



IoT in Action

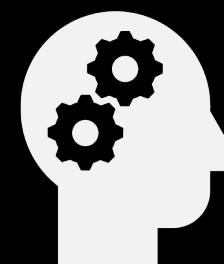
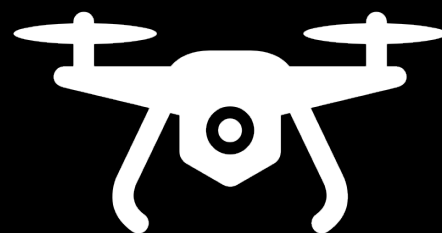
#IoTinActionMS



Evolving IoT with Autonomy, Drones, Mixed Reality and AI

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Sr Principal Solution Specialist, IoT
Microsoft





We are living in an
automated world



...in an increasingly
autonomous world



Evolution of systems

Mechanized systems



Powered by **steam or electricity**

Manually operated

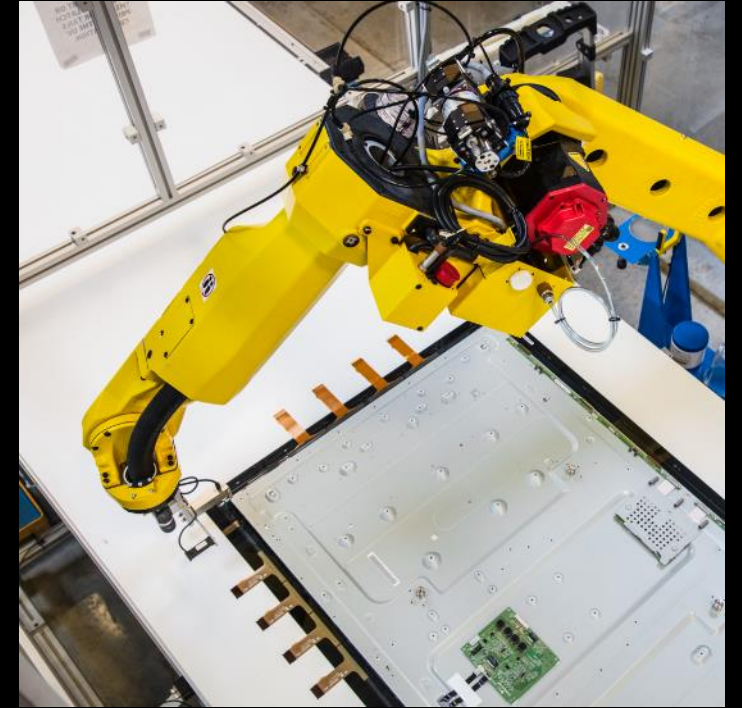
Automated systems



Powered by **software**

Fixed operation

Autonomous systems



Powered by **AI**

Intelligent operation

Microsoft platform for autonomous systems



Scale human expertise

Machine Teaching

- Domain experts “teach” the machine
- No data science expertise required
- Expert provides “lesson plans” to help the AI algorithm solve the problem

The Drone as an Intelligent Edge



Infrastructure survey and inspection



eSmart
SYSTEMS

ALTA METRIS

oasen
drinkwater

Transforming cities with Drones

Asset health inspection

- Buildings, bridges, roads, tunnels, railways
- Electrical grid

Delivery

- Last mile delivery
- Cargo delivery

Surveying

- Geospatial & construction
- Evaluate asset insurability (underwriter)

Environmental

- Weather & air quality
- Environmental hazards response
- Traffic flow and incidents monitoring

Public security & disaster response

- Survey flood, fire, tornado damage
- Locate missing people (thermal imaging)
- Navigate through smoke & hazards
- Survey accident & crime scenes
- Crowd control

Microsoft AirSim

Train drones in a safe, virtual environment



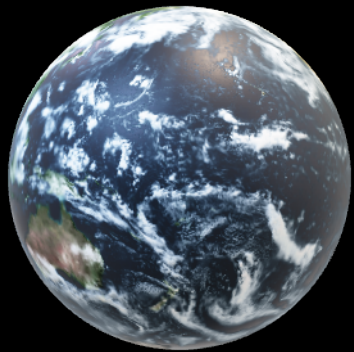
Mixed Reality



Mixed reality

A blending of the physical and digital worlds in which users may interact with digital and real-world objects while maintaining presence in the physical world

Physical world

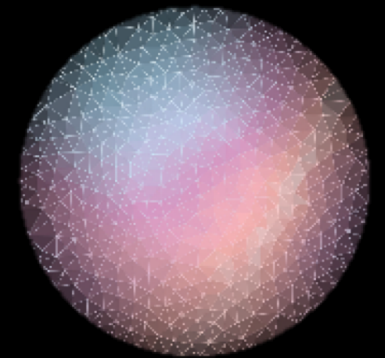


Augmented reality



Virtual reality

Digital world



Mixed reality spectrum

The Microsoft mixed reality stack

Mixed Reality Applications



Azure Cognitive Services



Vision



Speech



Language



Knowledge



Search

Azure Mixed Reality & IoT Services



Azure Digital Twins



Azure Spatial Anchors



Azure Remote Rendering

Intelligent Edge Devices



Geospatial Planning



■ The 3rd wave of computing



Artificial Intelligence



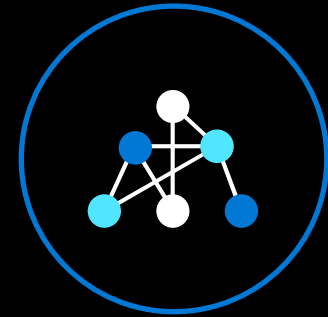
Azure AI



AI apps & agents



Knowledge mining



Machine learning

Deliver breakthrough experiences



AI apps & agents

- Cognitive Services
- Bot Service

Deliver breakthrough experiences



AI apps & agents

- Cognitive Services
- Bot Service

Azure Cognitive Services

Decision

Personalizer
Anomaly Detector

Speech

Conversation transcription capability
Neural Text-to-Speech
Speech Service Device SDK

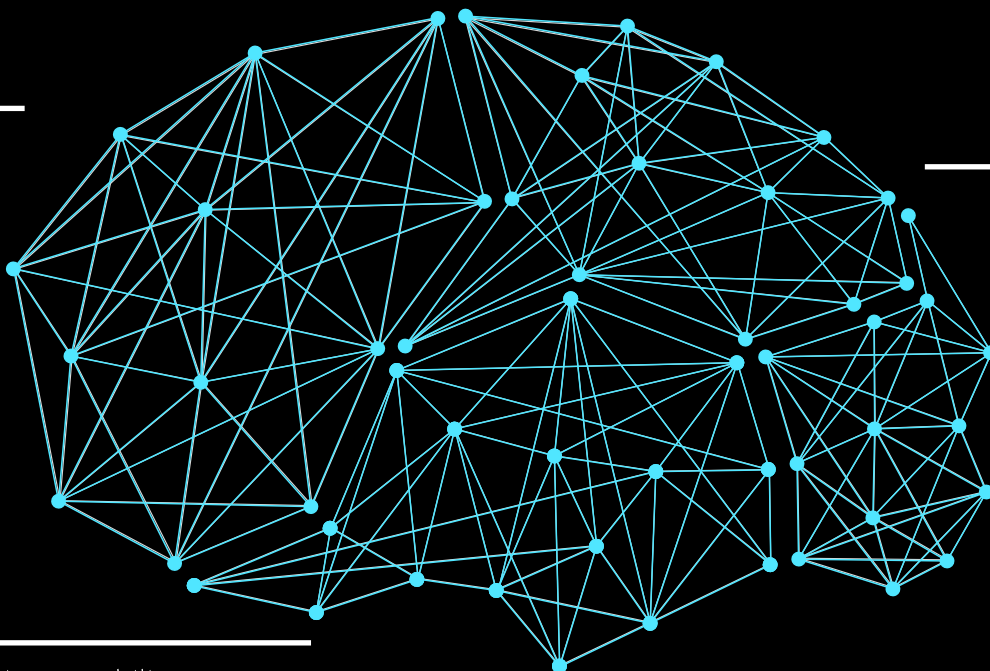
Language

Language Understanding
QnA Maker

Vision

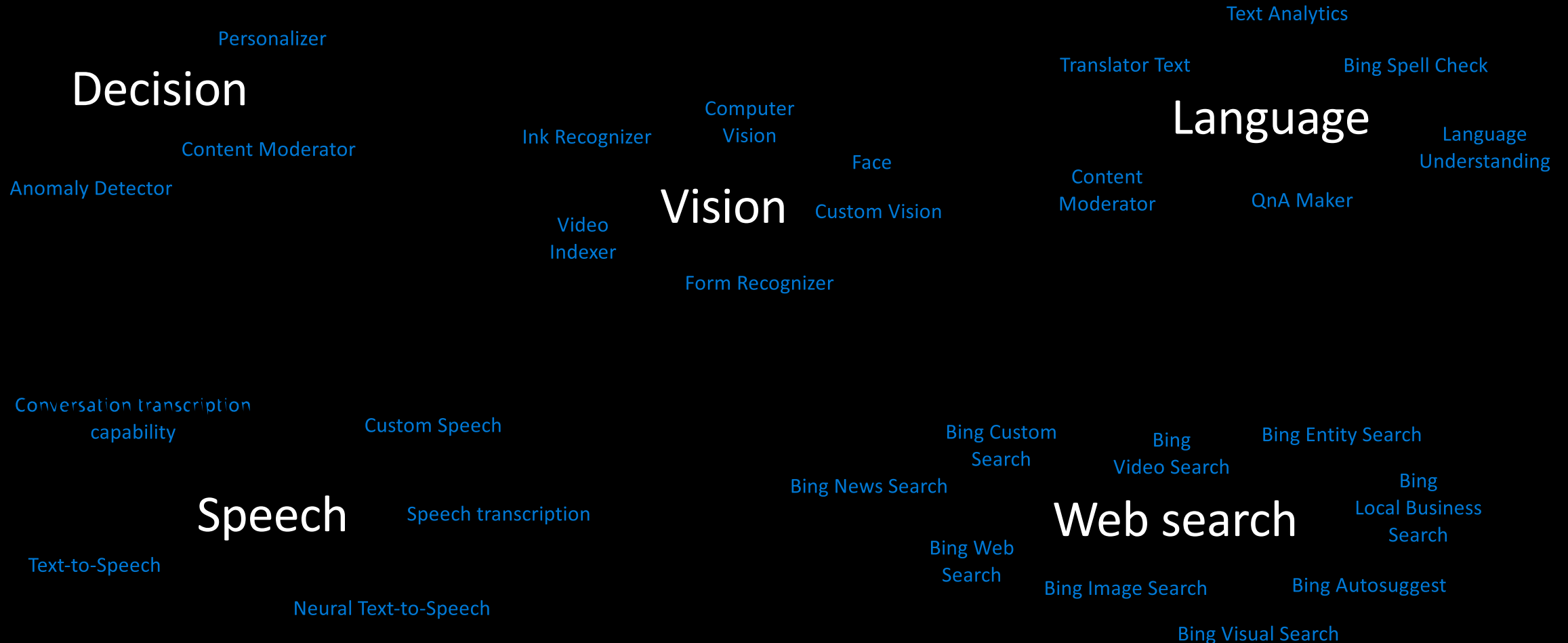
Ink Recognizer
Computer Vision

Web search



Azure Cognitive Services

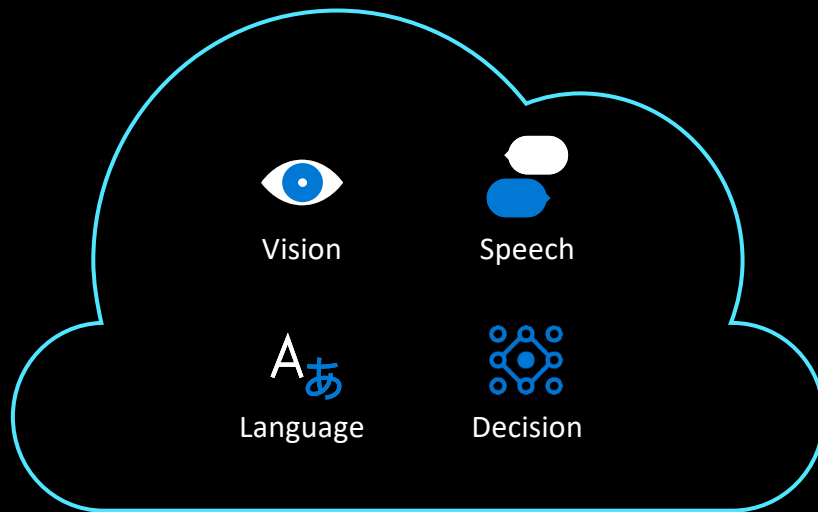
The most comprehensive pre-trained AI



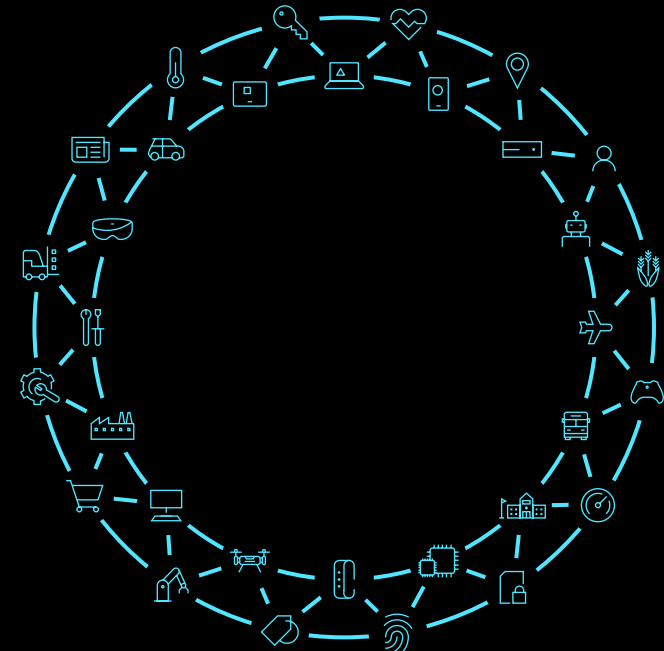
Azure Cognitive Services

Deploy anywhere using containers

Azure Cognitive Services

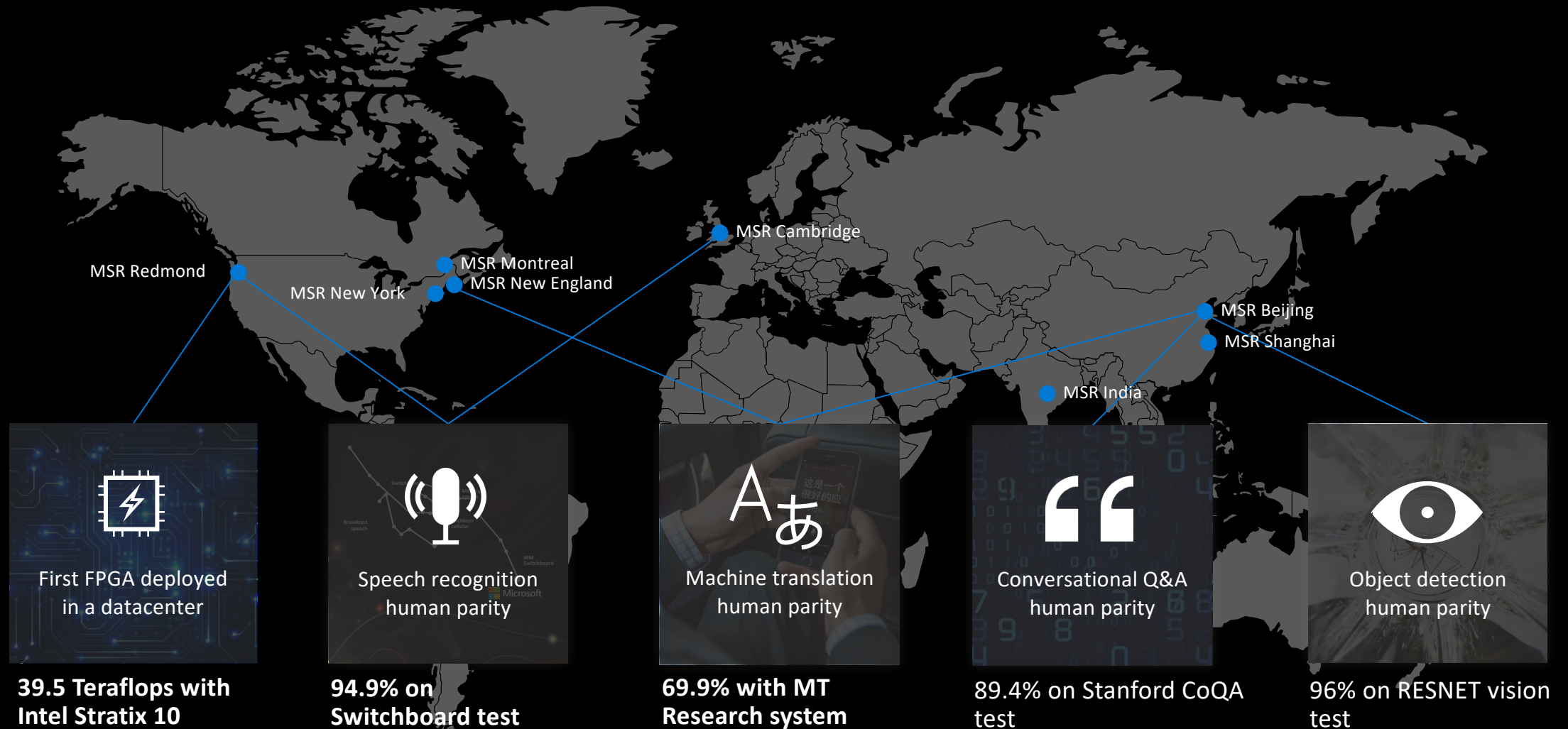


Wherever your data resides



Azure AI

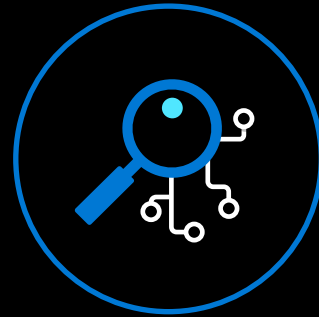
Fueled by Microsoft breakthrough research



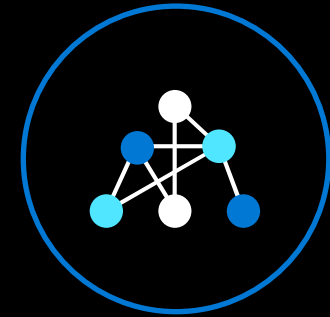
Azure AI



AI apps & agents



Knowledge mining



Machine learning

Machine Learning on Azure

Domain specific pretrained models

To simplify solution development



Vision



Speech



Language



Web search



Decision

Familiar data science tools

To simplify model development



Visual Studio Code



Azure Notebooks



Jupyter



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 Machine Learning



Azure Databricks



Machine Learning VMs

Powerful infrastructure

To accelerate deep learning



CPU



GPU



FPGA

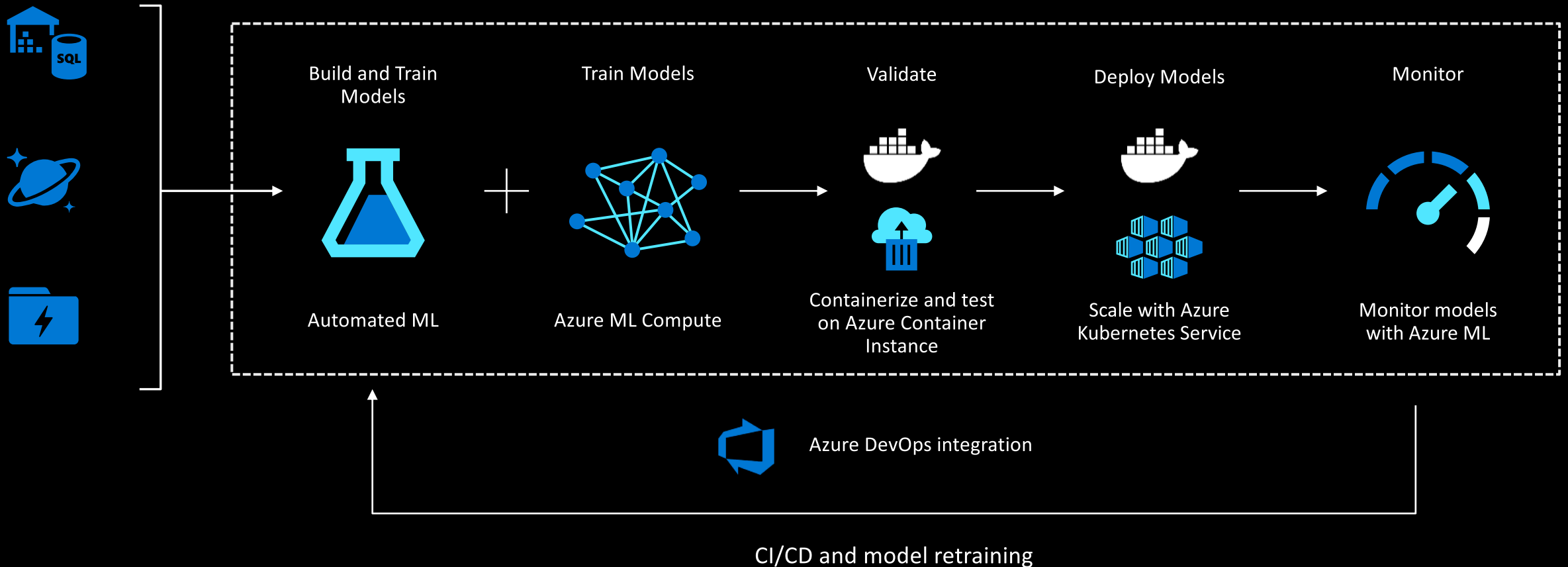


From the Intelligent Cloud to the Intelligent Edge



Deploy machine learning models at scale

Azure Machine Learning service





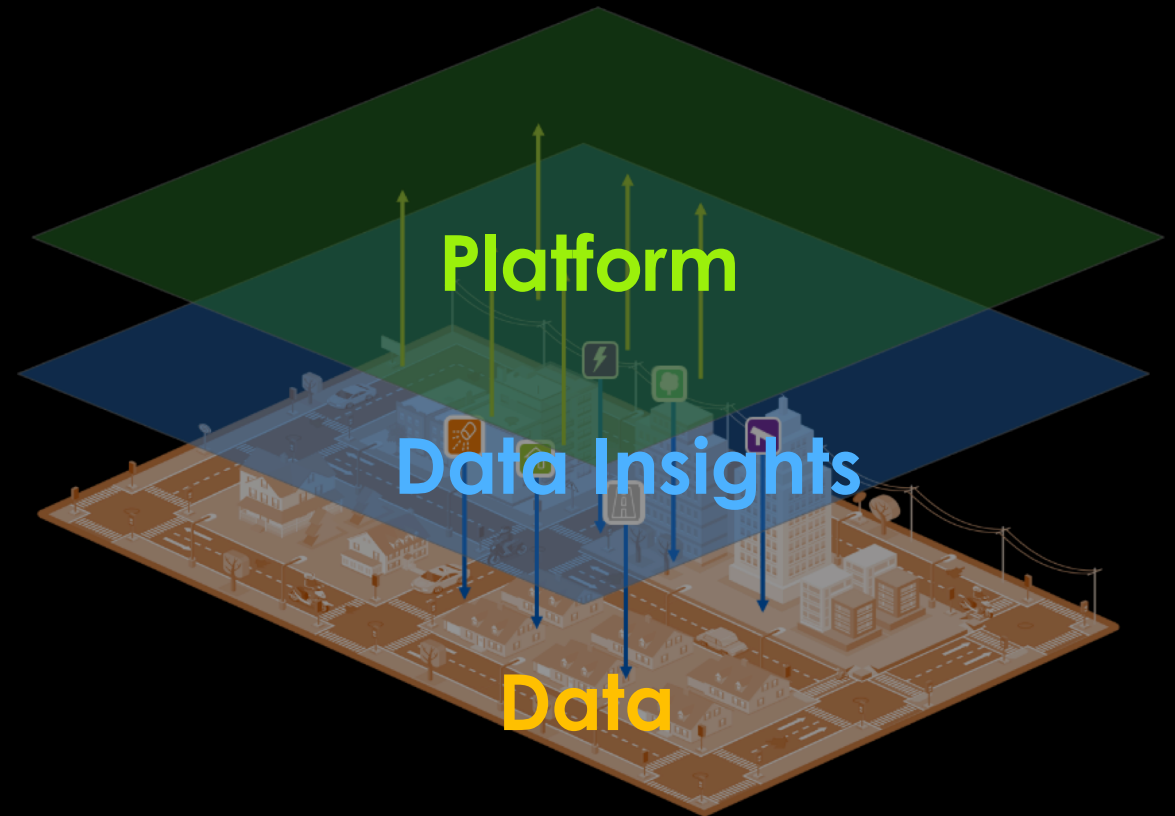
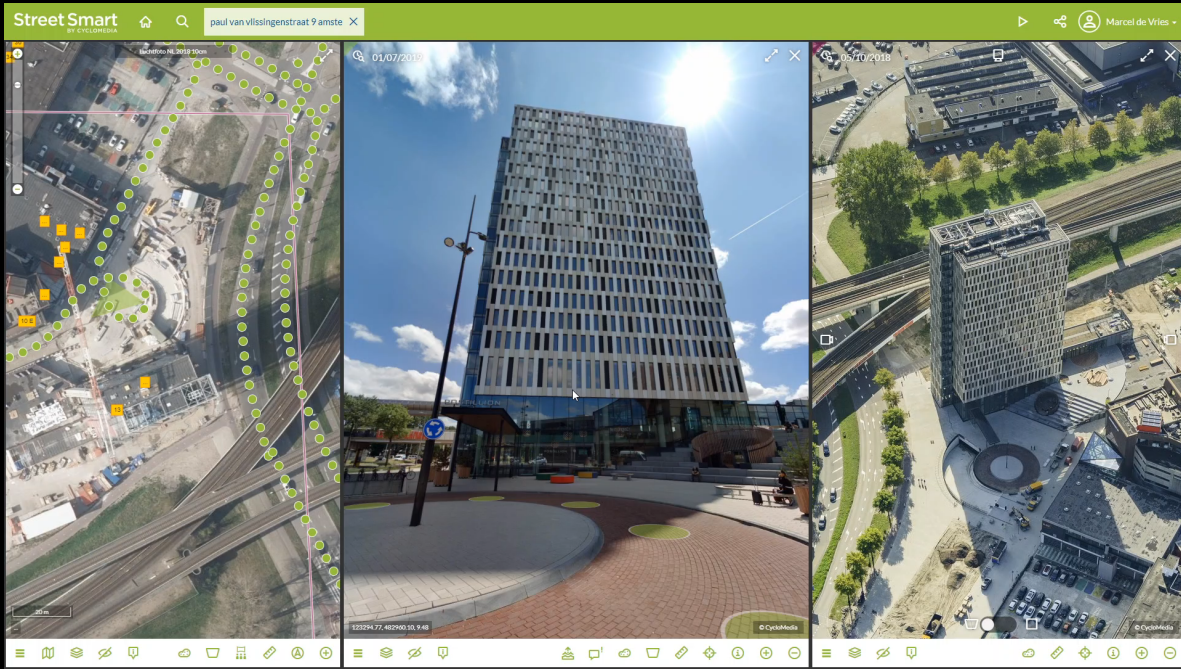
Visualize a Better World

CycloMedia
Rutger Gerritz

IoT in Action



CycloMedia Building Blocks



Challenge City:

Admin \neq Physical Reality

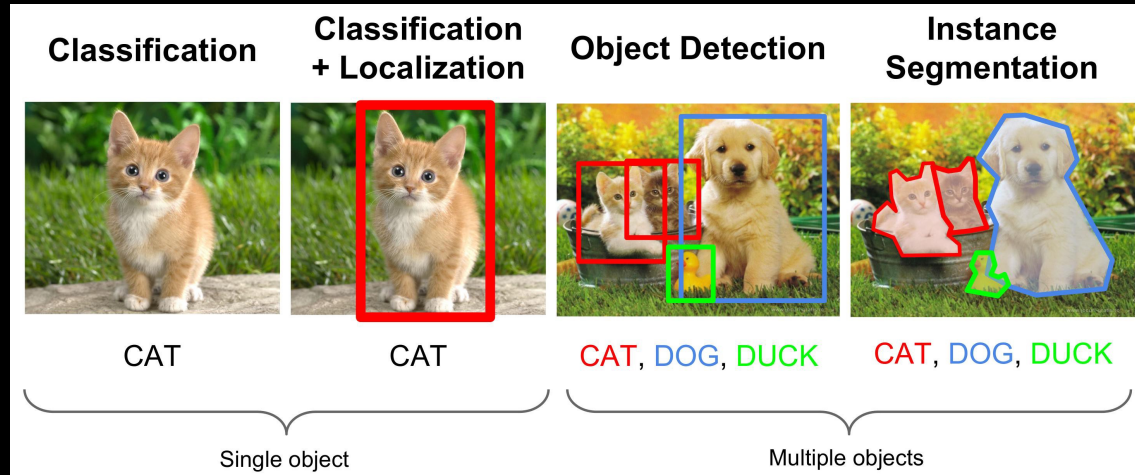
Incorrect, incomplete, outdated or
non-existent data

No digital asset management

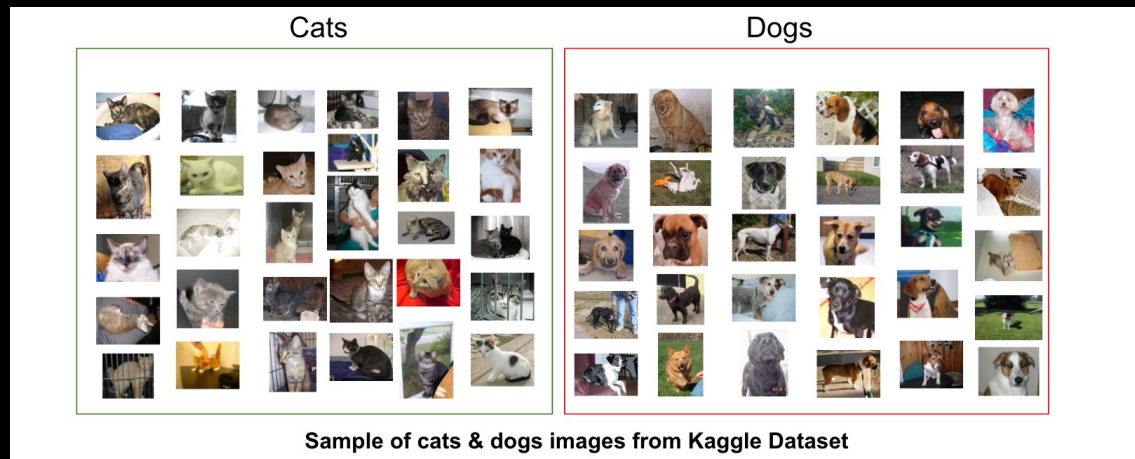


Applying The Principles

Algorithms



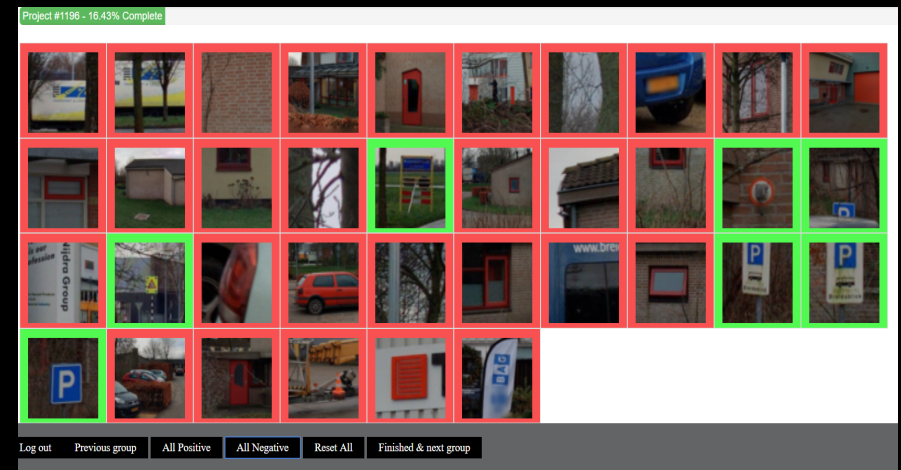
Data



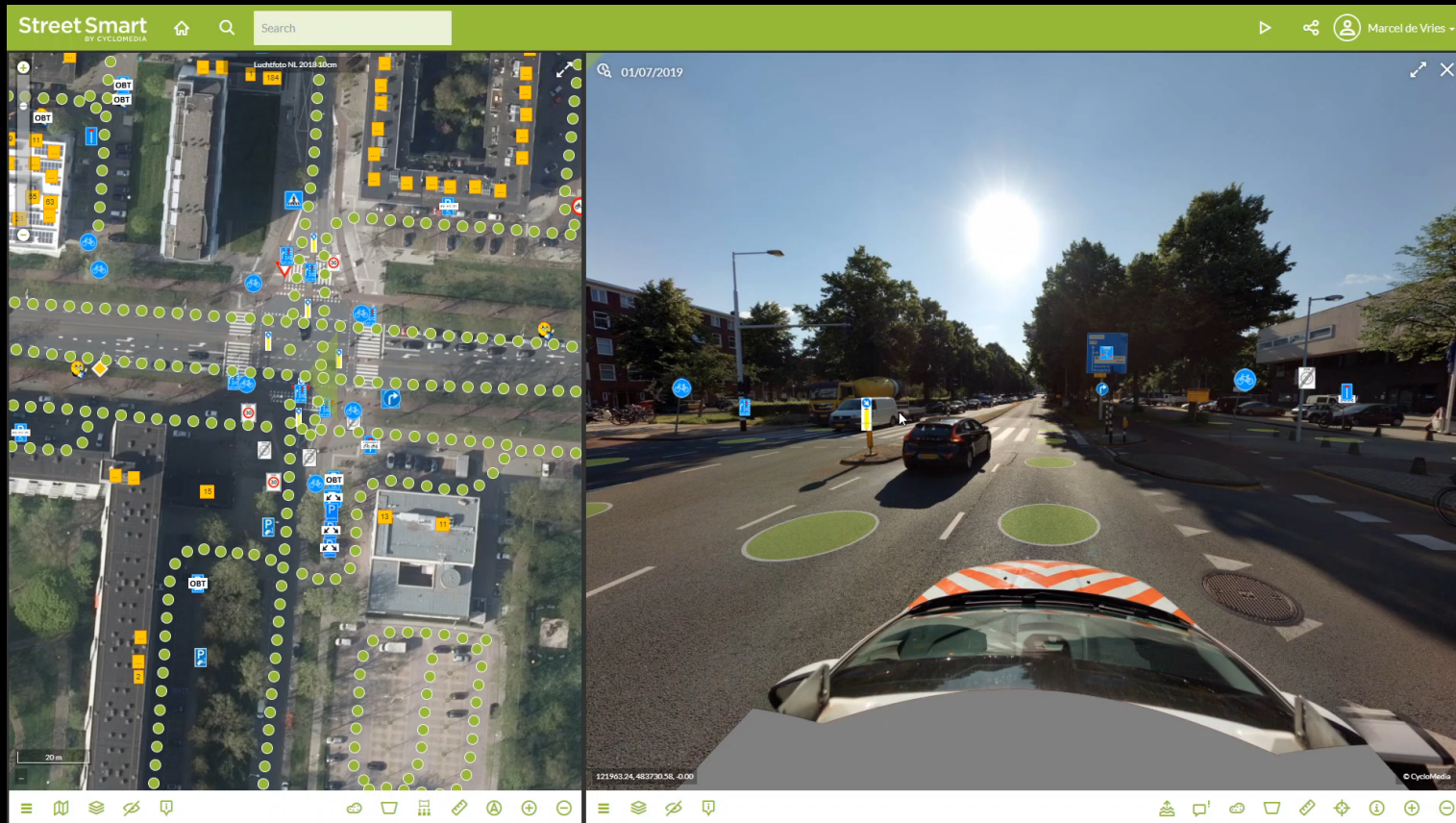
Recall



Precision



Case Traffic Signs: **A Smart City Knows**



'How many traffic signs has the City of Amsterdam?'

98,735

A Digital Twin

- Location, Type, Orientation, Bearer

Asset Management

- Plan, Design, Install, Maintain, Replace, Repair
- Managing Costs

Impact

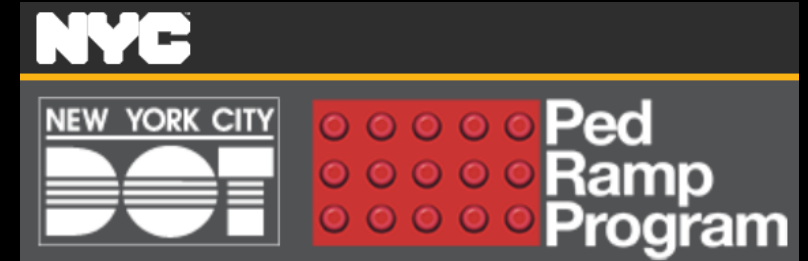
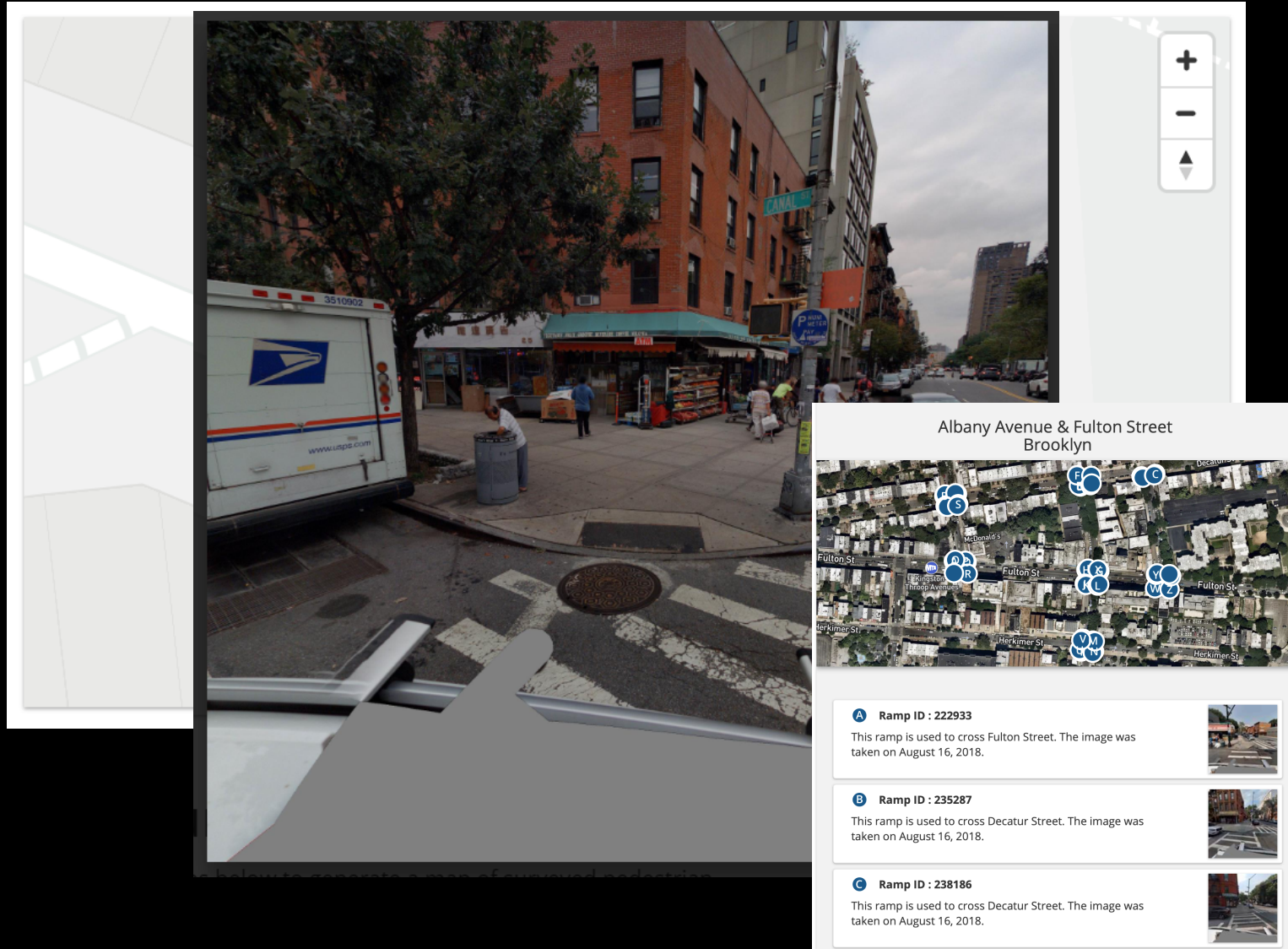
- Improving Safety
- Avoiding Congestion
- Anticipating Future Changes In The Way We Move Around



Challenge: Access for Everyone



Case: Ped Ramp Project New York: **An Inclusive City**





To keep in mind

- Use the Best Data
- Focus on Business Value
- Educate for Public Acceptance
- Ensure Process Integration
- Be Able to Scale



Real Data

True Understanding

Big Impact



Free AI online training & certification



AI Business School



Business leaders can use AI Business School to gain specific, practical knowledge to define and implement your AI strategy. Hear directly from industry experts on how to foster an “AI-ready” culture and learn how to use AI responsibly and with confidence.



Define an AI strategy to create business value

8 MODULES 4 HR 16 MIN BEGINNER > INTERMEDIATE

[Learn More >](#)



Discover ways to foster an AI-ready culture in your business

6 MODULES 3 HR 10 MIN INTERMEDIATE

[Learn More >](#)

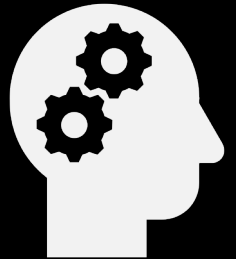
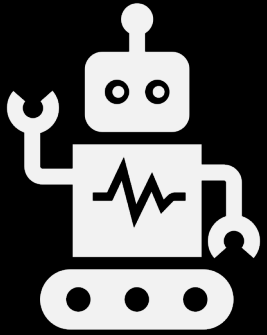


Identify guiding principles for responsible AI in your business

3 MODULES 55 MIN INTERMEDIATE

[Learn More >](#)

The Intelligent Edge





Dank u!



Patrick Ward



@_PDubya

