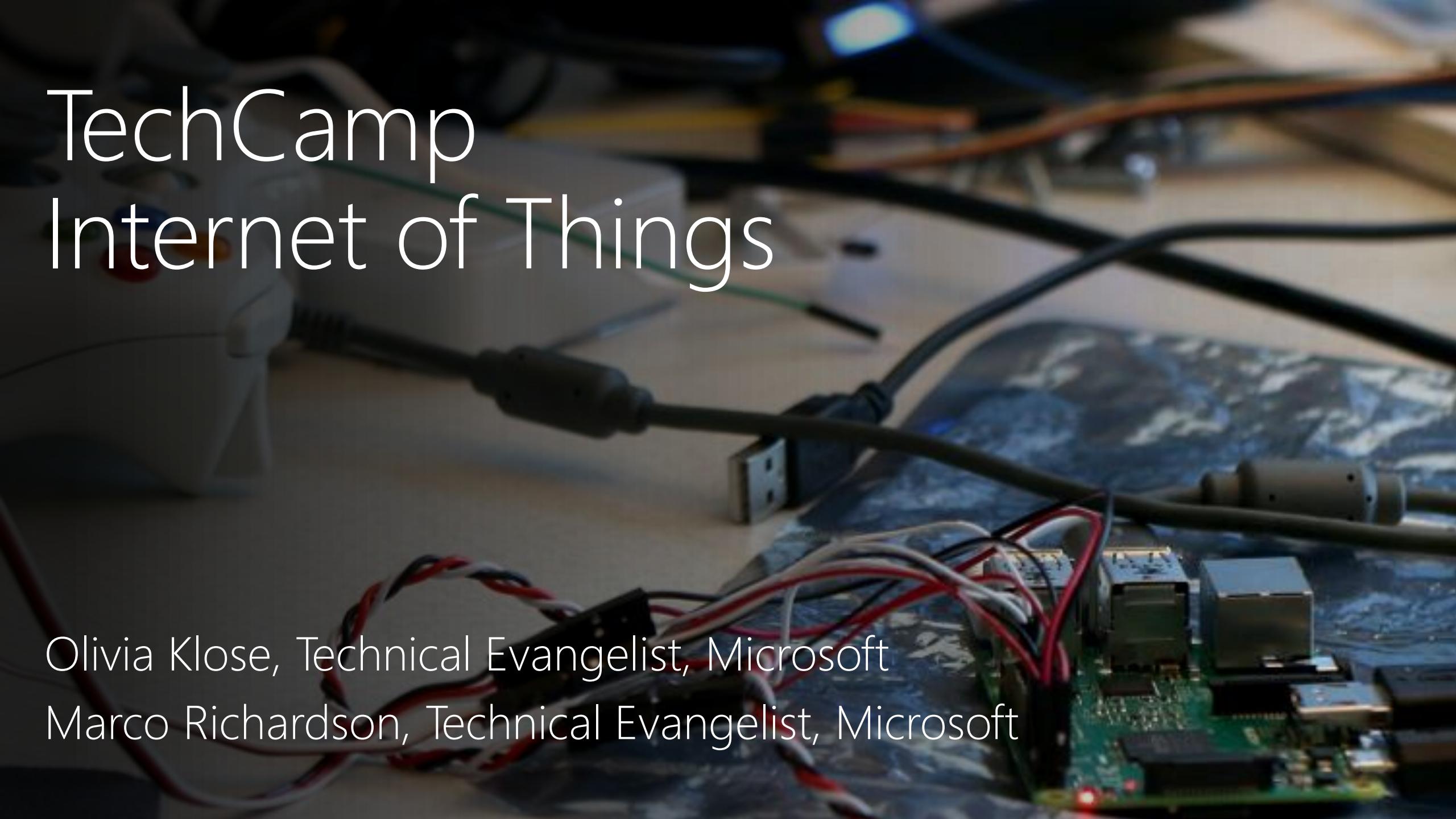


TechCamp Internet of Things



Olivia Klose, Technical Evangelist, Microsoft

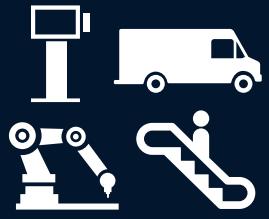
Marco Richardson, Technical Evangelist, Microsoft

Agenda

1. Intro: What is IoT? What does Microsoft offer?
2. Things: Windows 10 IoT Overview
3. Connectivity: Azure IoT Overview
4. Data: Sensor data, cognitive services, etc.
5. **Analytics: Stream Analytics, Power BI,
Azure Machine Learning**
6. Command & Control
7. Wrap-up

Defining Internet of Things

Things



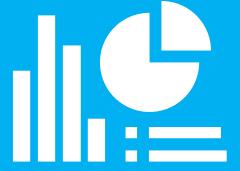
Connectivity



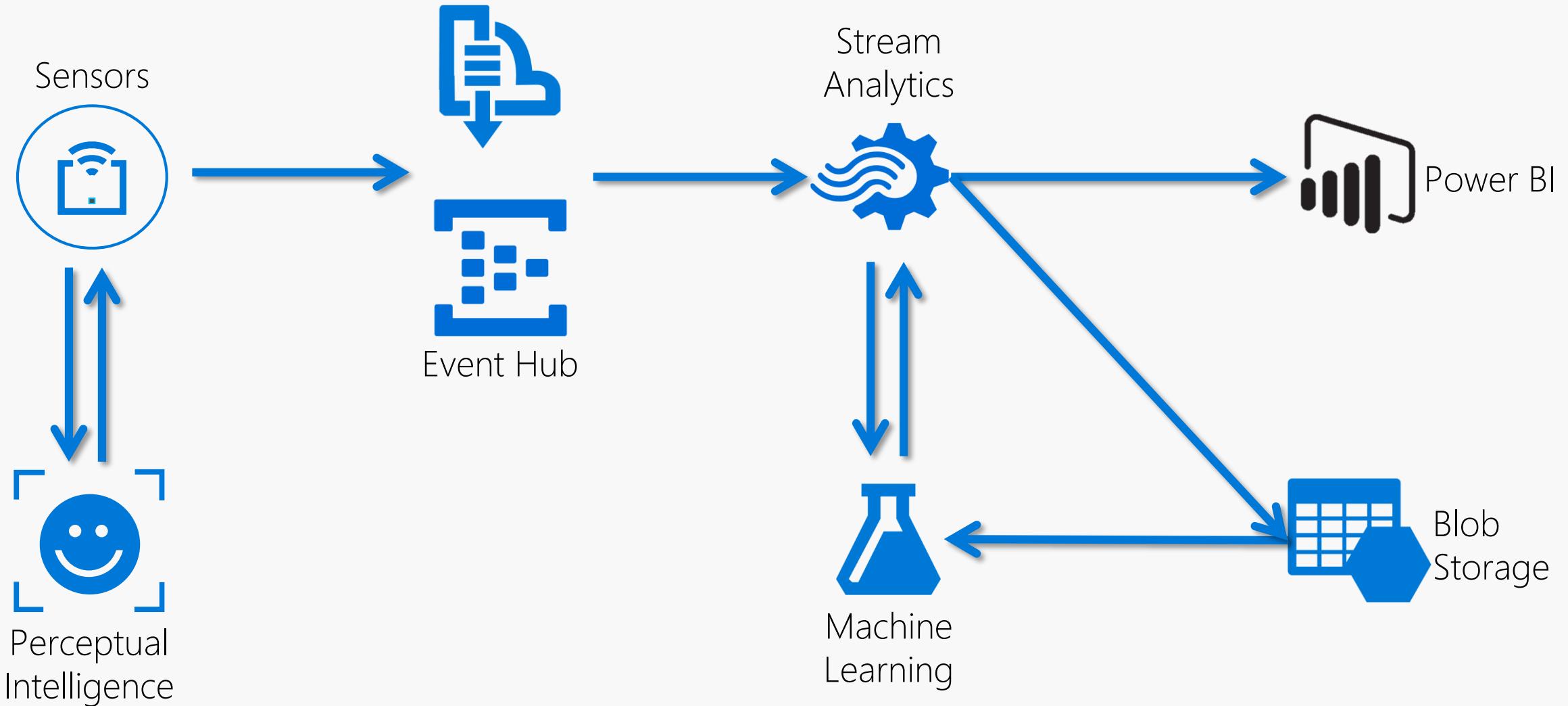
Data

10101
01010
00100

Analytics

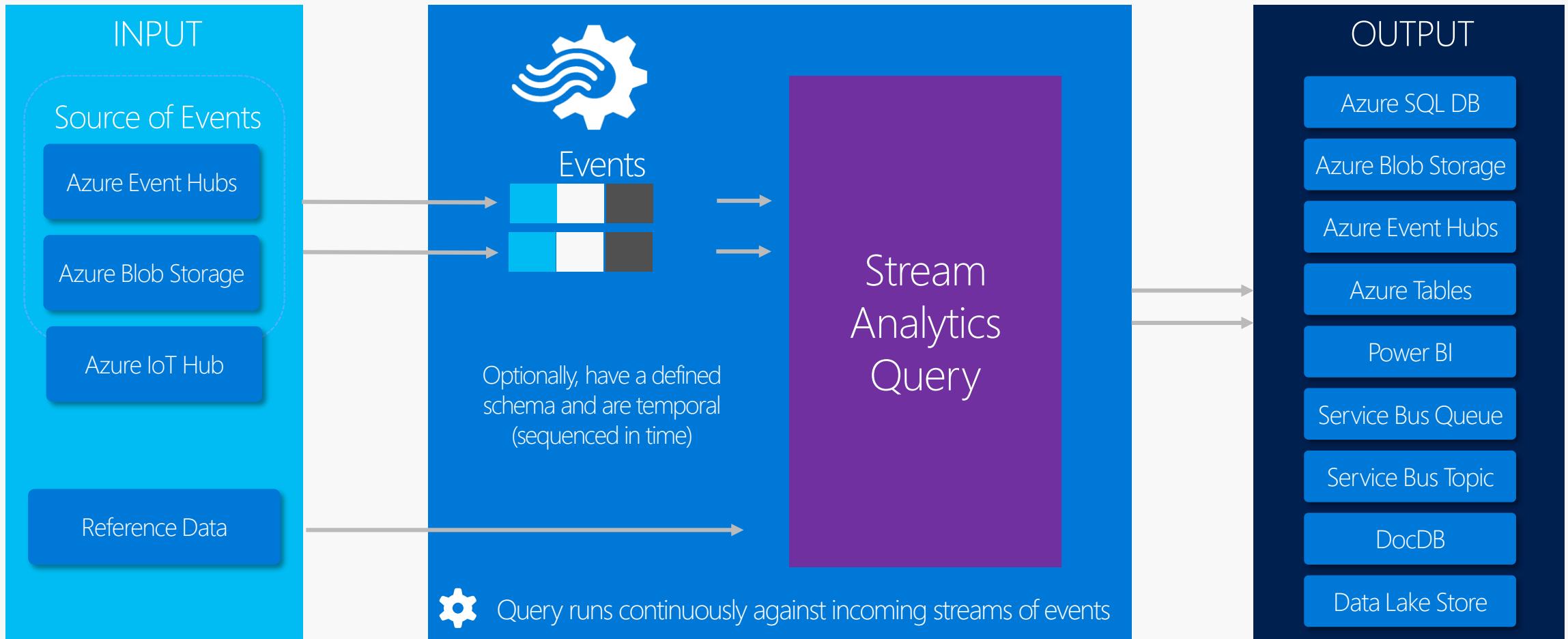


Stadium Architecture



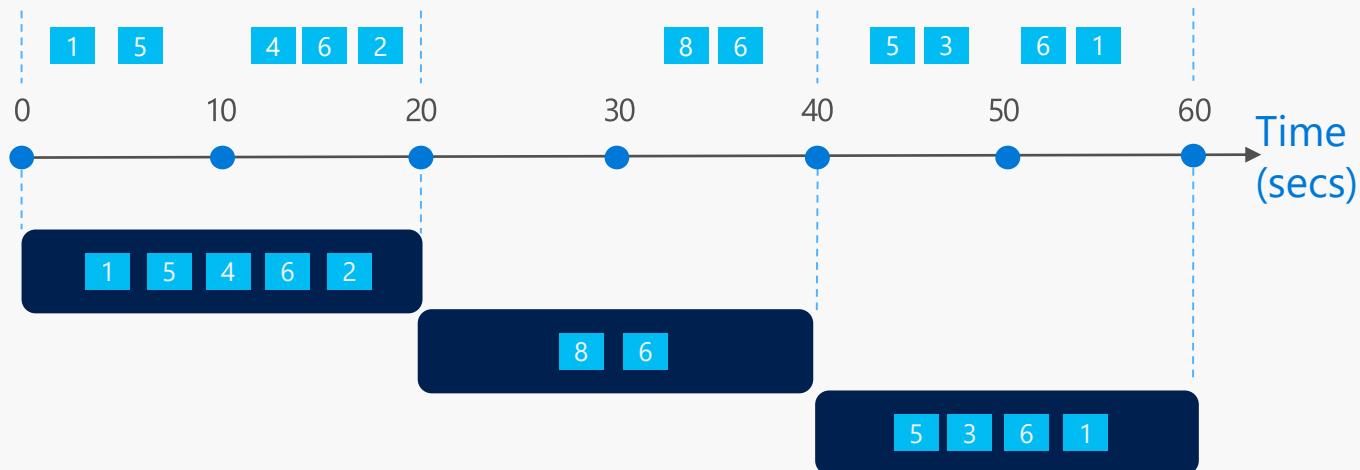
Azure Stream Analytics Components

Components of an Azure Stream Analytics Application



Tumbling Window

A 20-second Tumbling Window



Tumbling windows:
Repeat
Are non-overlapping

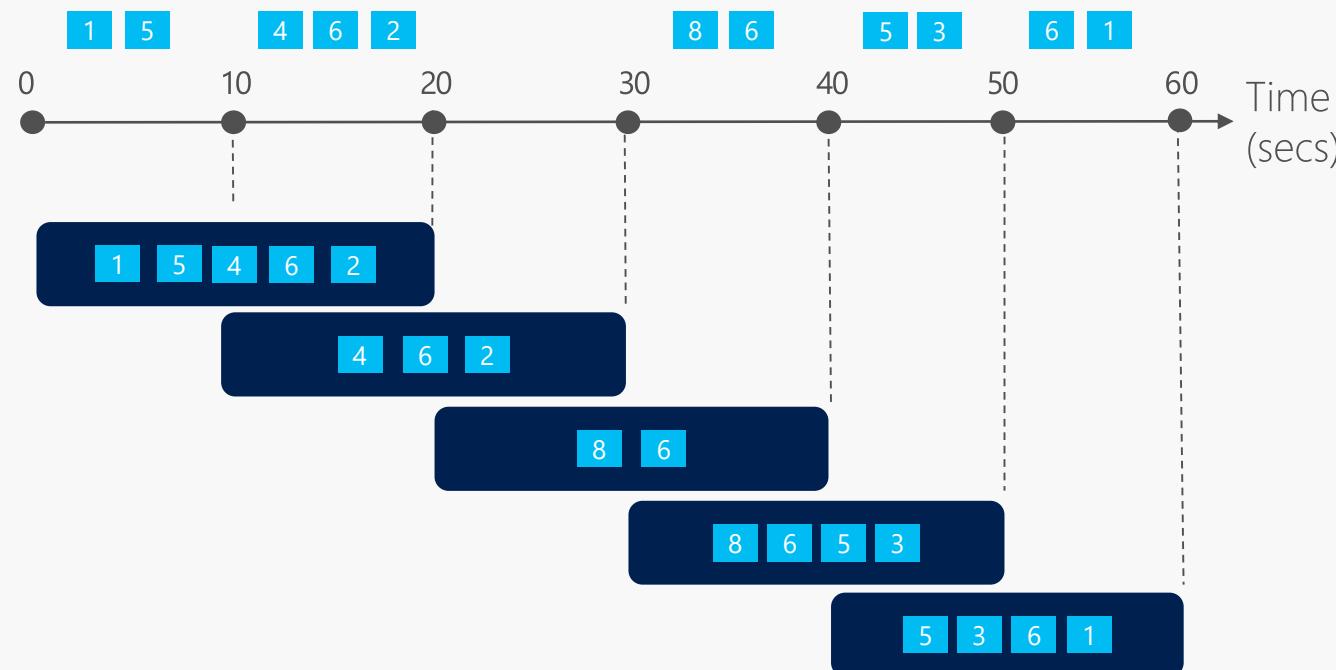
An event can belong to only one tumbling window

Query: Count the total number of vehicles entering each toll booth every interval of 20 seconds.

```
SELECT TollId, COUNT(*)  
FROM EntryStream TIMESTAMP BY EntryTime  
GROUP BY TollId, TumblingWindow(second, 20)
```

Hopping Window

A 20-second Hopping Window with a 10 second "Hop"



Hopping windows:

Repeat

Can overlap

Hop forward in time by a fixed period

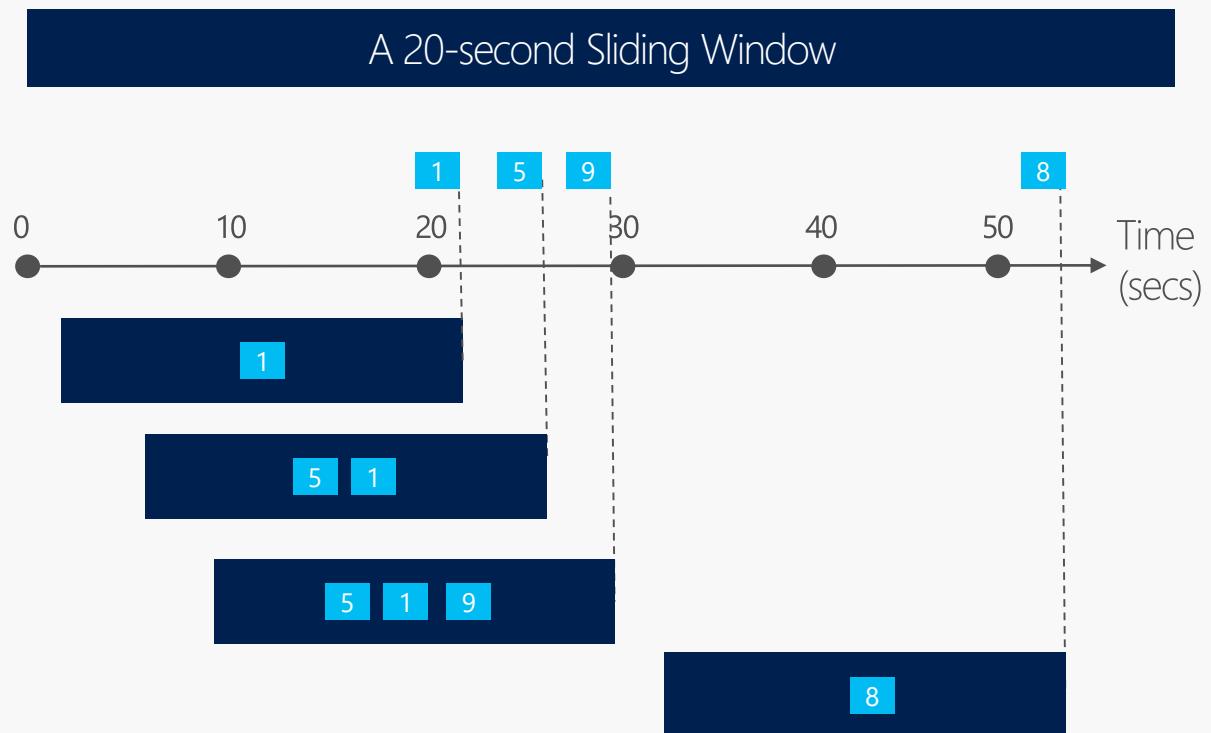
Same as tumbling window if hop size = window size

Events can belong to more than one hopping window

QUERY: Count the number of vehicles entering each toll booth every interval of 20 seconds; update results every 10 seconds

```
SELECT COUNT(*), TollId  
FROM EntryStream TIMESTAMP BY EntryTime  
GROUP BY TollId, HoppingWindow (second, 20, 10)
```

Sliding Window



Sliding window:

- Continuously moves forward by an ϵ (epsilon)
 - Produces an output *only during the occurrence of an event*
 - Every windows will have at least one event
- Events can belong to more than one sliding window

Query: Find all the toll booths which have served more than 10 vehicles in the last 20 seconds

```
SELECT TollId, Count(*)  
FROM EntryStream ES  
GROUP BY TollId, SlidingWindow (second, 20)  
HAVING Count(*) > 10
```

Query Language – Overview

DML Statements

- SELECT
- FROM
- WHERE
- GROUP BY
- HAVING
- CASE
- JOIN
- UNION

Date and Time Functions

- DATENAME
- DATEPART
- DAY
- MONTH
- YEAR
- DATETIMEFROMPARTS
- DATEDIFF
- DATADD

Aggregate Functions

- SUM
- COUNT
- AVG
- MIN
- MAX

Scaling Functions

- WITH
- PARTITION BY

Windowing Extensions

- Tumbling Window
- Hopping Window
- Sliding Window
- Duration

String Functions

- LEN
- CONCAT
- CHARINDEX
- SUBSTRING
- PATINDEX

Azure Machine Learning



Microsoft Azure Machine Learning

europewest.studio.azureml.net/Home/ViewWorkspaceCached/

Microsoft Azure Machine Learning

Find Top Emotion

Finished running ✓

Properties Project

Execute R Script

R Script

```
4 penultimax <- function(origvector){  
5   top2 = max(origvector[!origvector == max(origvector)])  
6   return(top2)  
7 }  
8  
9 penultimax_idx <- function(origvector){  
10  top2 = max(origvector[!origvector == max(origvector)])  
11  top2idx = which(origvector == top2)  
12  return(top2idx)  
13 }  
14  
15 data.set <- data.frame(cbind(TopEmotionValue=apply(dataset1,1,  
16  TopEmotionIndex =apply(dataset1,1,which.max) ,  
17  TopEmotion= names(dataset1)[apply(dataset1,1,which.max)  
18  PenultimateEmoVal = apply(dataset1, 1, penultimax),  
19  PenultimateEmoIdx = apply(dataset1, 1, penultimax_idx),
```

Quick Help

Executes an R script from an Azure Machine Learning experiment
(more help...)

Search experiment items

- Web service input
- emotions-norm.csv
- Execute R Script
- Metadata Editor
- Metadata Editor
- Project Columns
- Σ_{i=1} Apply Math Operation
- Σ_{i=1} Apply Math Operation
- Metadata Editor
- Σ_{i=1} Apply Math Operation
- Web service output

NEW

RUN HISTORY

SAVE

SAVE AS

DISCARD CHANGES

RUN

DEPLOY WEB SERVICE

PUBLISH TO GALLERY

Azure Machine Learning



Microsoft Azure Machine Learning

happystadium ? ⚽ 😊

Properties Project

◀ Train Model

Label column
Selected columns:
Column names: Risk

Launch column selector

START TIME 3/10/2016 1...
END TIME 3/10/2016 1...
ELAPSED TIME 0:00:06.173
STATUS CODE Finished
STATUS DETAILS None

View output log

Web Service Parameters
New column names

Quick Help
Train a previously created classification or regression model
(more help...)

Training experiment Predictive experiment

Stadium risk prediction

Finished running ✓

Classification

- Multiclass Decision Forest
- Multiclass Decision Jungle
- Multiclass Logistic Regression
- Multiclass Neural Network
- One-vs-All Multiclass
- Two-Class Averaged Perceptron
- Two-Class Bayes Point Machine
- Two-Class Boosted Decision Tree
- Two-Class Decision Forest
- Two-Class Decision Jungle
- Two-Class Locally-Deep Support...
- Two-Class Logistic Regression
- Two-Class Neural Network

IoTConfData.txt → Project Columns → Metadata Editor → Split Data → Two-Class Decision Forest → Train Model → Score Model → Evaluate Model

RUN HISTORY SAVE SAVE AS DISCARD CHANGES RUN SET UP WEB SERVICE PUBLISH TO GALLERY

NEW

Azure Machine Learning



Microsoft Azure Machine Learning

happystadium ? ☺ ☻

Properties Project

Stadium risk prediction [trained...]

AUTHOR mtilly
CREATED ON 3/10/2016 9:...

Training experiment

Predictive experiment

Stadium risk prediction [Predictive Exp.]

Finished running ✓

Draft saved at 14:10:59

Web service input

Score Model

Project Columns

Metadata Editor

Apply Math Operation

Apply Math Operation

Stadium risk prediction [train...]

Project Columns

Web service input

Score Model

Project Columns

Metadata Editor

Apply Math Operation

Apply Math Operation

1

Search experiment items

Saved Datasets

Trained Models

Custom

Data Format Conversions

Data Input and Output

Data Transformation

Feature Selection

Machine Learning

OpenCV Library Modules

Python Language Modules

R Language Modules

Statistical Functions

Text Analytics

Web Service

Quick Help

+

NEW

RUN HISTORY

SAVE

SAVE AS

DISCARD CHANGES

RUN

DEPLOY WEB SERVICE

PUBLISH TO GALLERY

The screenshot shows the Microsoft Azure Machine Learning studio interface. On the left, there's a sidebar with various icons for different data science operations like saved datasets, trained models, and machine learning. The main workspace is titled "Stadium risk prediction [Predictive Exp.]". It displays a flowchart of steps: "Stadium risk prediction [train...]" (highlighted with a blue border), "Project Columns", "Score Model", "Project Columns", "Metadata Editor", "Apply Math Operation", and "Apply Math Operation". Arrows indicate the flow from one step to the next. The "Score Model" step has a green checkmark. The "Project Columns" step after "Score Model" also has a green checkmark. The "Metadata Editor" step has a green checkmark. The first "Apply Math Operation" step has a green checkmark. The second "Apply Math Operation" step has a grey circle with a black dot, indicating it's the active or selected step. The status bar at the bottom shows "1:1" and "2:1" with a "1:1" icon. The top right corner shows user information "happystadium" and various icons for help, sharing, and profile.

Power BI



msit.powerbi.com/groups/me/dashboards/

Power BI Stadium Risk

STADIUM RISK

Stellen Sie eine Frage zu den Daten in diesem Dashboard. [Fragen](#)

Risk Rating in Stadium
IN BLOCKS

block ● Block A ● Block B ● Block C ● Block D

00:00 03:00 06:00 09:00

Risk in Block A

0,00 24,25 75,00

Risk in Block B

0,00 25,66 63,00

Risk in Block C

0,00 16,43 50,00

Risk in Block D

0,00 27,91 75,00

Top 2 Emotions

● secondtopemotionvalue ● topemotionvalue

Power BI



Power BI

Stadium Risk

STADIUM RISK

Stellen Sie eine Frage zu den Daten in diesem Dashboard.

Fragen

Risk in Block A: 24.25

Risk in Block B: 25.66

Risk in Block C: 16.43

Risk in Block D: 27.91

Top Emotions

Emotion	Value
Anger	0.18
Contempt	0.18
Disgust	0.21
Fear	0.19
Happiness	0.34
Neutral	0.38
Sadness	0.23
Surprise	0.18

Second Top Emotions

Emotion	Value
Anger	0.17
Contempt	0.16
Disgust	0.18
Fear	0.16
Happiness	0.16
Neutral	0.16
Sadness	0.15
Surprise	0.15

Top 2 Emotions

Block	secondtopemotionvalue	topemotionvalue
Block A	0.33	0.67
Block B	0.48	0.52
Block C	0.47	0.53
Block D	0.47	0.53

Demo:
Happy Stadium

Hands-on Lab

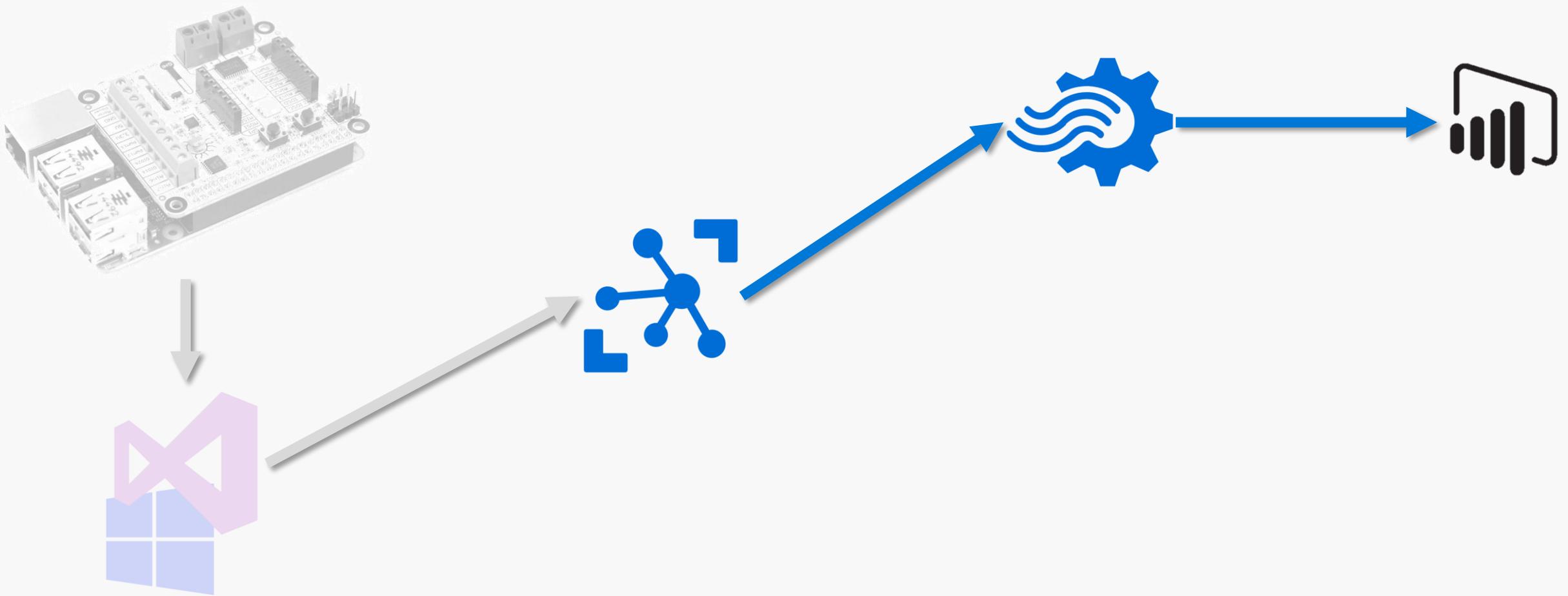
Lab 5

Consume IoT hub data from website

<http://aka.ms/iotcamp-de>

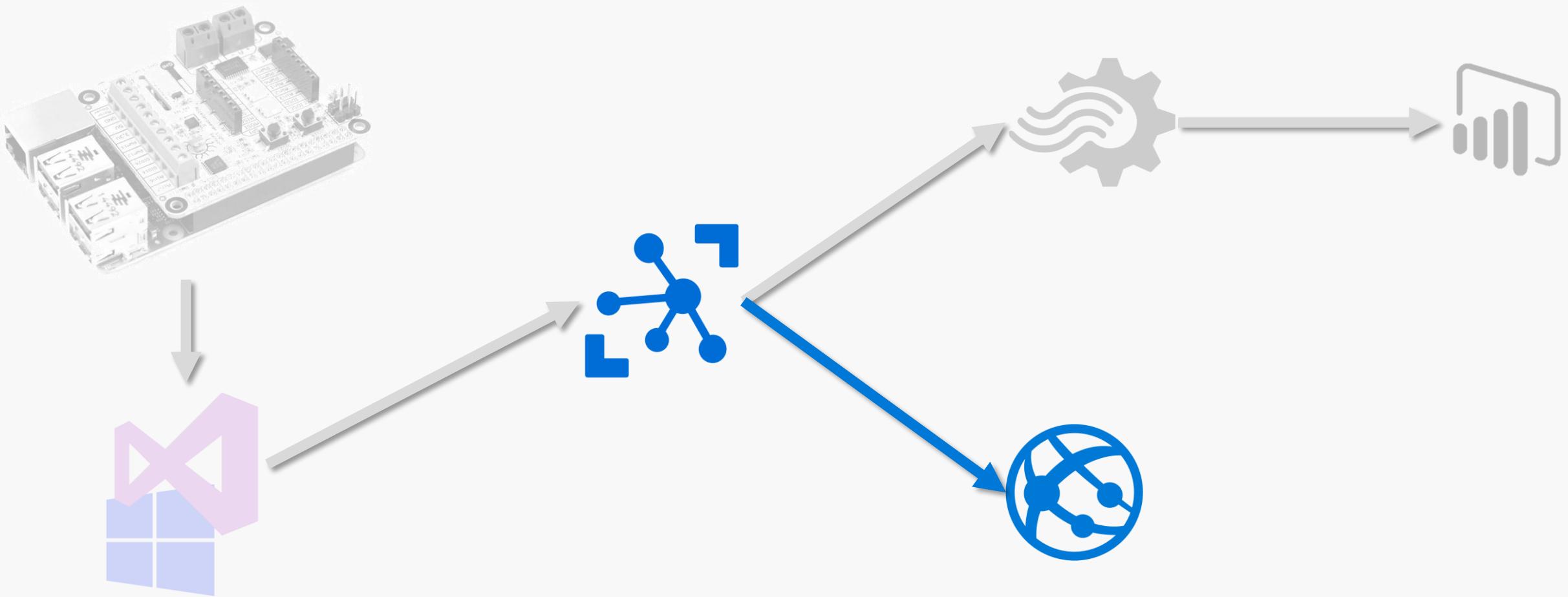
Lab 4: Listen to the Cloud (Consume IoT Hub)

a) Visualise in Power BI



Lab 4: Listen to the Cloud

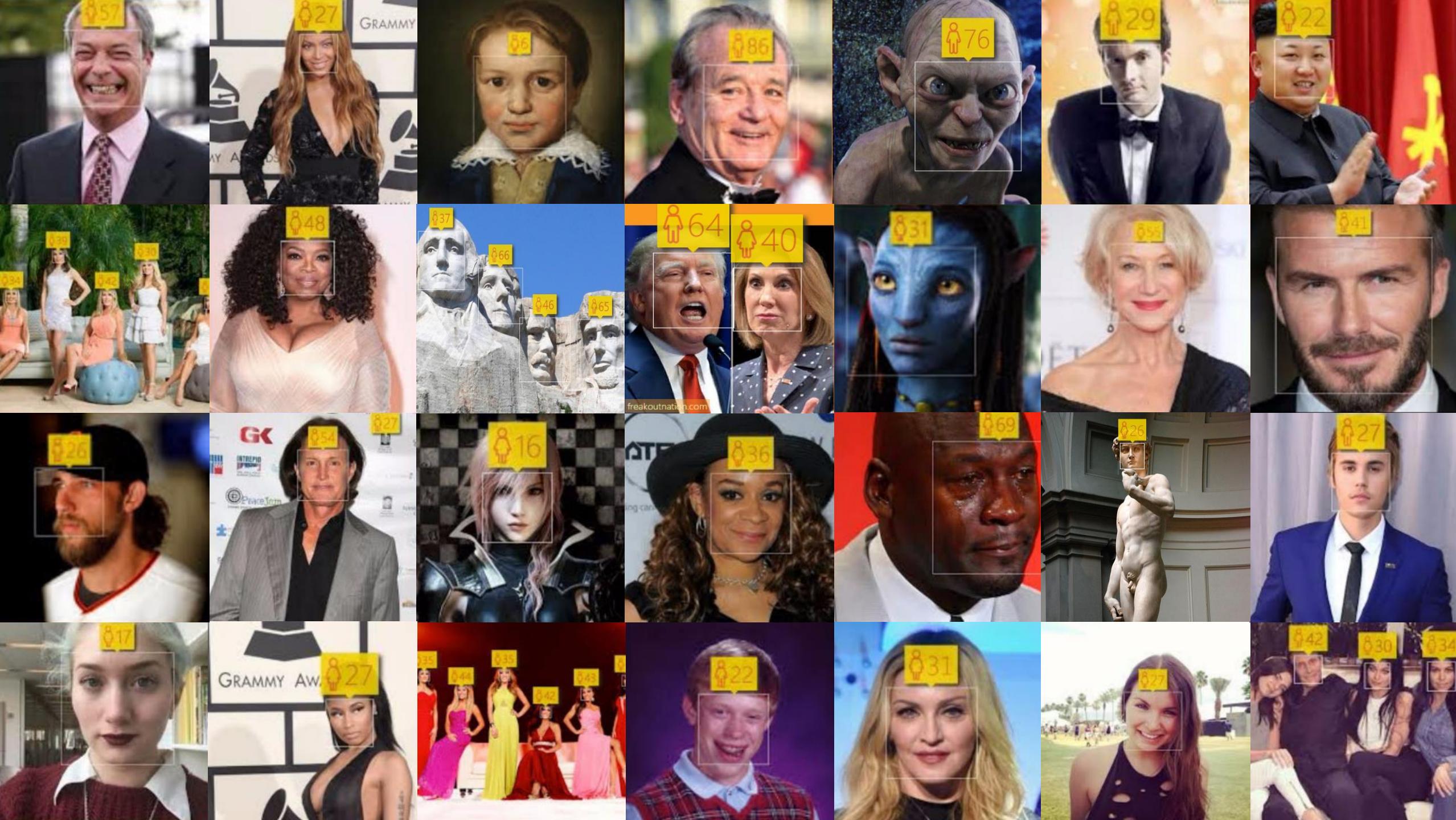
b) Consume IoT Hub data from Website

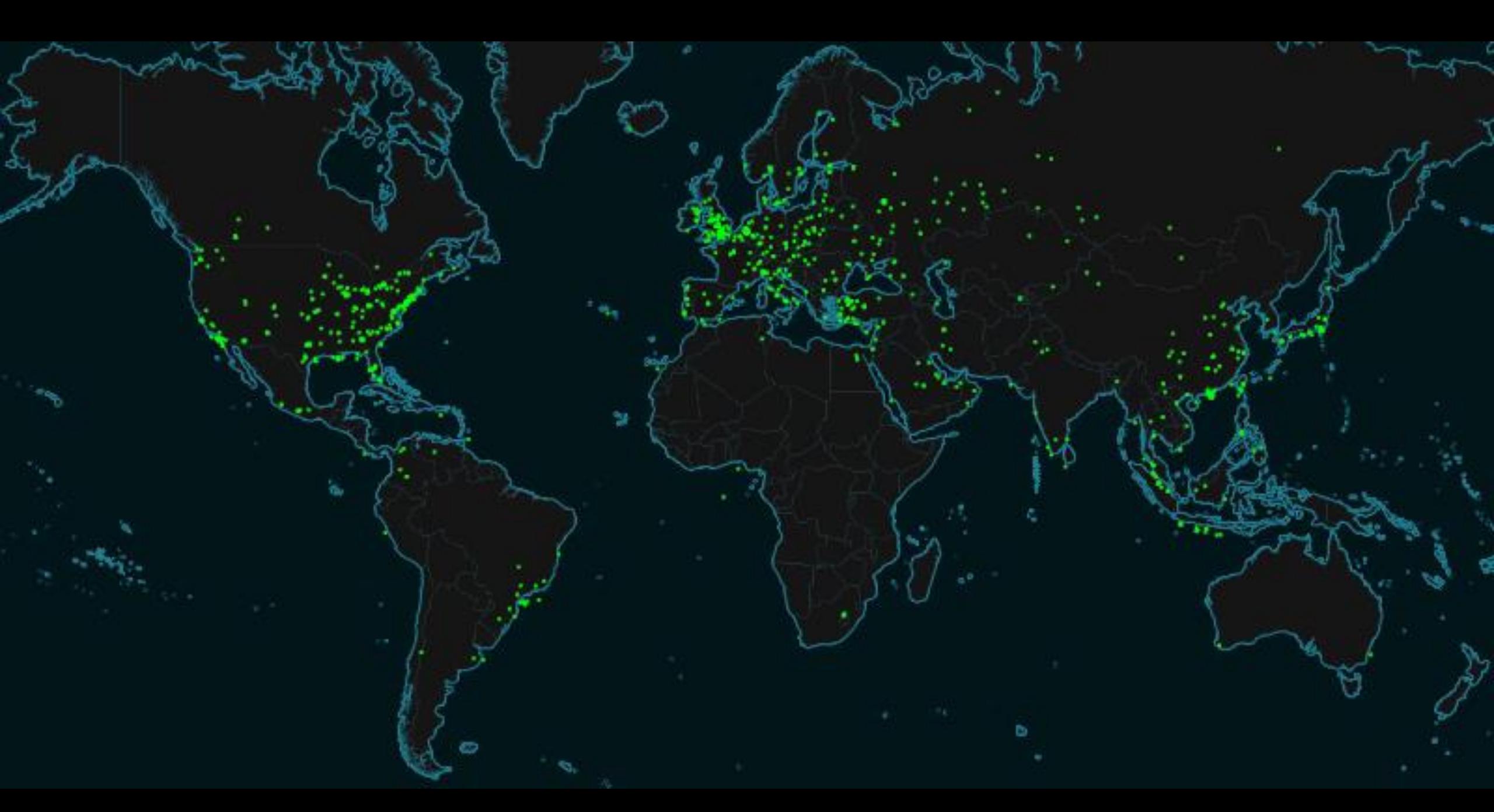


Azure Machine Learning



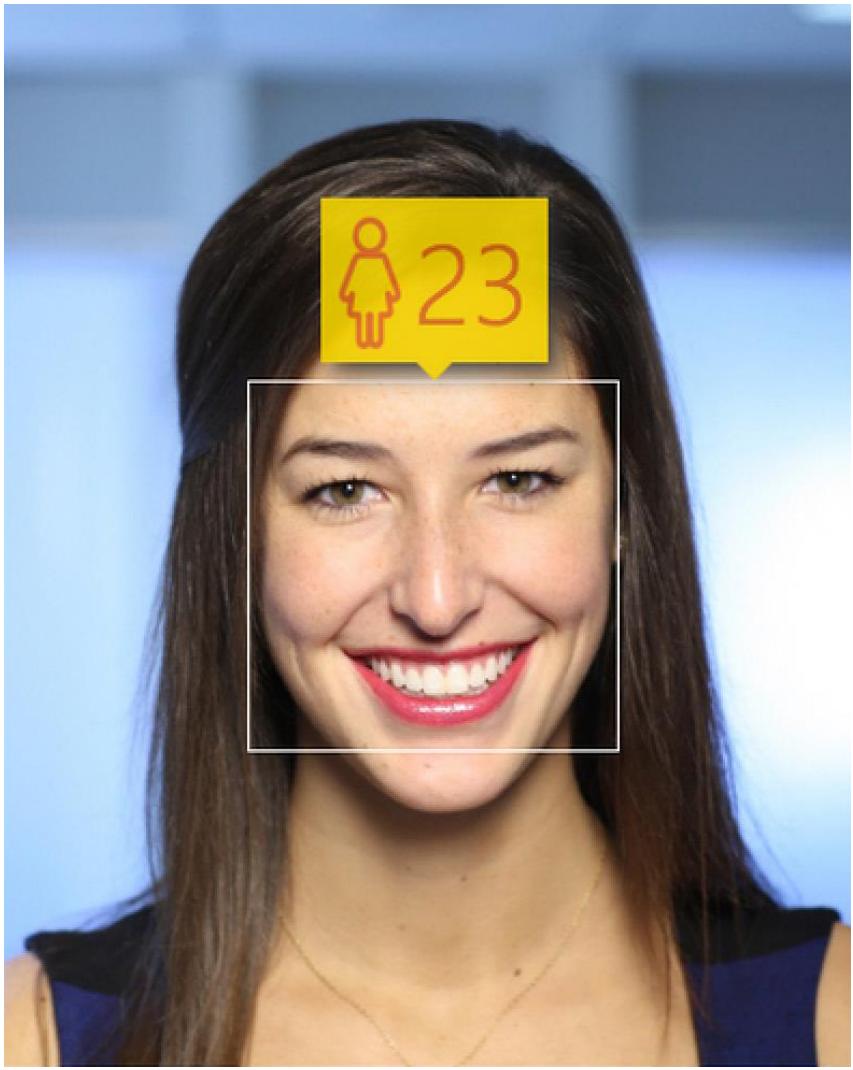
How-Old.net
HOW OLD DO I LOOK? #HowOldRobot





We learned
important things

People share when
HowOldRobot is **right**



Courtney Bernard @cbernard916 · Apr 30
Nailed it #HowOld @actonline

“Nailed it”

Even more
when it's **wrong**



Ellen DeGeneres

@TheEllenShow



I don't know why everyone's so upset about
this [#HowOldRobot](#). It's clearly a genius.
how-old.net

Ellen:

"I don't know
why everyone's
so upset..."



Wolfgang Werner @0xcafebabe · Apr 30
This may be an edge case, but still.... #howOld



3



2



110th Birthday:

“This may be an edge case, but still...”

Marketers
don't miss a chance

AGED
TO
PERFECTION



Patrón Tequila @Patron · 8h
Aged to Perfection. #HowOldRobot #Patron7Anos



How-Old.net

How old do I look? #HowOldRobot

Happy #CokeBottleBirthday!

[Learn more about the iconic Coca-Cola Bottle](#)



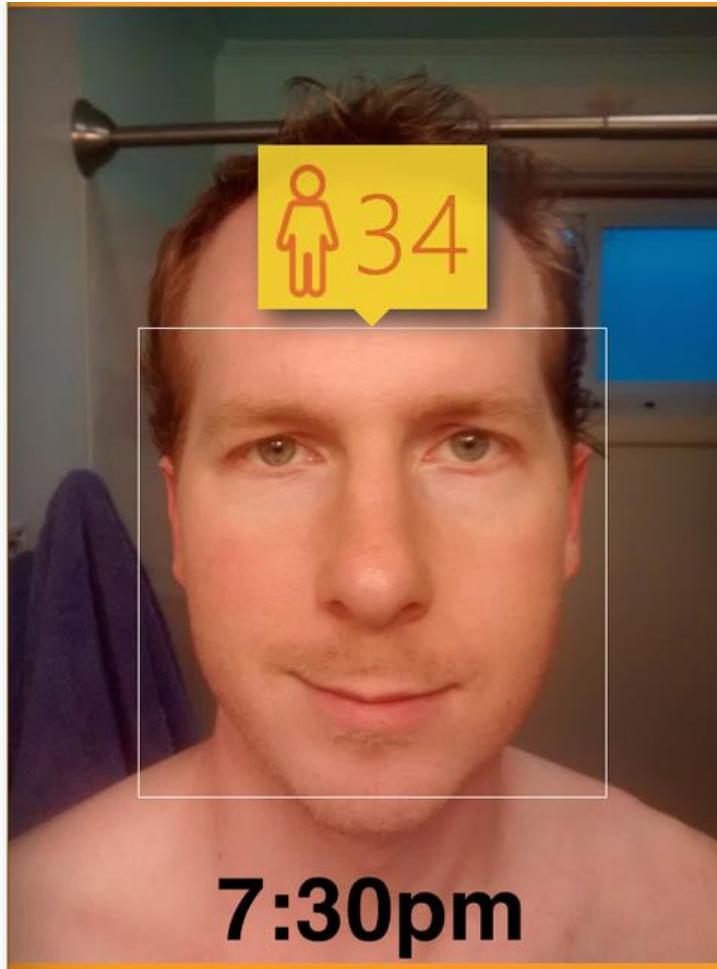
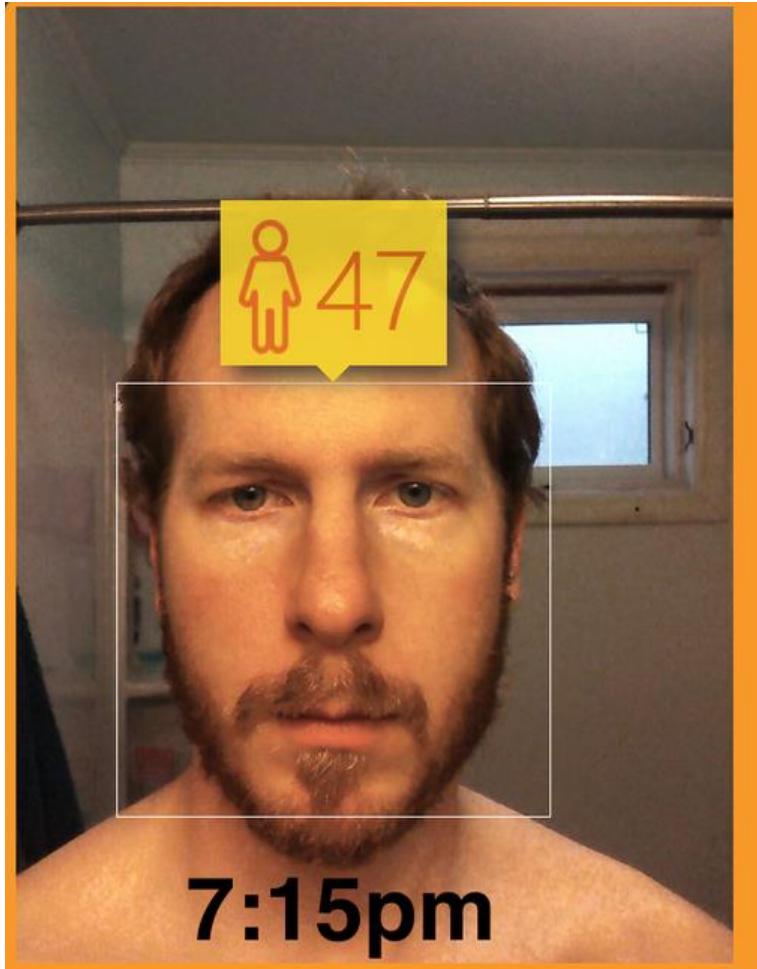
Sorry if we didn't quite get it right - [we are still improving this feature](#).

[Try Another Photo!](#)



P.S. We don't keep the photo

How to look younger



Steve Desmond @stevedesmond_ca · May 5

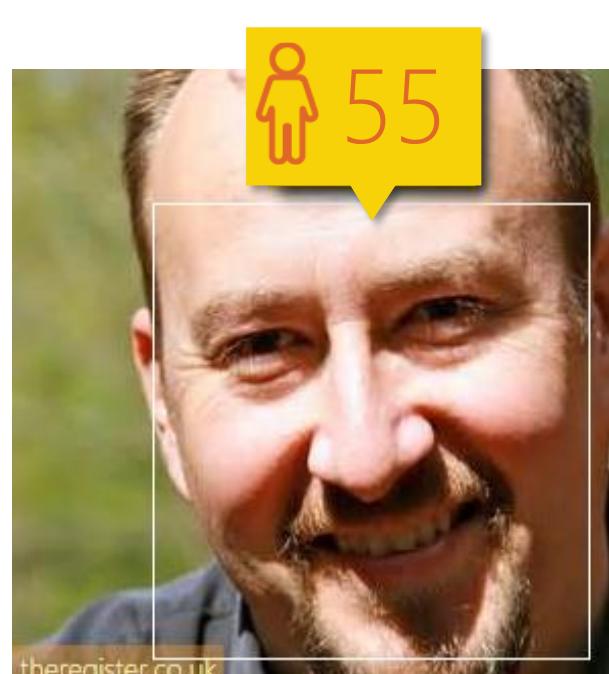
Try my new age defying process: 15 minutes will *shave* more than a decade off your #HowOldRobot score!

2 1 ...

Tip 1
Shave



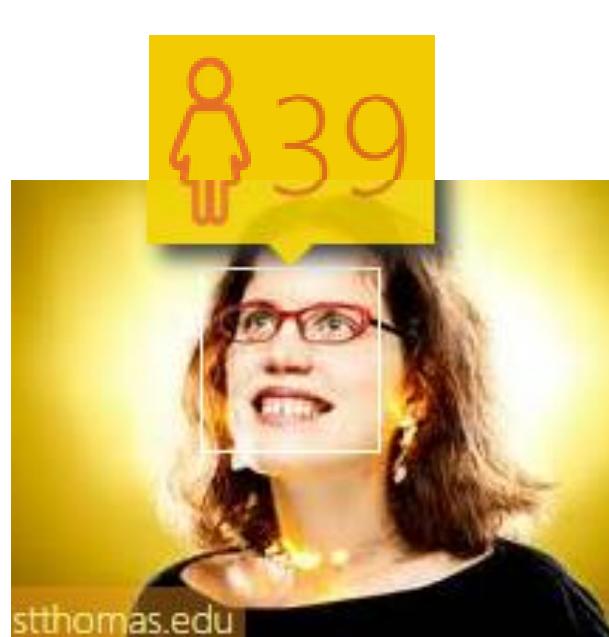
linkedin.com



theregister.co.uk



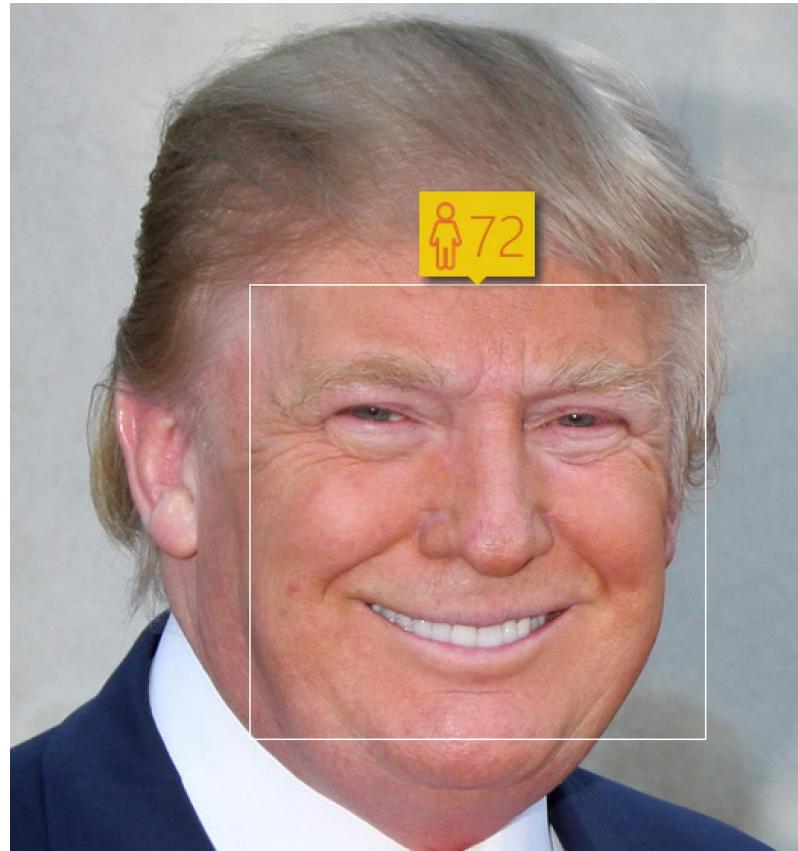
craftcouncil.org



stthomas.edu

Tip 2

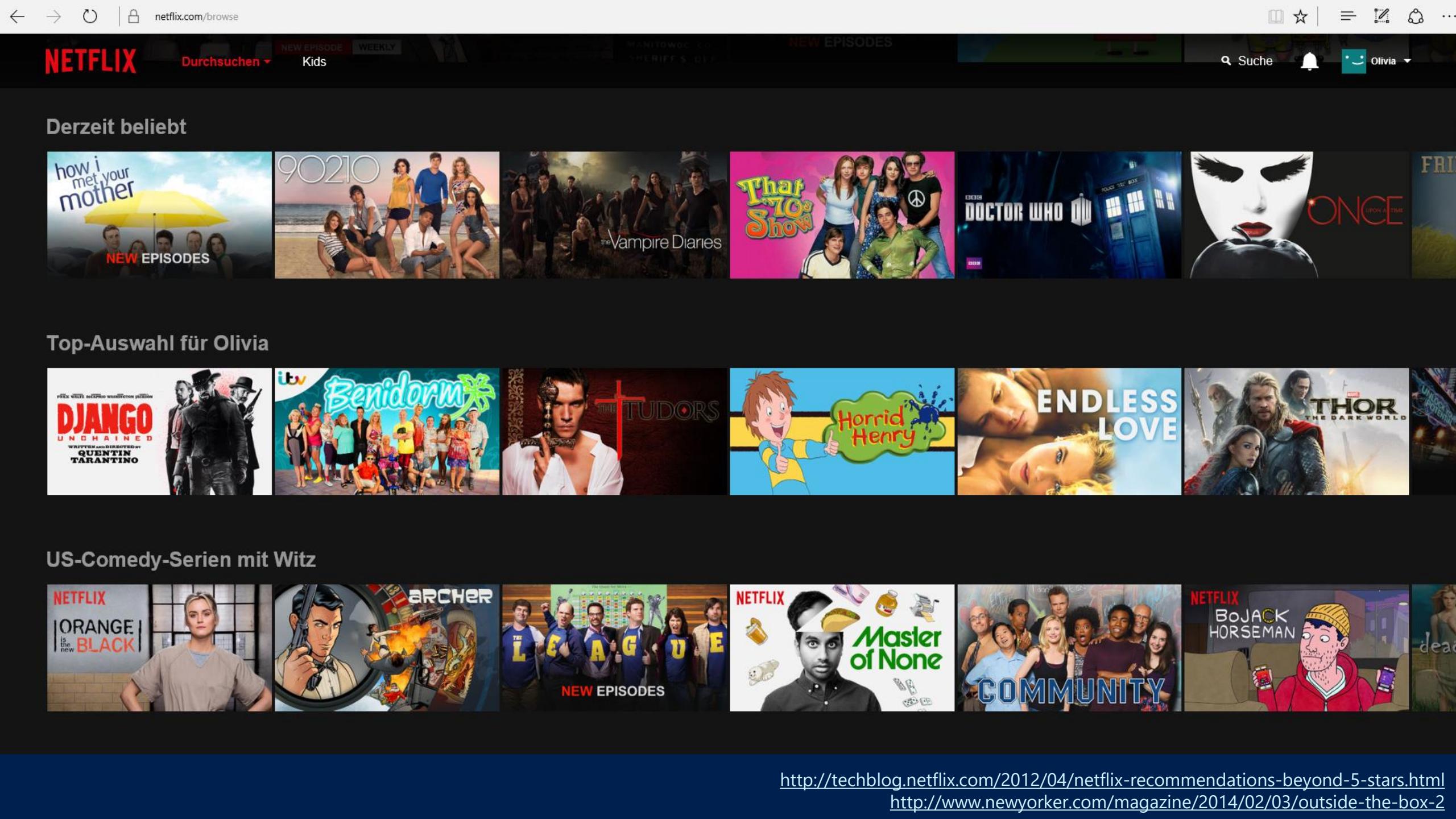
Don't smile



Tip 3

Wear a hat





<http://techblog.netflix.com/2012/04/netflix-recommendations-beyond-5-stars.html>

<http://www.newyorker.com/magazine/2014/02/03/outside-the-box-2>

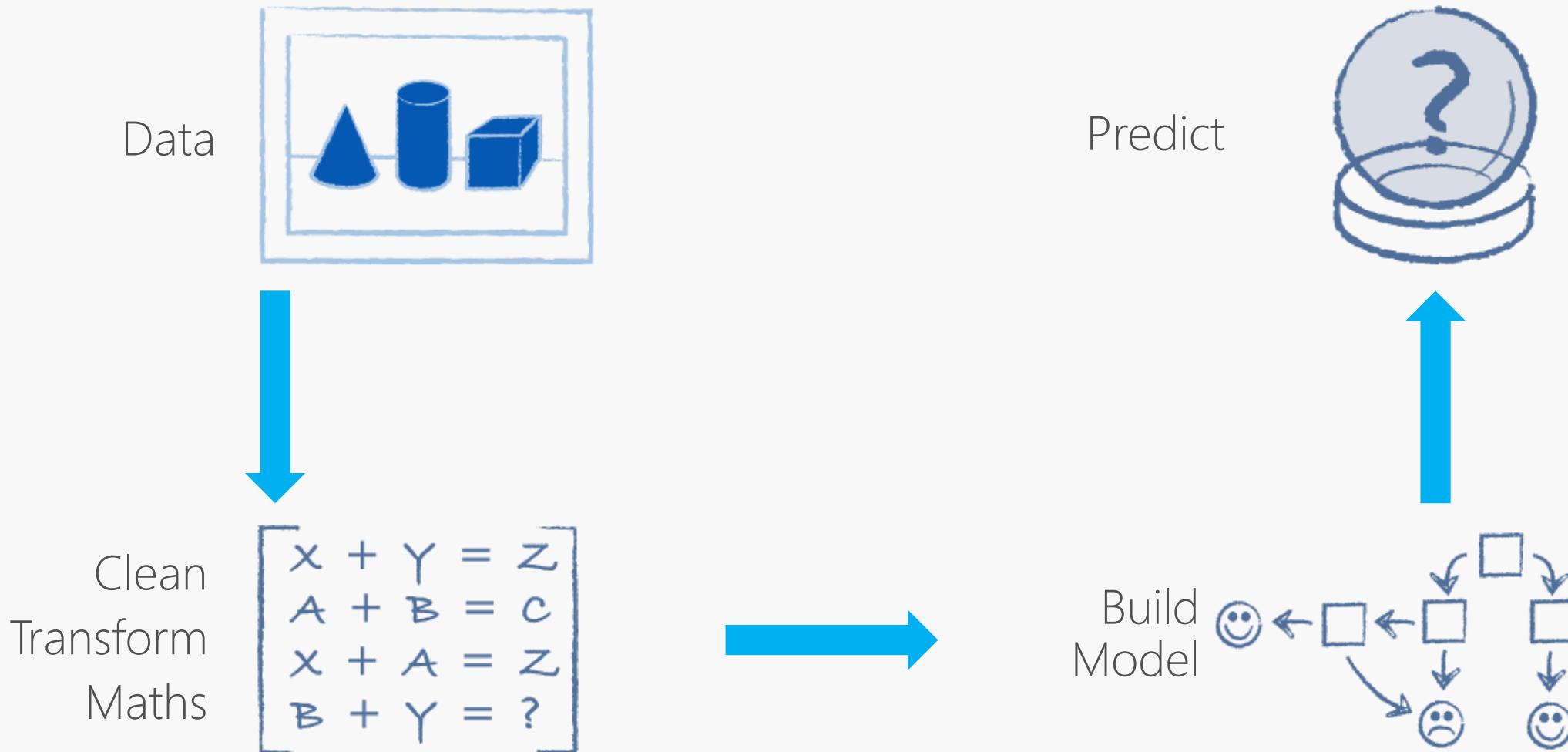
Machine Learning @ Microsoft?

What is Machine Learning?

“The goal of machine learning is
to program computers
to use **example data** or **past experience**
to solve a given problem.”

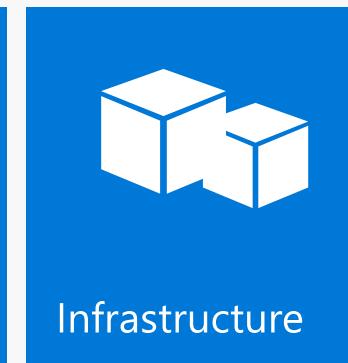
Introduction to Machine Learning, 2nd Edition, MIT Press

Machine Learning Process



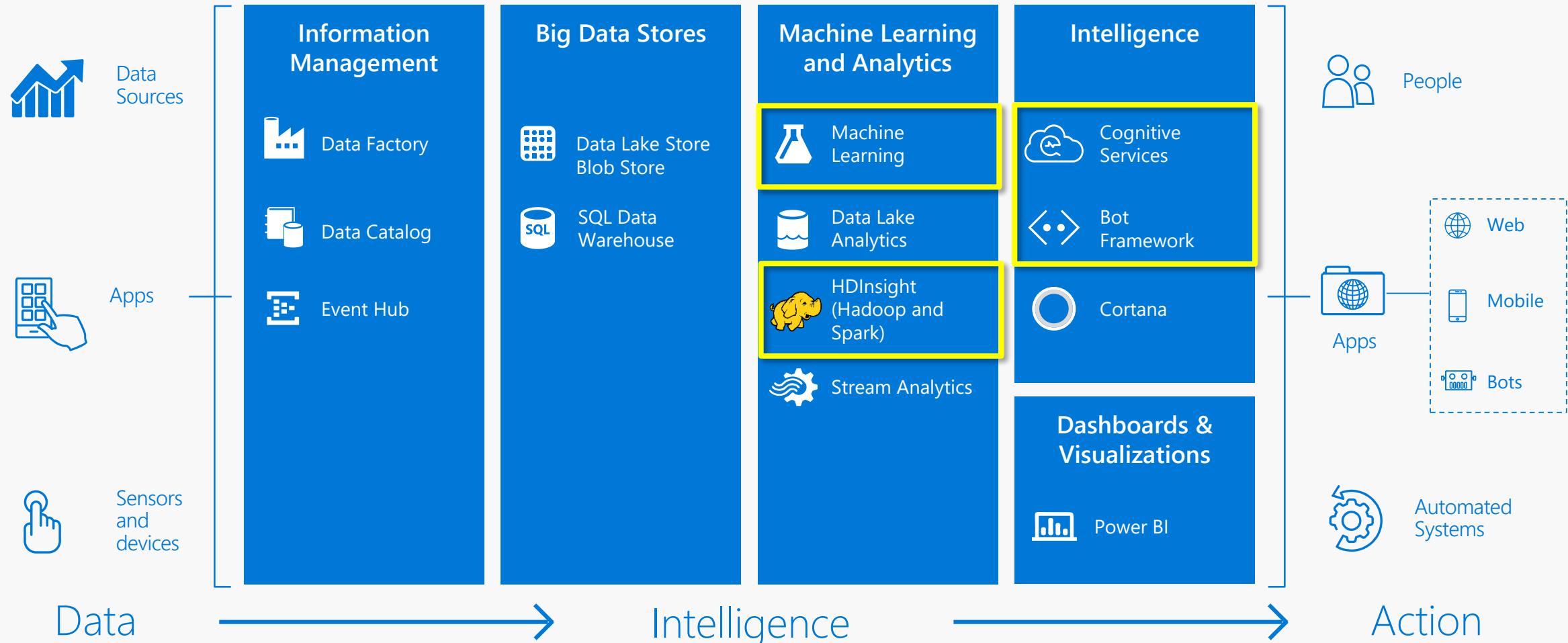


ML Adoption Challenges



Cortana Intelligence Suite

Transform data into intelligent action



Azure Machine Learning

ML
Algorithms

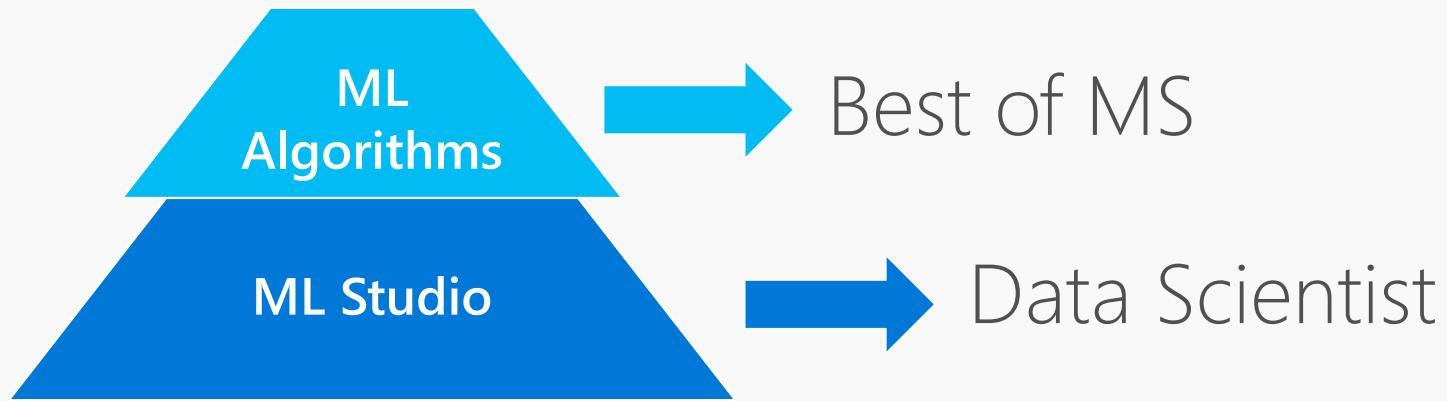


State of the Art Algorithms



A screenshot of the Microsoft Office 365 SharePoint homepage. The page shows a grid of document cards. Some visible titles include "Journey to the cloud", "Contoso Information Security Policy", and "Phased Deploy". The interface includes navigation links like "Home", "My work", and "Shared with me".

Azure Machine Learning



Azure Machine Learning

Microsoft Azure Machine Learning | Home Studio Gallery PREVIEW qbattaglia's Workspace ▾     

Sample 5: Train, Test, Evaluate for Binary Classification: Adult Dataset

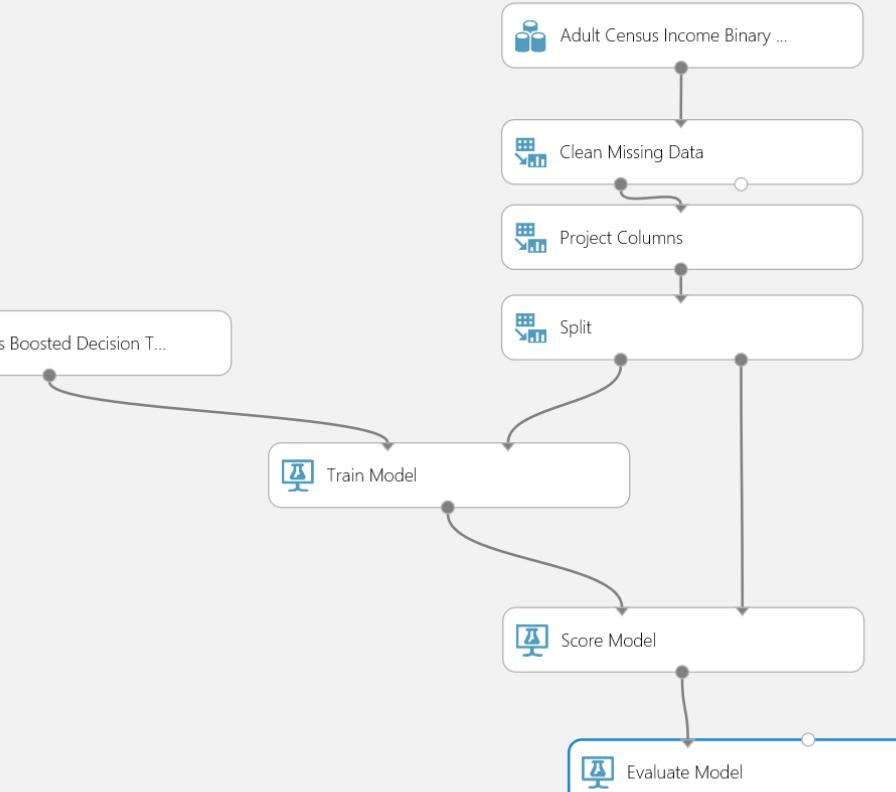
In draft

Draft saved at 9:05:48 AM

Properties

Evaluate Model
No parameters

Quick Help
Evaluate a scored classification or regression model
[\(more help...\)](#)



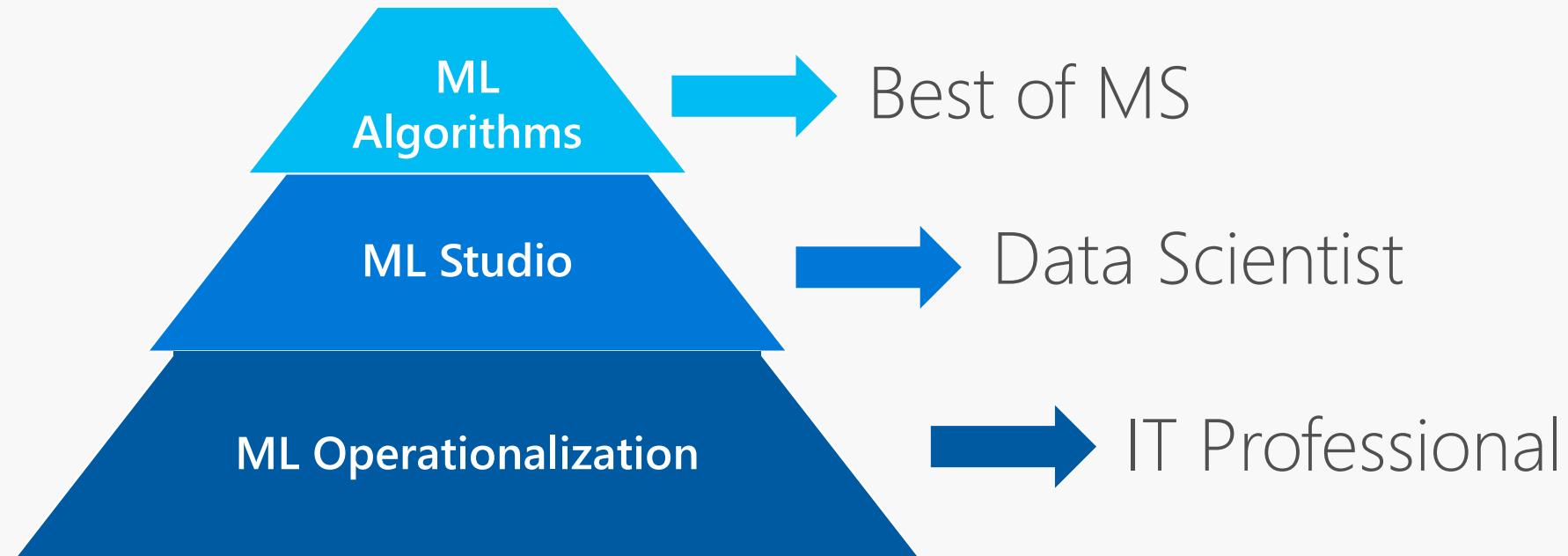
Search experiment items 

- Saved Datasets
- Trained Models
- Data Format Conversions
- Data Input and Output
- Data Transformation
- Feature Selection
- Machine Learning
- OpenCV Library Modules
- Python Language Modules
- R Language Modules
- Statistical Functions
- Text Analytics
- Web Service
- Deprecated

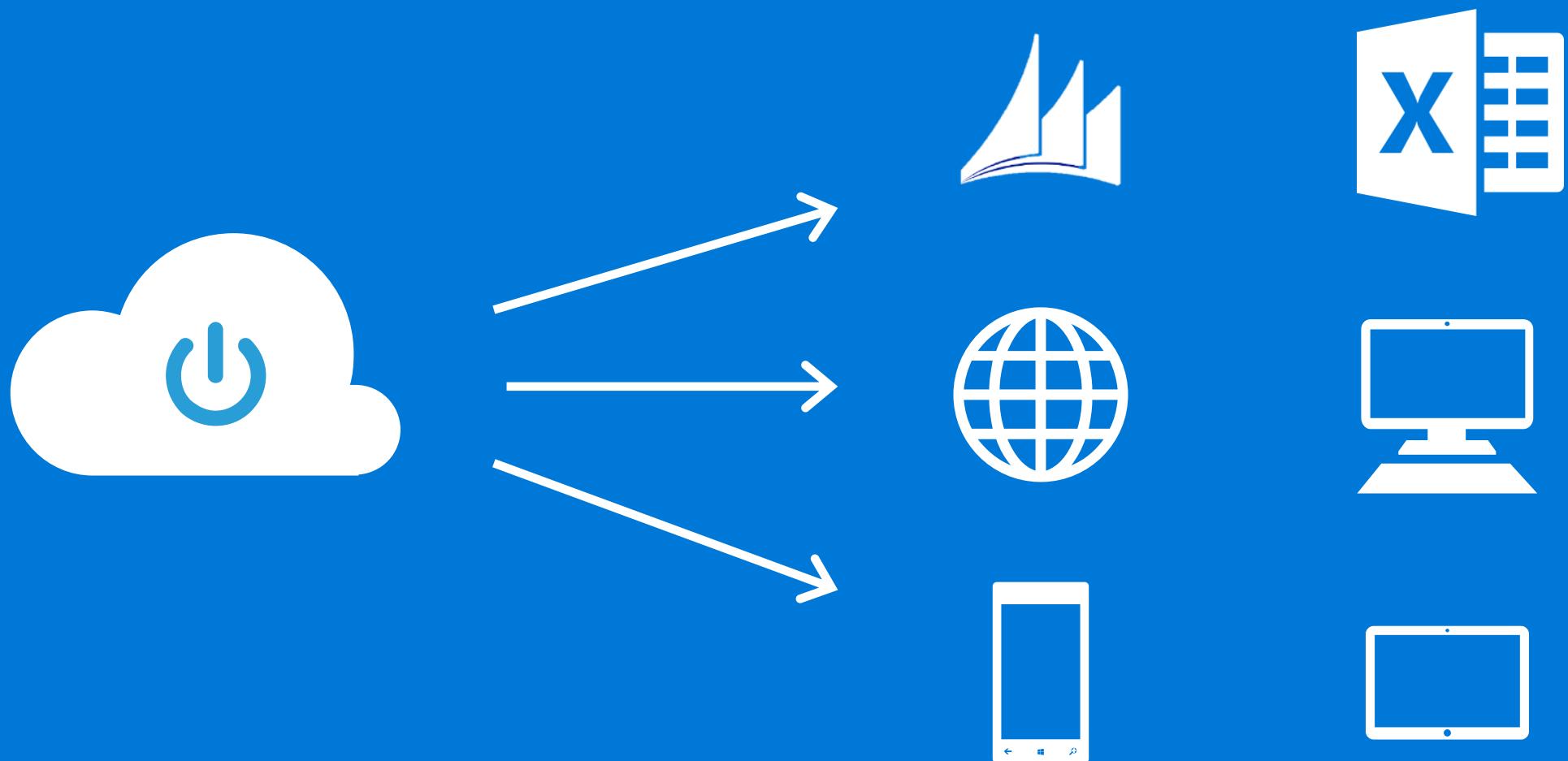
Search bar: - + 1:1 ↕ ↖ ↘

NEW  VIEW RUN HISTORY  SAVE  DISCARD CHANGES  REFRESH  CANCEL  RUN  PREPARE WEB SERVICE  PUBLISH TO GALLERY  CREATE SCORING EXPERIMENT 

Azure Machine Learning



Azure Machine Learning

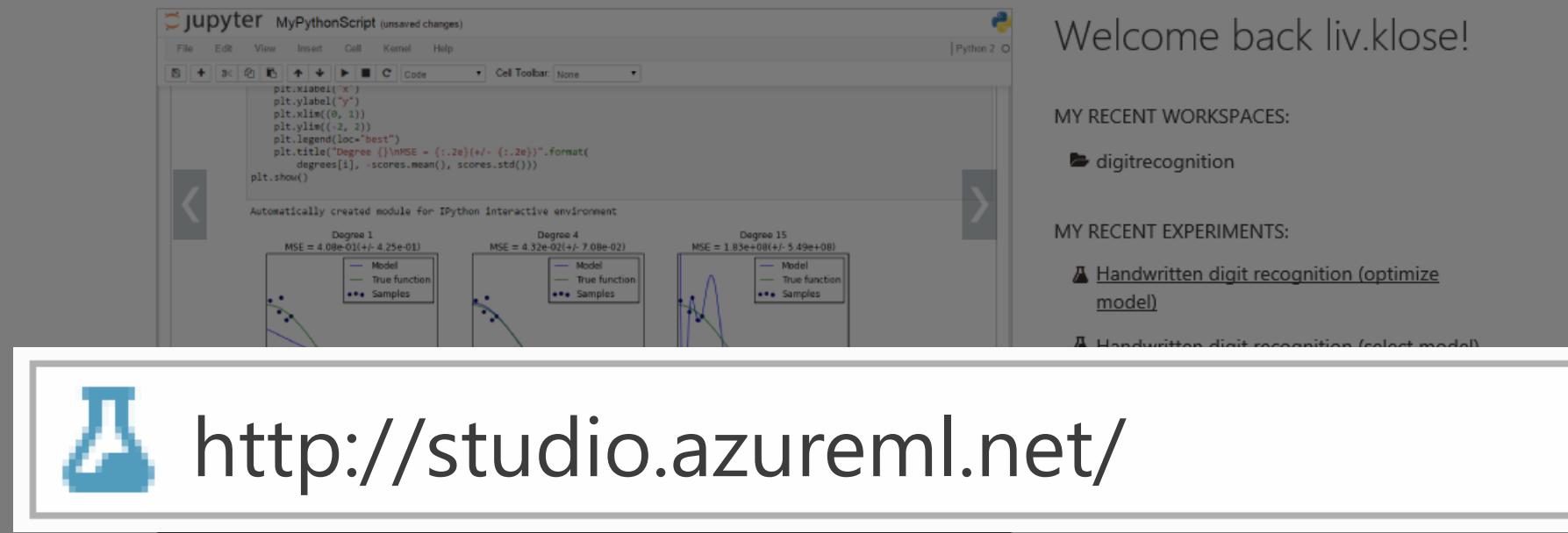


Consume anywhere



Demo

Surviving the Titanic



Webinars **NEW!**

Real-time and Predictive Insights on Vehicle Health and Driving Behavior Pattern

Aired on September 15, 2015

In this demo, we will enable you to setup and run a sample Cortana analytics application to light up an Internet of Things (IoT) usecase related to vehicle telemetry analysis.

> Learn More

Leveraging Predictive Analytics for Sales and Marketing

Aired on September 01, 2015

Learn how the Microsoft Global Marketing team built predictive analytics solutions to meet the marketing and sales business need for Microsoft subsidiaries and business groups.

> Learn More

Harness Predictive Customer Churn Models with Cortana Analytics Suite

Aired on August 18, 2015

Learn how to build a real-life churn model with Azure Machine Learning, make it enterprise-ready with Azure Data Factory, and deliver data insights with Power BI.

> Learn More

Upcoming Webinars →

← → ⌂ | 🔒gallery.cortanaintelligence.com/Experiment/Tutorial-Building-a-classification-model-in-Azure-ML-8| 📖 ⭐ | ⚙ ✎ 📡 ...

Cortana Intelligence Gallery

🔍 👤 😊 Sign in

[Browse all](#) [Solution Templates](#) [Experiments](#) [Machine Learning APIs](#) [Notebooks](#) [Competitions](#) [Tutorials](#) [Collections](#)

EXPERIMENT

Tutorial: Building a classification model in Azure ML

 Raja Iqbal • published on February 14, 2015

Summary

This experiment serves as a tutorial on building a classification model using Azure ML. We will be using the Titanic passenger data set and build a model for predicting the survival of a given passenger.

Description

Data

This version of the Titanic dataset can be retrieved from the [Kaggle](#) website, specifically their "train" data (59.76 kb). The train Titanic data ships with 891 rows, each one pertaining to an occupant of the RMS Titanic on the night of its sinking. [Demo: Interact with the user interface of a model deployed as service](#)

The dataset also has 12 columns that each record an attribute about each occupant's circumstances and demographic. For this particular experiment we will build a classification model that can predict whether or not someone would survive the Titanic disaster given the same circumstances and demographic.

Model

First, some preprocessing. It is highly recommended that you read the [detailed tutorial](#) to understand the rationale behind each step:



A painting of the RMS Titanic sinking, showing the ship listing heavily to the side with many people in lifeboats in the dark water.

[Open in Studio](#)

+ Add to Collection

👁 13658 views

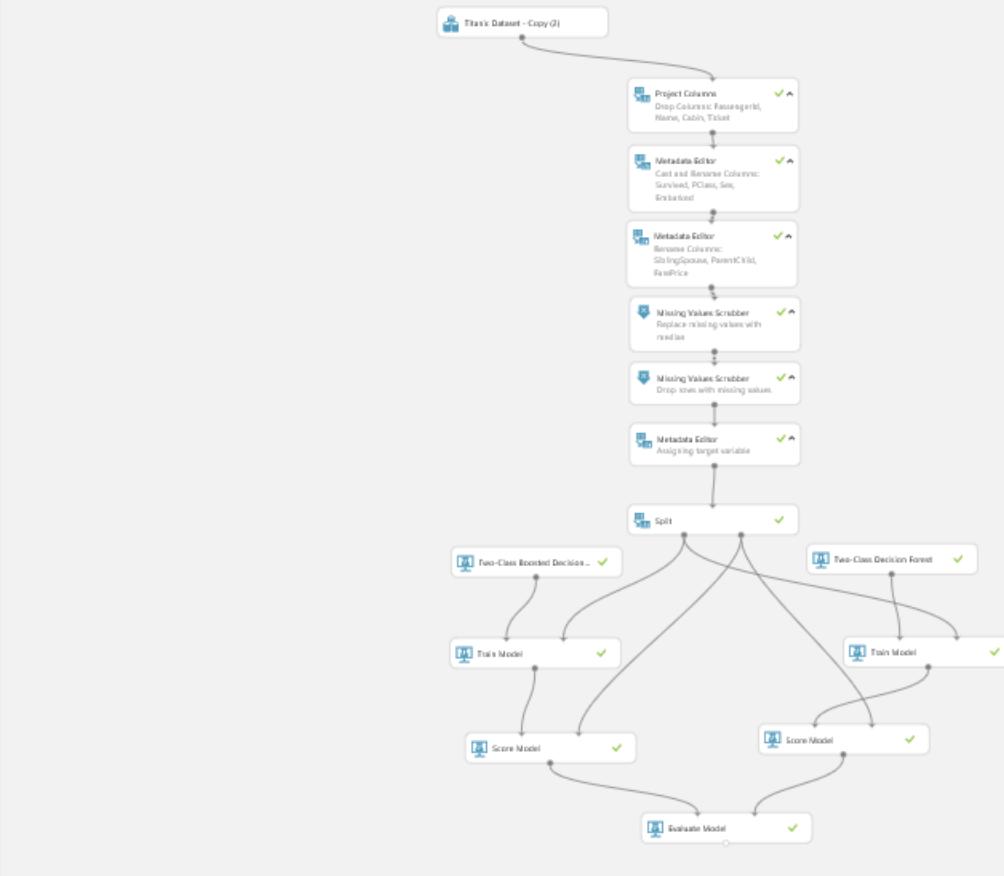
⬇ 5903 downloads

[Tweet](#) [Share](#) [Email](#)

ALGORITHMS

Tutorial: Building a classification model in Azure ML

Finished running ✓



Properties

Experiment Properties

START TIME	9/29/201...
END TIME	9/29/201...
STATUS CODE	Finished
STATUS DETAILS	None

Summary

This experiment serves as a tutorial on building a classification model using Azure ML. We will be using the Titanic passenger data set and build a model for predicting the survival.

Description

Enter the detailed description for your experiment.

Quick Help



Search experiment items



Saved Datasets



Trained Models



Data Format Conversions



Data Input and Output



Data Transformation



Feature Selection



Machine Learning



OpenCV Library Modules



Python Language Modules



R Language Modules



Statistical Functions



Text Analytics



Web Service



Deprecated



NEW



RUN HISTORY



SAVE



DISCARD CHANGES



RUN



SET UP WEB SERVICE



PUBLISH TO GALLERY

Tutorial: Building a classification model in Azure ML

In draft

Properties

Tutorial: Building a classification model in Azure ML > Titanic Dataset - Copy (2) > dataset

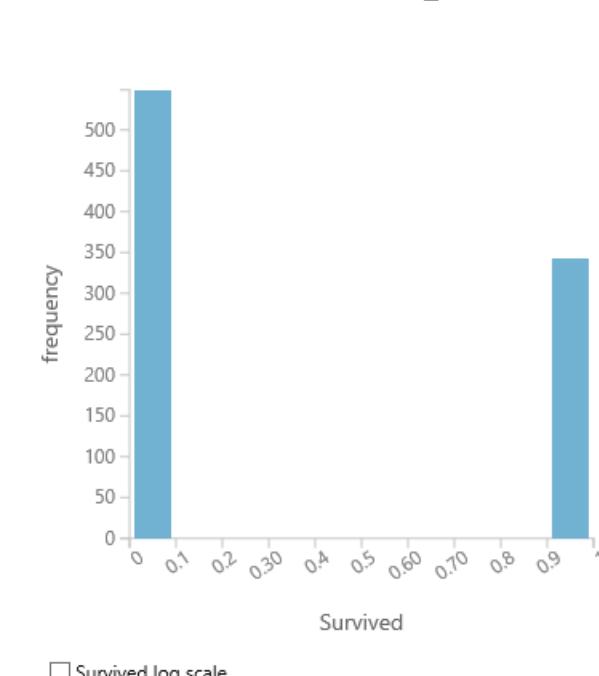


rows

891 12

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket
1	1	0	3	Braund, Mr. Owen Harris	male	22	1	0	A/5 21
2	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Thayer)	female	38	1	0	PC 175
3	3	1	3	Heikkinen, Miss. Laina	female	26	0	0	STON/310128
4	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35	1	0	113803
5	5	0	3	Allen, Mr. William Henry	male	35	0	0	373450
6	6	0	3	Moran, Mr. James	male		0	0	330877
7	7	0	1	McCarthy, Mr. Timothy J	male	54	0	0	17463
8	8	0	3	Palsson, Master. Gosta Leonard	male	2	3	1	349901

Survived Histogram

compare to 

NEW



RUN HISTORY



SAVE



DISCARD CHANGES



RUN



SET UP WEB SERVICE



PUBLISH TO GALLERY

← → ⌂ | 🔒 studio.azureml.net/Home/ViewWorkspace/ ?#Workspaces/Experiments/Experiment/ | 🔍 ☆ | ⌂ ⌂ ⌂ ⌂

Microsoft Azure Machine Learning | Home Studio Gallery PREVIEW recommender | ⌂ ⌂ ⌂ ⌂ ⌂

Search experiment items

◀ ▶

Anomaly Detection

Classification

- Multiclass Decision Forest
- Multiclass Decision Jungle
- Multiclass Logistic Regression
- Multiclass Neural Network
- One-vs-All Multiclass
- Two-Class Averaged Perceptron
- Two-Class Bayes Point Machine
- Two-Class Boosted Decision Tree
- Two-Class Decision Forest
- Two-Class Decision Jungle
- Two-Class Locally-Deep Support Vec...
- Two-Class Logistic Regression
- Two-Class Neural Network
- Two-Class Support Vector Machine

Clustering

Regression

Tutorial: Building a classification model in Azure ML

Finished running ✓

Properties

Train Model

Label column
Selected columns:
Column names: Survived

Launch column selector

START TIME
END TIME
ELAPSED TIME 0:00:00.000
STATUS CODE Finished
STATUS DETAILS Task output was present in output cache

Quick Help

Train a previously created classification or regression model
(more help...)

```
graph TD; Split((Split)) --> T1[Train Model 1]; Split --> T2[Train Model 2]; T1 --> S1[Score Model]; T2 --> S2[Score Model]; S1 --> E[Evaluate Model]; S2 --> E;
```

Run History

Save

Discard Changes

Run

Set Up Web Service

Publish to Gallery

+

NEW



In draft

Properties



Tutorial: Building a classification model in Azure ML

Tutorial: Building a classification model in Azure ML > Score Model > Scored dataset

rows columns

267 10

PasengerClass	Gender	Age	SiblingSpouse	ParentChild	FarePrice	PortEmbarkation	Scored Labels	Scored Probabilities
	male	20	1	1	15.7417	C	0	0.128143
	female	25	1	1	30	S	1	0.999319
	male	28	0	0	7.8958	C	0	0.40695
	female	28	1	1	22.3583	C	1	0.993964
	male	28	0	0	9.5	S	0	0.000195
	male	29	0	0	30	S	1	0.97861
	male	49	1	0	56.9292	C	1	0.932772
	male	24	0	0	7.1417	S	0	0.001666
	female	48	1	3	34.375	S	0	0.140264
	male	24	0	1	247.5208	C	0	0.028601
	male	48	1	0	52	S	0	0.000549
	female	36	1	0	17.4	S	0	0.007758
	female	33	0	2	26	S	1	0.999938

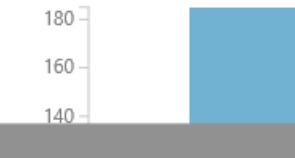
▶ Statistics

Mean	NaN
Median	NaN
Min	NaN
Max	NaN
Standard Deviation	NaN
Unique Values	2
Missing Values	0
Feature Type	Categorical Score

▶ Visualizations

Scored Labels

Histogram

compare to 

RUN HISTORY

SAVE

DISCARD CHANGES

RUN

SET UP WEB SERVICE

PUBLISH TO GALLERY



titanic web service

[DASHBOARD](#) [CONFIGURATION](#)[General](#)[Published experiment](#)[View snapshot](#) [View latest](#)[Description](#)

No description provided for this web service.

[API key](#)

MFY5ohjD/KM0/V3PpKLDB7iCdw1FqNTKcd0XJrv8ony4iBg/LfbB3a7cAw8GCJSuE5adORQckfgzJ2KKWCSYg==

[Default Endpoint](#)[API HELP PAGE](#)[TEST](#)[APPS](#)[LAST UPDATED](#)[REQUEST/RESPONSE](#)[Test](#)[Download Excel Workbook](#)

9/29/2015 6:31:36 PM

[BATCH EXECUTION](#)

9/29/2015 6:31:36 PM

[Additional endpoints](#)

Number of additional endpoints created for this web service: 0

[Manage endpoints in Azure management portal](#)

NEW



DELETE



Titanic Survival Predictor

Find out your statistical chances of survival based upon your circumstances to see if you would survive the Titanic disaster. Given your gender, age, fare price, accommodation class, the people you came with you, and the port from which you departed.

Would you survive the Titanic disaster?

What passenger class are you?

First Class Second Class Third Class

What is your gender?

Male Female

How old are you?

0 80



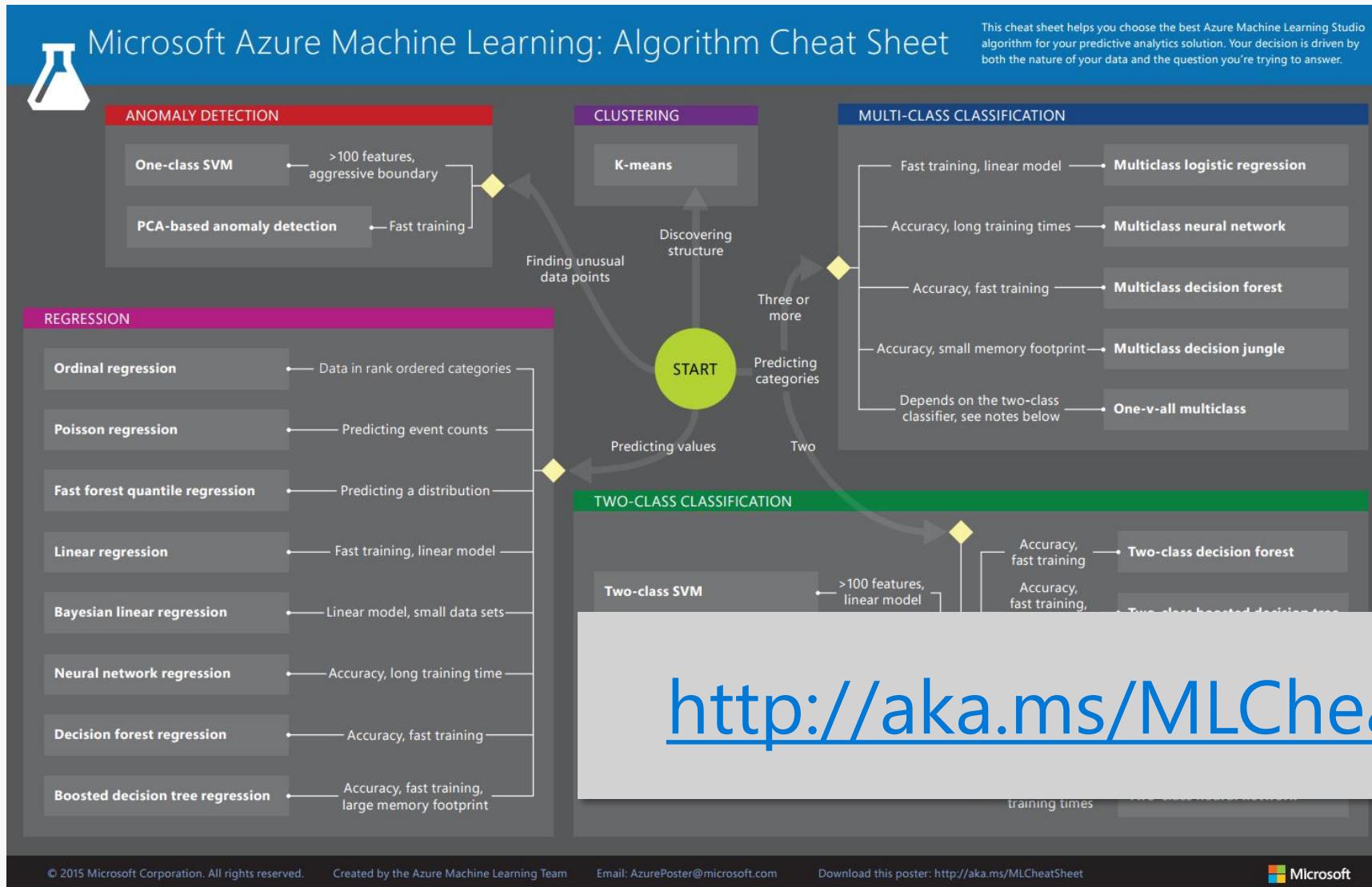
PREDICTION TABLE		
Show <input type="button" value="10"/> entries	Search:	
Chances of Survival	Prediction	Message
No data available in table		

Showing 0 to 0 of 0 entries

Previous Next

Contact Us

When which algorithm?



<http://aka.ms/MLCheatSheet>

Machine Learning Algorithms – Explained!

The screenshot shows a video player interface on the Channel 9 website. At the top, there's a navigation bar with links for 'Follow us @ch9', 'Subscribe to Channel 9', 'Admin', 'Profile', and 'Sign Out'. Below that is a search bar and a magnifying glass icon. The main header says 'Channel 9' with a yellow 'C9' logo to its left. To the right are 'BROWSE', 'TOPICS', 'FORUMS', and 'EVENTS' buttons. Underneath, there are 'Blogs' and 'TechTalk' links. The main content area is titled 'Episode 48 - Machine Learning Algorithms'. Below the title, it says 'Posted: Oct 21, 2015 at 6:55PM' and 'By: Olivia Klose, Seth Juarez'. It has a 4-star rating from 9 reviews and 6,714 views. There are 'edit details' and 'change status' buttons. Below this is a social sharing section with icons for YouTube, 8 pts., Twitter, 59, Facebook, Like, and 70. A large play button is overlaid on the video frame. The video frame itself shows two hosts, a man and a woman, standing behind a desk. The man is wearing a red and white checkered shirt, and the woman is wearing a green t-shirt with 'NO SHORT-CUTS' printed on it. They are positioned in front of a large screen displaying a flowchart of a machine learning process: 'data' leads to 'model', which then leads to 'predict'. The Microsoft logo is at the bottom left, and a timer at the bottom center indicates the video is 44 minutes and 44 seconds long. At the very bottom, there are download links for MP3, High Quality MP4, and Mid Quality MP4.

<http://aka.ms/MExplained>

Free Online MVA Course: Recommenders

Microsoft Virtual Academy | Kurse ▾ Nach Kursen suchen Anmeldung

Level 200 | Veröffentlicht: 17 September 2015

Building Recommendation Systems in Azure

Kursleiter: Olivia Klose

34 ★★★★★ | Bewerten

Lernplan 0% ABGESCHLOSSEN

Inhalt

Machine Learning, or Data Science, is one of today's hottest buzzwords. The scenarios in which Azure Machine Learning can be applied are diverse and can range from predict ... Mehr

Zeit Alle anzeigen

- [+ 01 | Machine Learning & Recommenders](#)
- [+ 02 | Targeted Marketing](#)
- [+ 03 | Collaborative Filtering – Association Rules in R & AzureML](#)
- [+ 04 | Content-Based Filtering & Hybrid: MatchBox Recommender](#)
- [+ 05 | Azure Marketplace](#)

Olivia Klose | Technical Evangelist

WEITER | 01 | Machine Learning & Recommenders AutoPlay

<http://aka.ms/recommender-mva>



Further Resources

Azure ML Studio <http://studio.azureml.net>

Cortana Intelligence Gallery <https://gallery.cortanaintelligence.com>

Cognitive Service <http://microsoft.com/cognitive-services>

Bot Framework <https://dev.botframework.com/>

Machine Learning Cheat Sheet <http://aka.ms/MLCheatSheet>

Machine Learning Algorithms explained! <http://aka.ms/MExplained>

MVA Recommenders <http://aka.ms/recommender-mva>