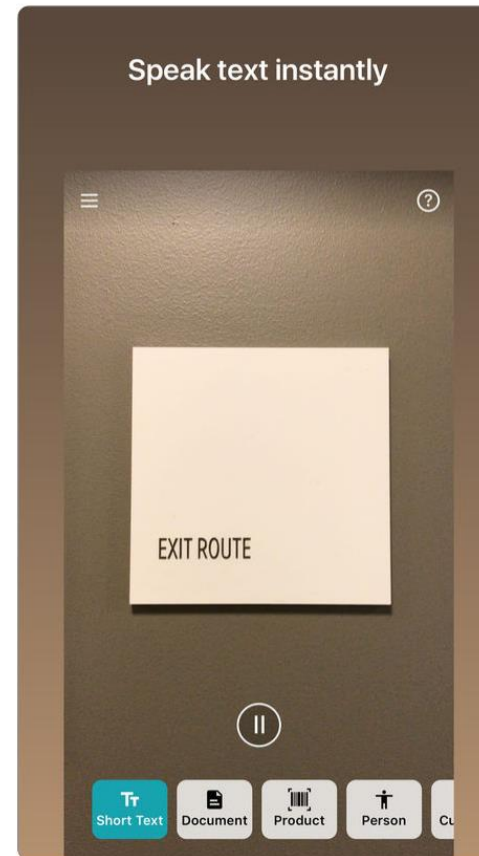
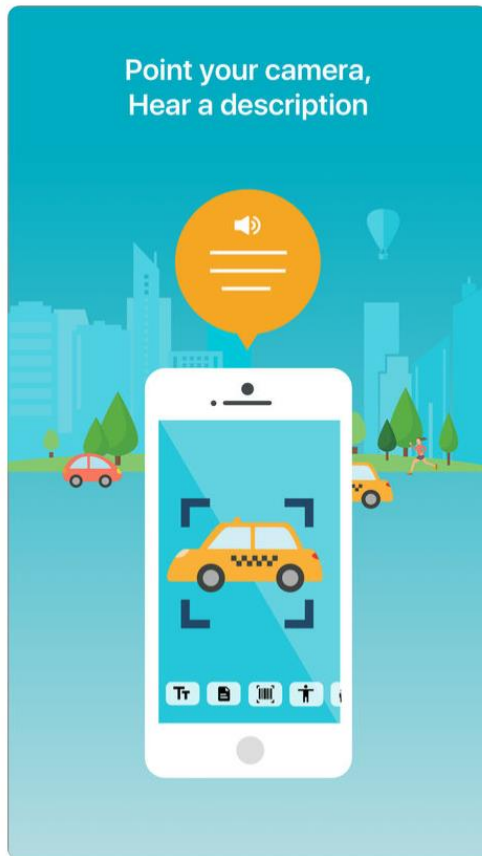
Seeing AI

<http://seeingai.com/>



Seeing AI

<http://seeingai.com/>



Face Recognition and Verification

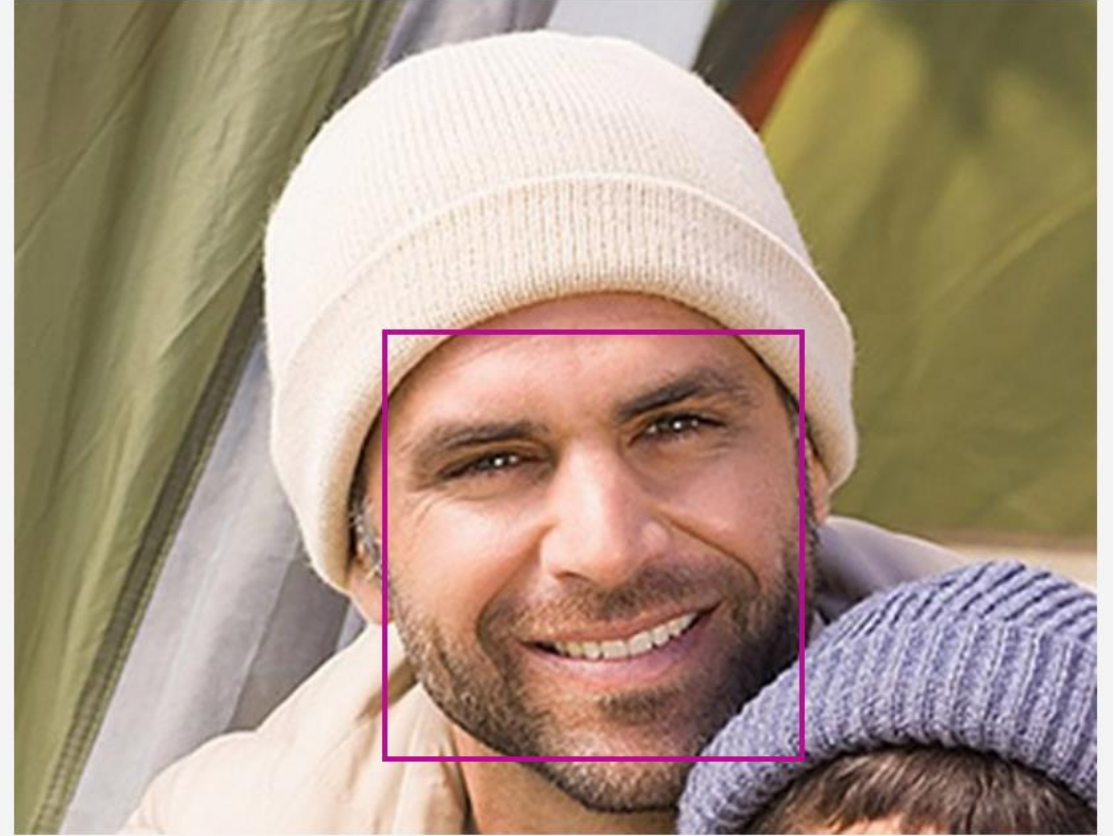


Image URL

Submit

 Browse

Image URL

Submit

 Browse

Verification result: The two faces belong to the same person. **Confidence is 0.7349.**



Real-Time Video Augmentation



Language to image synthesis

<https://drawingbot.azurewebsites.net/>

“A bird with **wings that are blue** and a **red belly**”



“this bird is **red with white** and has a very **short beak**”



“A herd of **sheep** grazing on a lush **green field**”





The Microsoft AI platform

AI for every developer

The Microsoft AI Spectrum

Pre-Built AI

Custom AI

Cognitive Services

DIY Machine Learning



Persisted models



Custom models

Models are pre-trained using
Microsoft supplied data

Models "customized" with your data

Models tailored to your
scenario and your data

Microsoft AI Platform

Azure AI Services

PRE-BUILT AI

Cognitive Services

CONVERSATIONAL AI

Bot Service



CUSTOM AI

Azure Machine Learning

CODING & MANAGEMENT TOOLS

VS Tools
for AI

Azure ML
Studio

Azure ML
Workbench

Others (PyCharm, Jupyter Notebooks...)



DEEP LEARNING FRAMEWORKS

3rd Party

Cognitive
Toolkit

TensorFlow

Caffe

Others (Scikit-learn, MXNet, Keras,
Chainer, Gluon...)

Azure Infrastructure

AI ON DATA

AI COMPUTE

Cosmos
DB

SQL
DB

SQL
DW

Data
Lake

Stream
Analytics

DSVM

Batch
AI

ACS

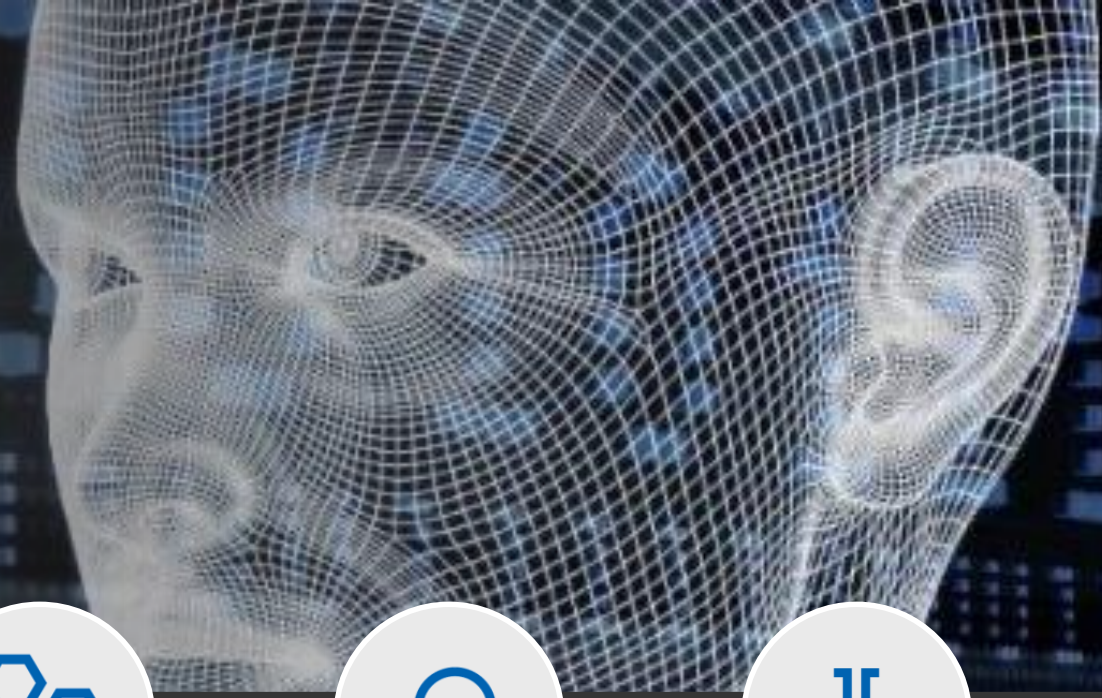
IoT
Edge



CPU, FPGA, GPU

Microsoft 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

Tap into rich knowledge amassed from the web, academia, or your own data



Search

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



Labs

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

Microsoft Cognitive Services

Customization

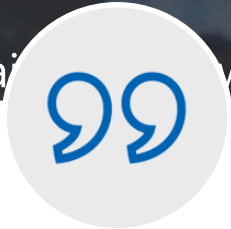
The set of custom services available to customers, allowing customers to use their own data to train models.



Vision



Speech



Language



Knowledge



Search



Labs

Custom Vision
Service

Custom Speech
Service

Language
Understanding

Custom Decision
Service

Bing Custom
Search



Vision

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

Computer Vision | Video Indexer | Custom Vision |
Face | Content Moderator



Custom Vision

A customizable web service that learns to recognize specific content in imagery

Upload images

Upload your own labeled images, or use Custom Vision Service to quickly tag any unlabeled images

Train

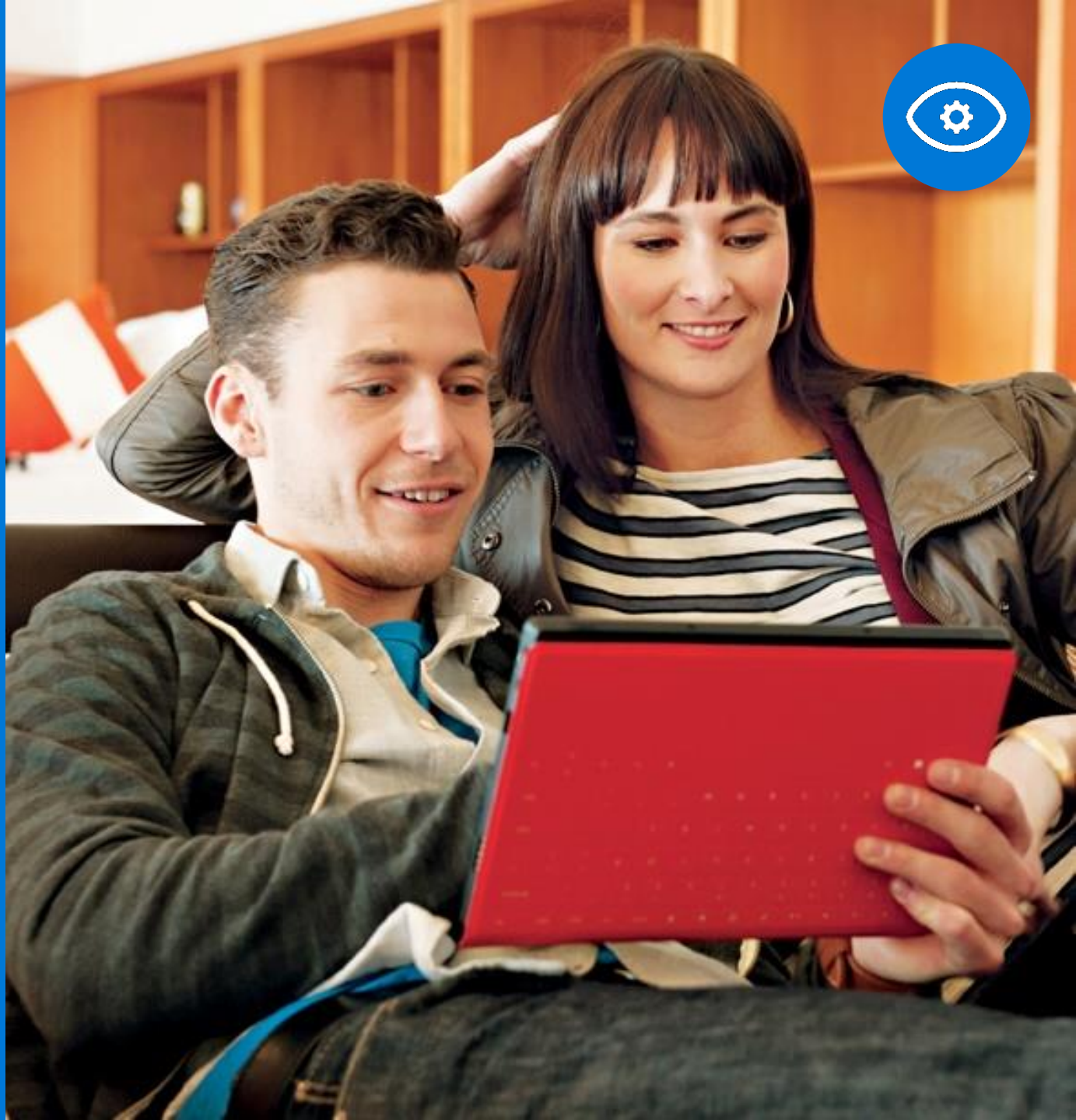
Use your labeled images to teach Custom Vision Service the concepts you want it to learn

Evaluate

Use simple REST API calls to quickly tag images with your new custom computer vision model

Active learning

Images evaluated through your custom vision model become part of a feedback loop you can use to keep improving your classifier



Custom Vision

Customize

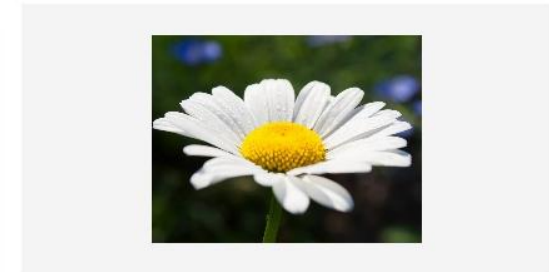
Design your own state-of-the-art models for unique use cases

Upload

Use labeled images to quickly train and update your models

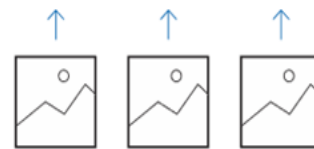
Export

Run models on a device or as a Docker container with just one click



Results

Tag	Probability
daisy	99.9%
trillium	3.1%
lily of the valley	0.1%
dogwood	0.0%



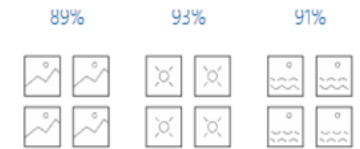
Upload Images

Bring your own labeled images, or use Custom Vision to quickly add tags to any unlabeled images.



Train

Use your labeled images to teach Custom Vision the concepts you care about.



Evaluate

Use simple REST API calls to quickly tag images with your new custom computer vision model.

Workshop

Image Classification with Custom Vision

bit.ly/BucharestAIBootcamp

Thank You