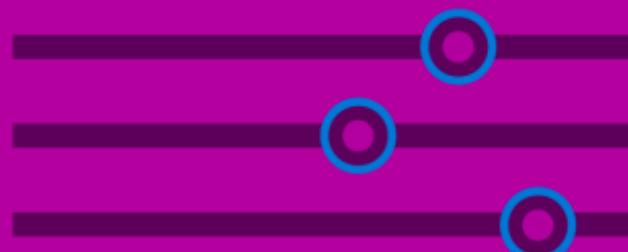




COGNITIVE SERVICES ADDING SMARTS TO YOUR APPLICATIONS

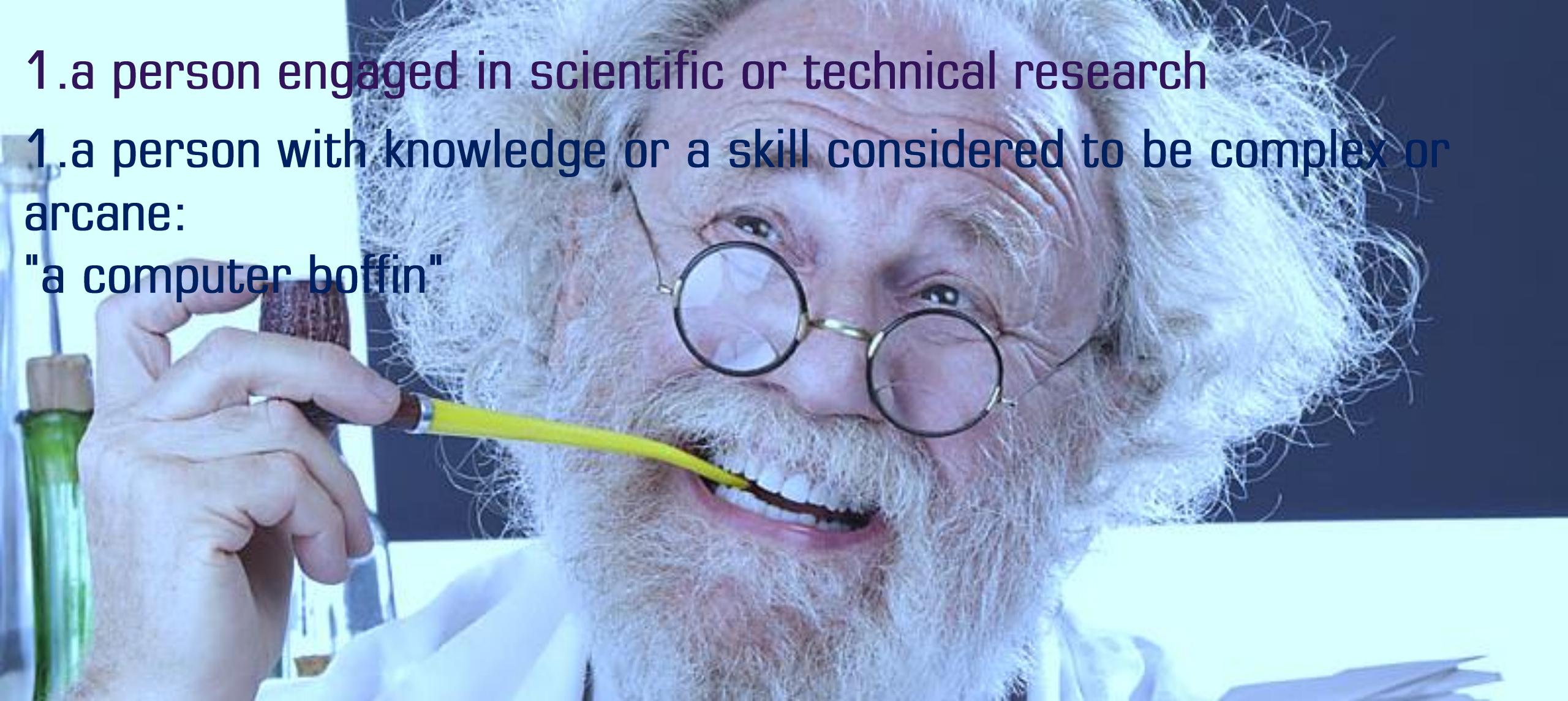
Lee Stott
@Lee_Stott



1.a person engaged in scientific or technical research

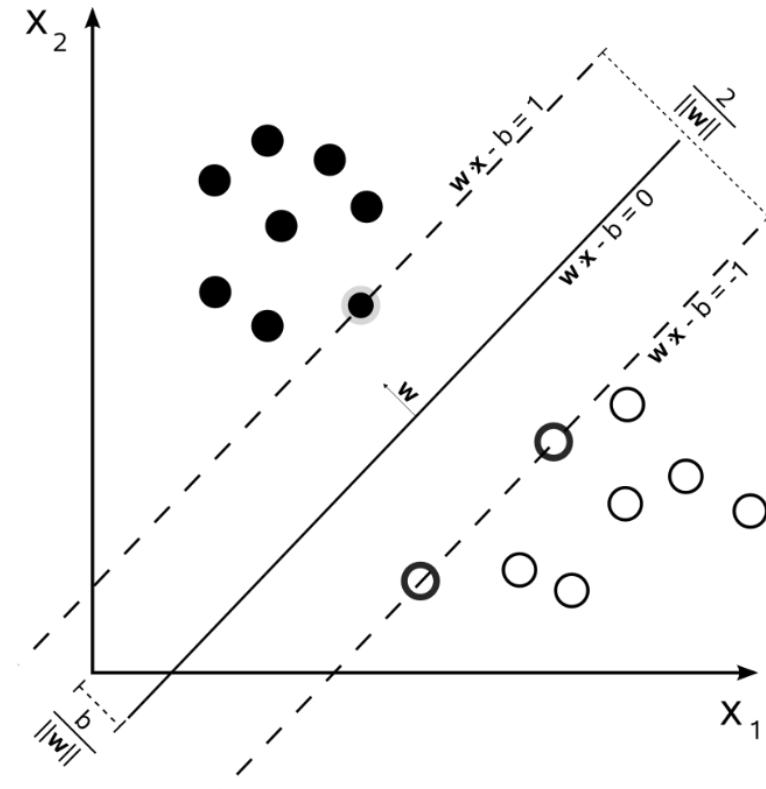
1.a person with knowledge or a skill considered to be complex or arcane:

"a computer boffin"



THE “BOFFIN”

Decision tree learning
Association rule learning
Artificial neural networks
Support vector machines
Bayesian networks
Reinforcement learning
Representation learning
Similarity and metric learning
Sparse dictionary learning
Genetic algorithms



BOFFINS DO SCARY THINGS



WE KEEP OURS IN CAMBRIDGE

Microsoft Imagine X



IN A BEAUTIFUL OFFICE

Microsoft Imagine 

SCIENTIFIC ART





GRAND PIANO IN THE FOYER

DATA SCIENCE IS FOR MUGGLES TOO





MACHINE LEARNING

COGNITIVE SERVICES

USING COGNITIVE SERVICES



WHAT IS MACHINE LEARNING?





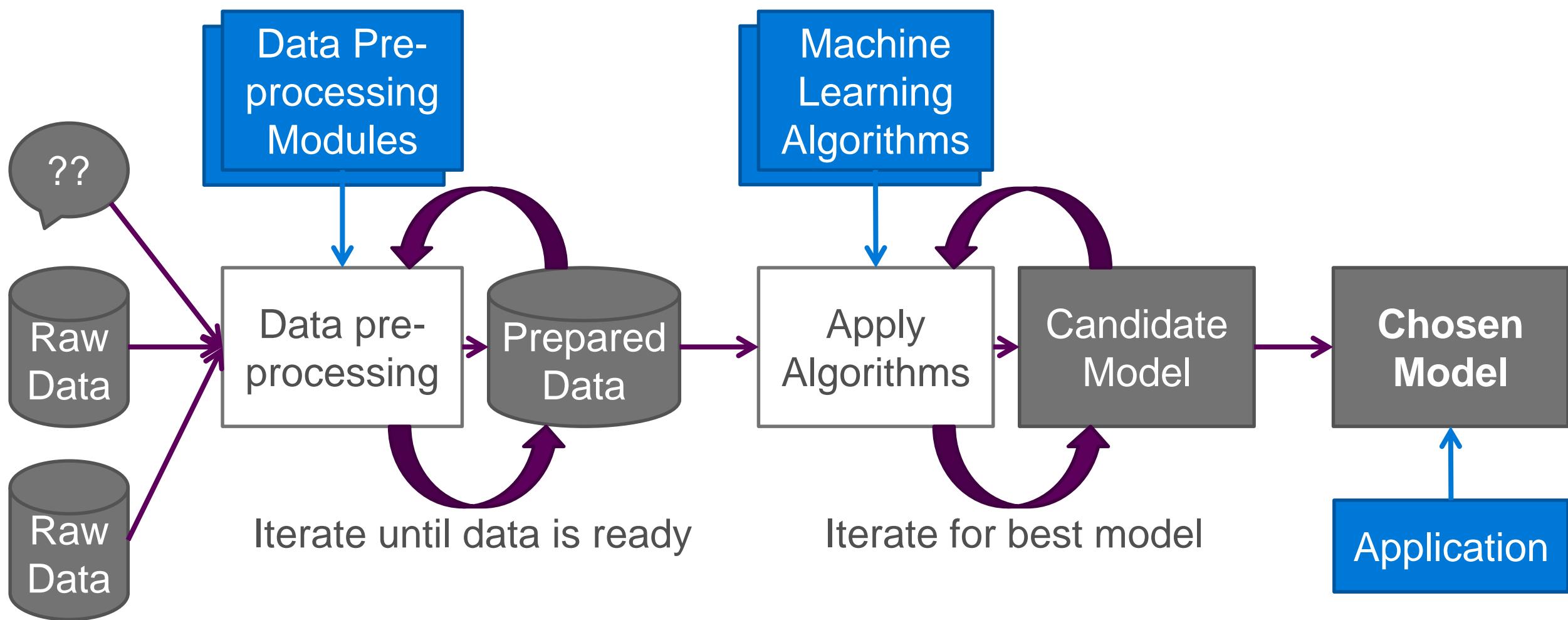
MACHINE LEARNING FINDS
COMPLEX PATTERNS IN DATA
AND ALLOWS APPLICATIONS TO
GAIN INSIGHTS IN NEW DATA
USING THOSE PATTERNS



Fraud Detection
Revenue Predictions
Customer Churn
Recommendations
Predictive Maintenance
Computer Vision
Search
Natural Language Processing
Sentiment Analysis
Motion Detection
Translation
Content Moderation

ANY SCENARIO
WHERE A PATTERN
CAN BE RECOGNISED
IN DATA

ML APPLICATIONS



MACHINE LEARNING PROCESS



AZURE MACHINE LEARNING

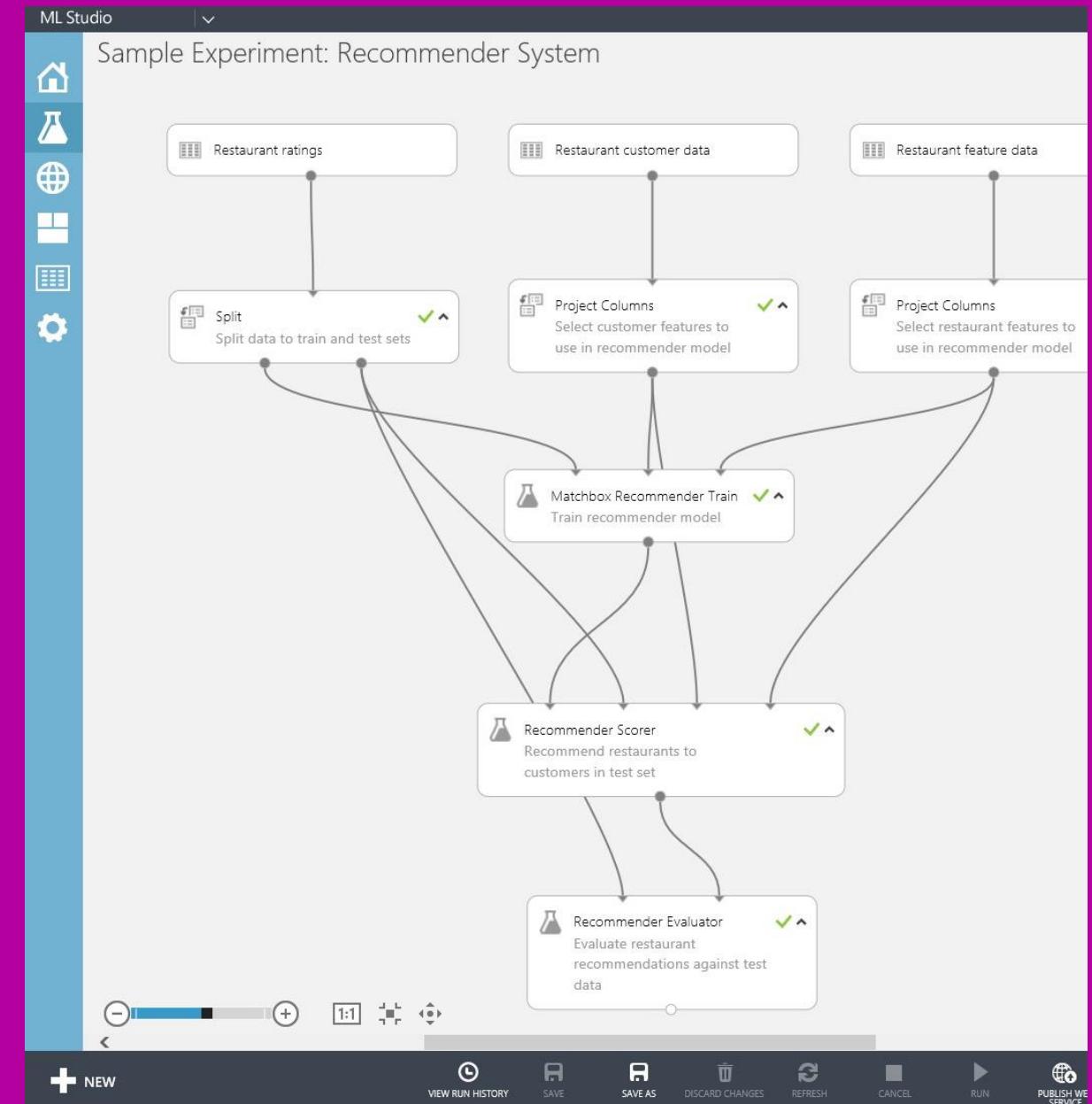
[HTTPS://STUDIO.AZUREML.NET](https://studio.azureml.net)

WHAT IS AZURE MACHINE LEARNING?

Data Pre-Processing Modules

Machine Learning Algorithms

REST APIs



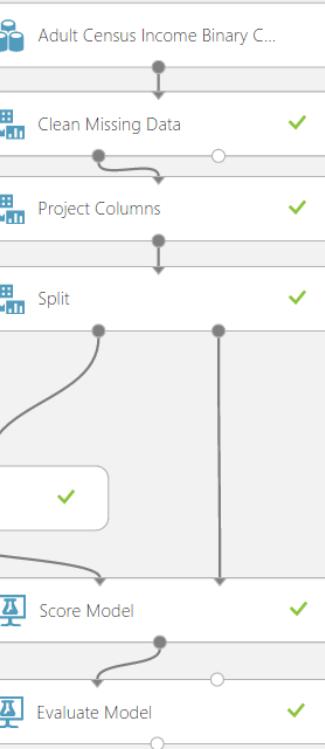
- Search experiment items
- Saved Datasets
- Trained Models
- Data Format Conversions
- Data Input and Output
- Data Transformation
- Feature Selection
- Machine Learning
- OpenCV Library Modules
- Python Language Modules
- R Language Modules
- Statistical Functions
- Text Analytics
- Deprecated
- Web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

Training experiment

Scoring experiment

Binary Classification: Income Prediction

Finished running ✓



Properties

Experiment Properties

START TIME 2/16/2015 ...
END TIME 2/16/2015 ...
STATUS CODE Finished
STATUS DETAILS None
 Disable upgrades

Summary

This experiment demonstrates how we can build a binary classification model to predict income levels of adult individuals. The process includes training, testing and evaluating the model.

Description

Enter the detailed description for your experiment.

Quick Help

+ NEW

VIEW RUN HISTORY

SAVE

SAVE AS

DISCARD CHANGES

REFRESH

CANCEL

RUN

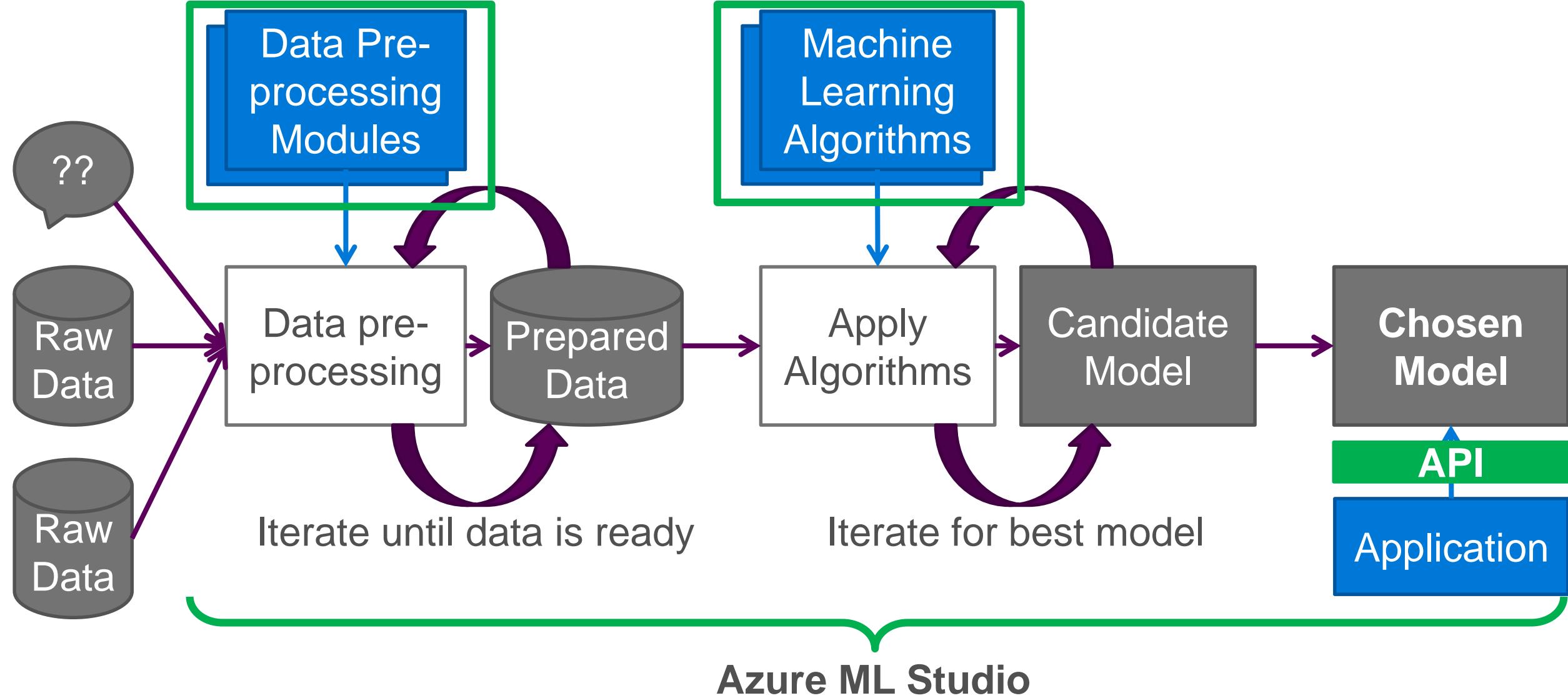
PREPARE WEB SERVICE

PUBLISH TO GALLERY

UPDATE SCORING EXPERIMENT

AZURE ML STUDIO

Microsoft Imagine



WHAT AZURE ML PROVIDES



IT'S STILL FOR BOFFINS!



Microsoft Imagine 

MICROSOFT COGNITIVE SERVICES

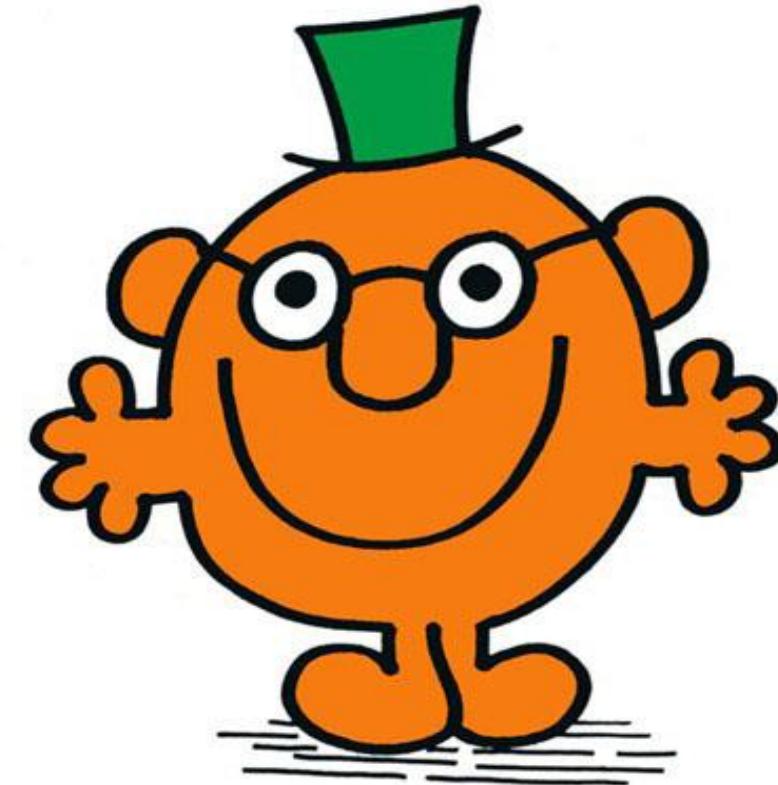
[HTTPS://WWW.MICROSOFT.COM/COGNITIVE](https://www.microsoft.com/cognitive)

ADD SMARTS TO YOUR APP



- ▶ Machine Learning Backend
- ▶ Simple REST APIs
- ▶ Free or Cheap

MR. CLEVER



Vision

- Computer Vision
- Emotion
- Face
- Video

Speech

- Custom Recognition Intelligence Service
- Speaker Recognition
- Speech

Language

- Bing Spell Check
- Language Understanding Intelligent Service
- Linguistics Analysis
- Text Analytics
- Web Language Model

Knowledge

- Academic Knowledge
- Entity Linking Intelligence Service
- Knowledge Exploration Service
- Recommendations

Search

- Bing Autosuggest
- Bing Image Search
- Bing News Search
- Bing Video Search
- Bing Web Search

microsoft.com/cognitive

21 REST APIs

Microsoft Imagine X

DEMO



COGNITIVE SERVICES IN ACTION

EMOTION



For the demo below please click the image samples to see how Emotion API uses world-class machine learning techniques to provide these results. You can also click the open image button or drag-and-drop to upload your own images, or input a URL for a remote image. We don't keep your images for this demo.



Image URL

Detection Result:

JSON:

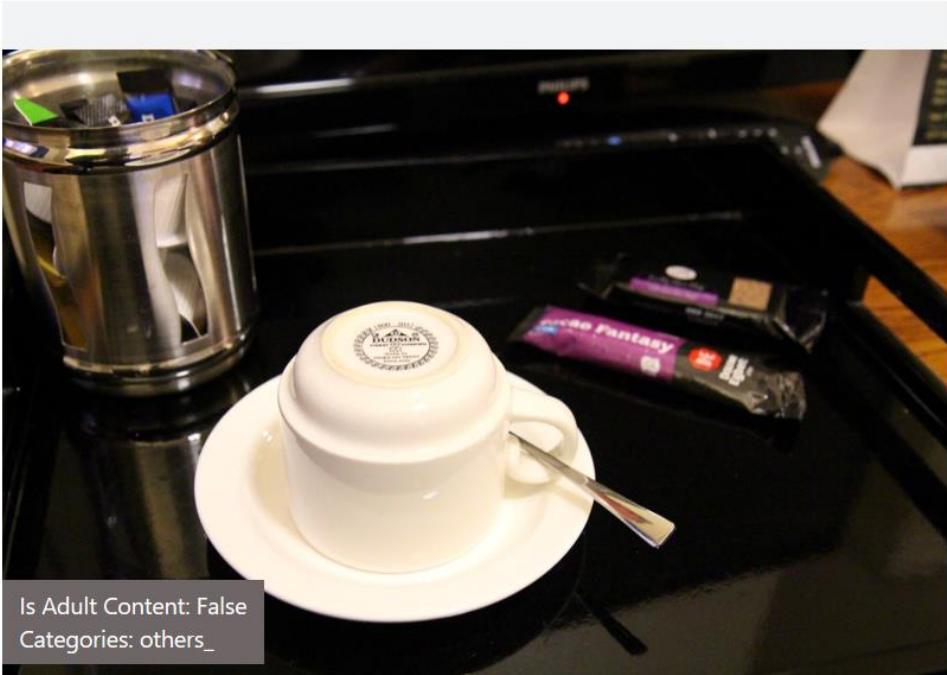
```
[  
  {  
    "faceRectangle": {  
      "left": 126,  
      "top": 137,  
      "width": 78,  
      "height": 78  
    },  
    "scores": {  
      "anger": 0.000403151324,  
      "contempt": 0.000973990536,  
      "disgust": 0.000574105,  
      "fear": 7.65503955e-7,  
      "happiness": 0.892577469,  
      "neutral": 0.105048679,  
      "sadness": 0.000413767964,  
      "surprise": 0.000008061223  
    }  
  }  
]
```



JSON RESPONSE

Apply the adult/racy settings to enable automated restriction of adult content. Identify image types and color schemes in pictures.

Please try vision feature analysis demo by uploading a local image, or providing an image URL. We don't keep your images for this demo unless you give us permission.



Features:	
Feature Name	Value
Description	{ "type": 0, "captions": [{ "text": "a blender sitting next to a cup of coffee", "confidence": 0.6214748949962084 }] }
Tags	[{ "name": "cup", "confidence": 0.9908850789070129 }, { "name": "indoor", "confidence": 0.9871270656585693 }, { "name": "coffee", "confidence": 0.9646278023719788 }, { "name": "kitchen appliance", "confidence": 0.18305939435958862 }]
Image Format	Jpeg
Image Dimensions	1620 x 1080
Clip Art Type	0 Non-clipart
Line Drawing Type	0 Non-LineDrawing
Black & White Image	False

COMPUTER VISION



I think it's a white sink sitting under a bathroom mirror.



How did I do?

CAPTIONBOT.AI

Microsoft Imagine X



TwinsOrNot.net

Are you twins? #TwinsOrNotRobot

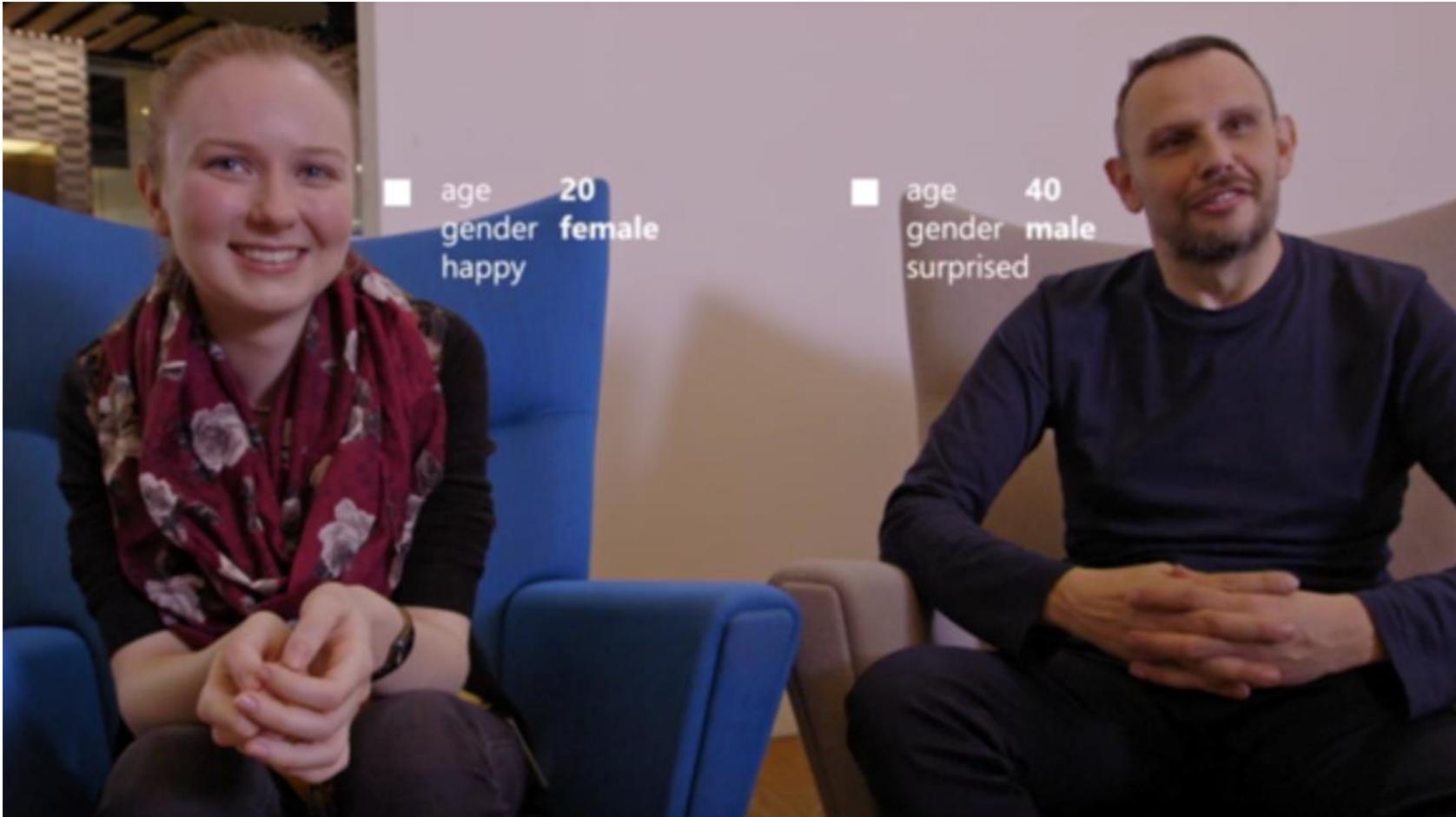


68%

I'm actually impressed

TWINSORNOT.NET

Microsoft Imagine X



[HTTPS://WWW.YOUTUBE.COM/WATCH?TIME_CONTINUE=1&V=R2MC-NUAMMK](https://www.youtube.com/watch?time_continue=1&v=R2MC-NUAMMK)

BOTS



DEV.BOTFRAMEWORK.COM



DEMO



WHAT IF I HAD A BEARD?



PROJECTMURPHY.NET





projectMurphy.net

what if Hillary Clinton was Donald trump? #ProjectMurphy

PROJECTMURPHY.NET

DEMO



SKYSCANNER BOT

Home + 📱

CONTACTS RECENT

All ▾

- Echo / Sound Test Service
- Murphy ✅
- Skyscanner ✅

W

start over 23:46

Please tell me the city you'd like to visit. 23:46

I'd like to book a flight to London for next weekend going from glasgow 23:47

23:47

A flight from Glasgow, United Kingdom to London, United Kingdom...
Departing on Friday, October 7, 2016

Change destination

Change origin city

Change outbound date

When are you coming back? 23:47

One way

SKYPE - SKYSCANNER

LANGUAGE UNDERSTANDING



The following weekend I'd like **to travel** to London from Glasgow

I'd like to **book** a flight to London for next weekend going from Glasgow

London. Glasgow. Fly. Weekend. Thank you

Entities

The Following weekend I'd like to travel to London
from Glasgow

I'd like to book a flight to London for next
weekend going from Glasgow

London. Glasgow. Fly. Weekend. Thank you



DEMO



HOW HAPPY AND LUIS DEMO

What would you like to know about these people?

We found 4 faces. We sorted them by happiness 😊



How Happy

App Settings

Publish

Intents

MostEmotional

None

SortedByEmotion

SpecificPosition

LeastEmotional

Entities

emotion

Pre-built Entities

ordinal

Regex Features

No patterns added

Phrase List Features

No phrase list features added

New utterances

Search

Suggest

Review labels

Please, enter an utterance.



Performance analysis



Click on the refresh icon to load or refresh the performance analysis pane.

Cognitive LUIS: Edit Application + luis.ai/application/ef3be68b-c416-4027-b8c3-94d952f3810c

LUIS Go to Preview My Applications About Help Docs Support Sign Out

New utterances Search Suggest Review labels Performance analysis

How Happy App Settings Publish

Intents

- MostEmotional
- None
- SortedByEmotion
- SpecificPosition
- LeastEmotional

Entities

- emotion

Pre-built Entities

- ordinal

Regex Features

No patterns added

Phrase List Features

No phrase list features added

who is the 5th saddest

This utterance has already been labeled. You can make changes to the label, or type in a different utterance.

who is the 5th saddest

ordinal

Submit

SpecificPosition(1)

Click on the refresh icon to load or refresh the performance analysis pane.

Train Last train completed: 06/10/2016 00:11:07 Microsoft

←→↻

luis.ai/application/ef3be68b-c416-4027-b8c3-94d952f3810c

≡

LUIS

Go to PreviewMy ApplicationsAboutHelp DocsSupport

How Happy

New utterancesSearchSuggestReview labels⚙ App Settings➡ PublishIntents ⊕

MostEmotional

None

SortedByEmotion

SpecificPosition

LeastEmotional

Entities ⊕emotion ▼Pre-built Entities ⊕

ordinal

Regex Features ⊕

No patterns added

Phrase List Features ⊕

who is the 4th happiest



who is the 4th happiest

SpecificPosition(0.75) ▼Submit



How Happy

New utterances

Search

Suggest

Review labels

Performance analysis



App Settings

Publish

Intents 

MostEmotional

None

SortedByEmotion

SpecificPosition

LeastEmotional

Entities emotion Pre-built Entities 

ordinal

Regex Features 

No patterns added

Phrase List Features 

No phrase list features added

HTTP service



Publish Current Application to URL for access via HTTP

Status: Published on 05/10/2016 23:42:11

Update published application

Query:

URL: <https://api.projectoxford.ai/luis/v1/application?id=ef3be68b-c416-4027-b8c3-94d952f3810c&subscription-key=8dc5dbe2f3ac45ee883bbef6f67d58bb>

Download web service usage logs

Download logs



Last train completed: 06/10/2016 00:11:07



Click on the refresh icon to load or refresh the performance analysis pane.

← → ⌂ | 🔒 api.projectoxford.ai/luis/v1/application?id=ef3be68b-c416-4027-b8c3-94d952f3810c&subscription-key=8dc5dbe2f3ac45ee

```
{  
    "query": "how is the 4th happiest",  
    "intents": [  
        {  
            "intent": "SpecificPosition",  
            "score": 0.8940012  
        },  
        {  
            "intent": "MostEmotional",  
            "score": 0.0558573343  
        },  
        {  
            "intent": "None",  
            "score": 0.006495554  
        },  
        {  
            "intent": "SortedByEmotion",  
            "score": 0.000766206067  
        },  
        {  
            "intent": "LeastEmotional",  
            "score": 3.22568745E-08  
        }  
    ],  
    "entities": [  
        {  
            "entity": "4th",  
            "type": "builtin.ordinal",  
            "startIndex": 11,  
            "endIndex": 13,  
            "score": 0.999942958  
        },  
        {  
            "entity": "happiest",  
            "type": "emotion::happiness",  
            "startIndex": 15,  
            "endIndex": 22,  
            "score": 0.832459  
        }  
    ]  
}
```

QUESTIONS

ENTER THE COGNITIVE CHALLENGE

[HTTP://GITHUB.COM/MSFTIMAGINE/COMPUTERSCIENCE](http://github.com/msftimagine/computerscience)

[HTTP://AKA.MS/FACULTYUK](http://aka.ms/facultyuk)

[HTTP://WWW.MICROSOFT.COM/UNIVERSITY](http://www.microsoft.com/university)

Lee Stott

@Lee_Stott

