

*Microsoft Cognitive Services*

# Applied AI: Real-World Use Cases for Azure Cognitive Services



# Paige Bailey

*Sr. Cloud Developer Advocate*

## Work Experience

- Focus at Microsoft is *machine learning* and *artificial intelligence*.
- Prior to joining Microsoft, was a *data scientist* and *geophysical application developer* in the energy industry for 5 years.
- *GIS Technician* (Esri products) for two years.

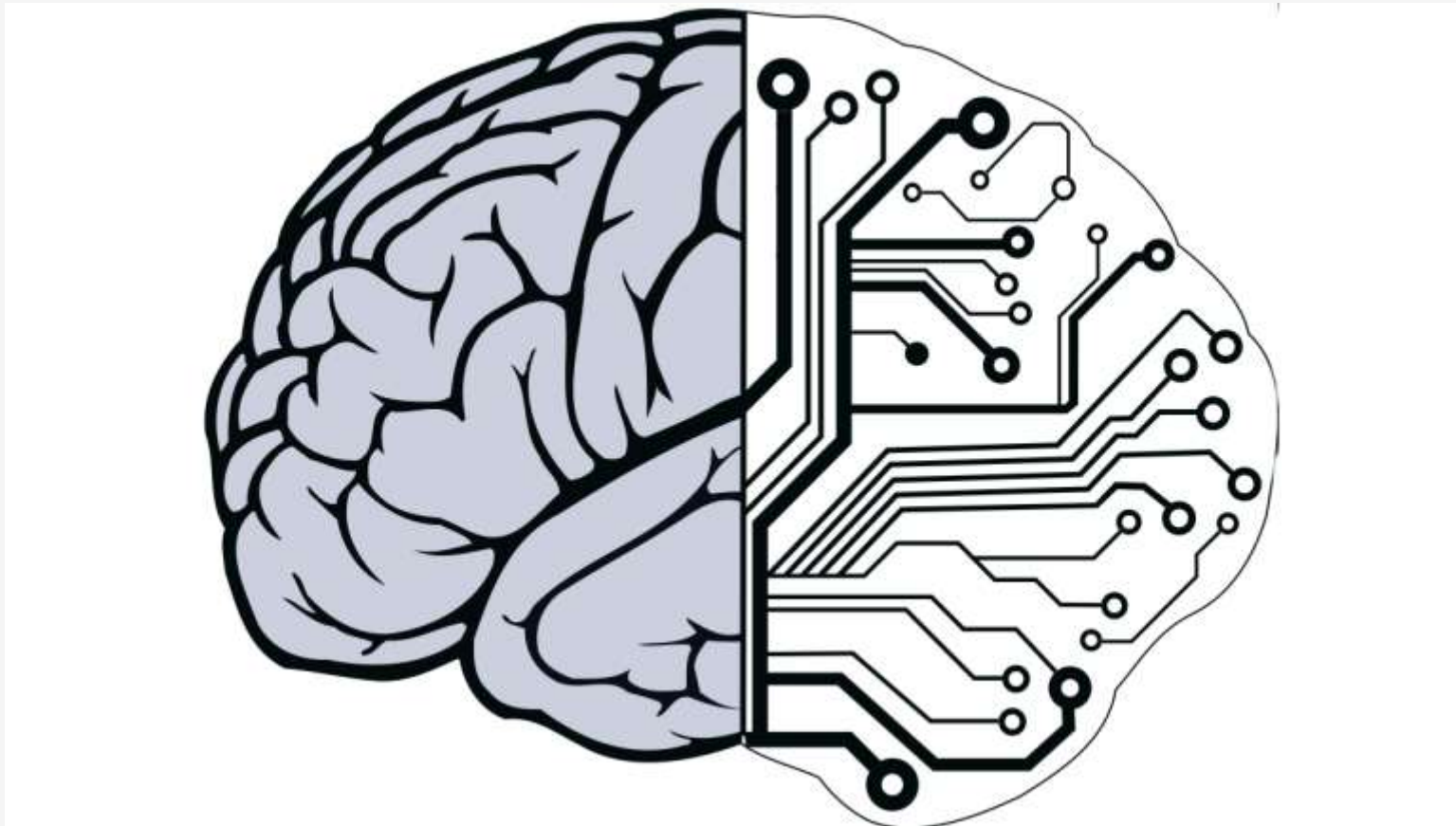
## Toolkit

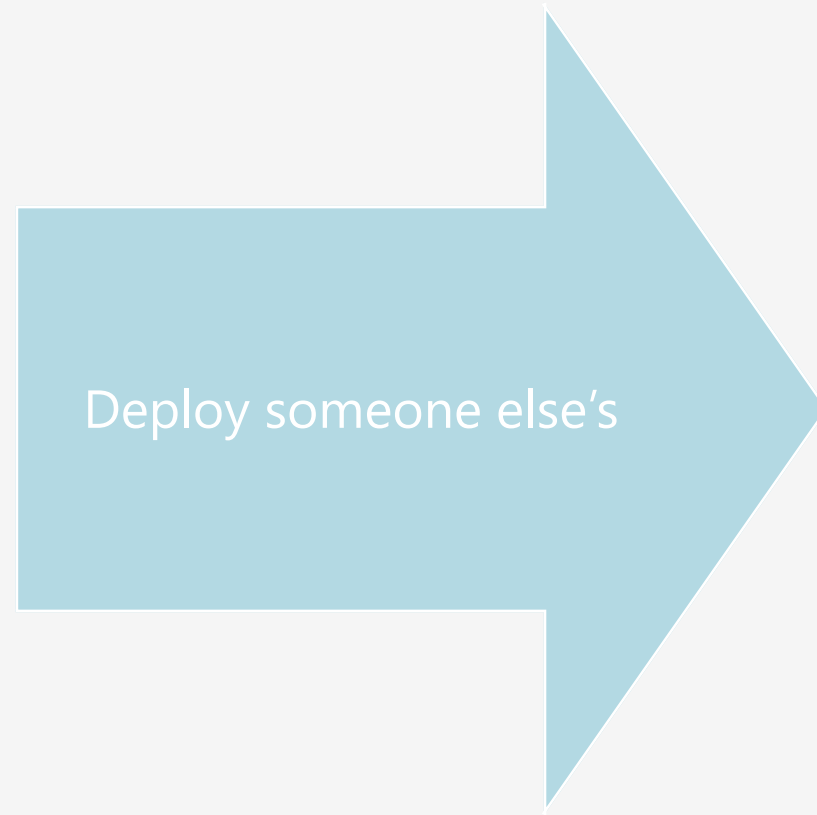
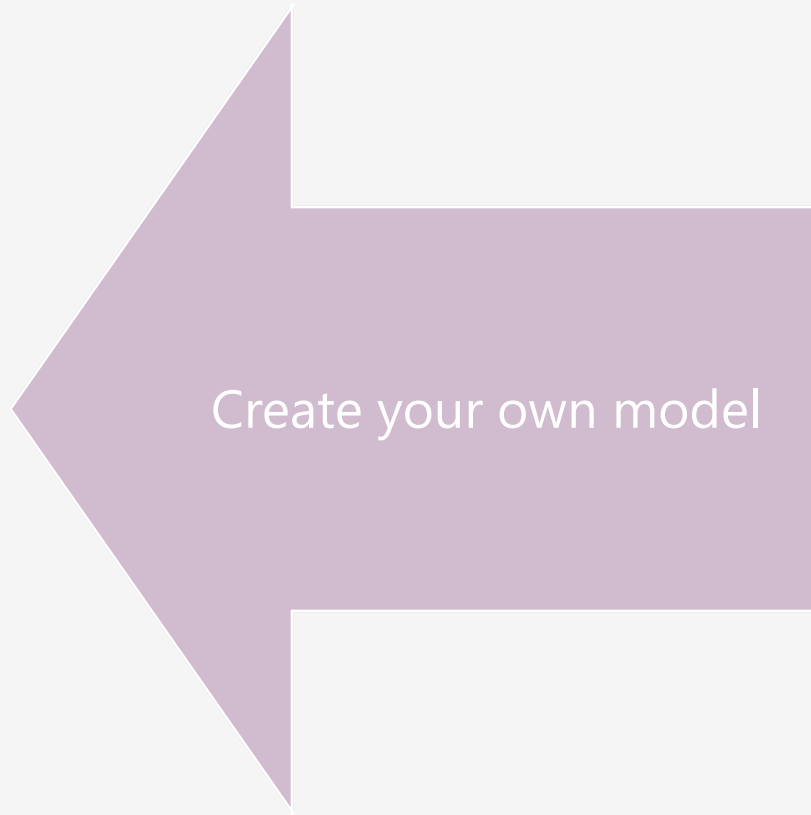
- Python (10 years)
- R (4 years)
- Spark, Kafka, Hive, HBase (2 years)

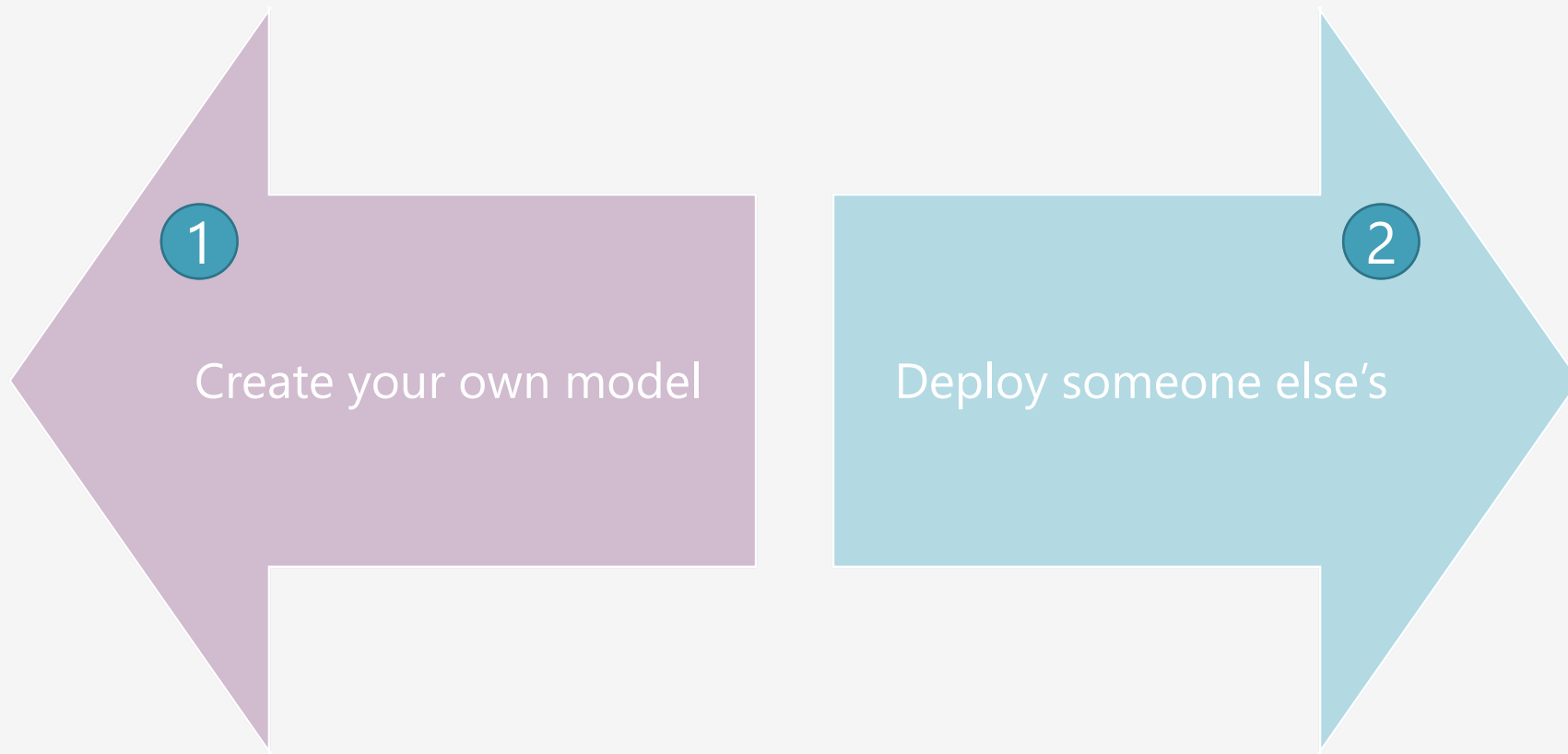
**Location:** *Austin, TX*

**Twitter:** *@DynamicWebPaige*



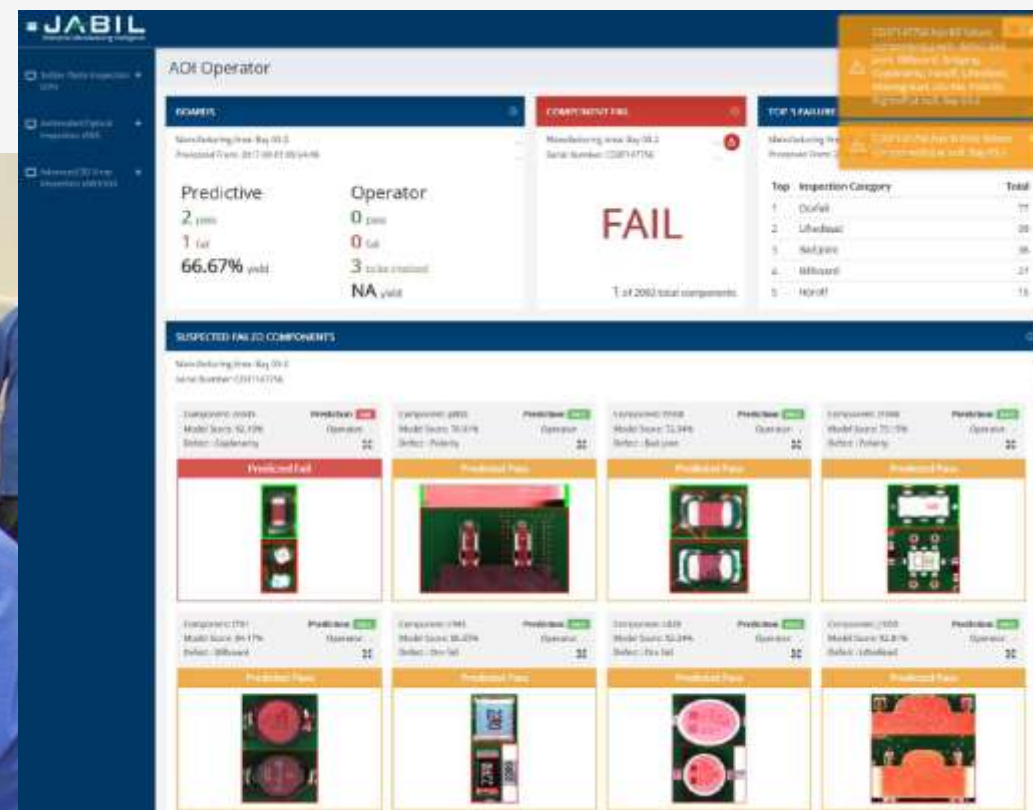






# Creating Your Own Model





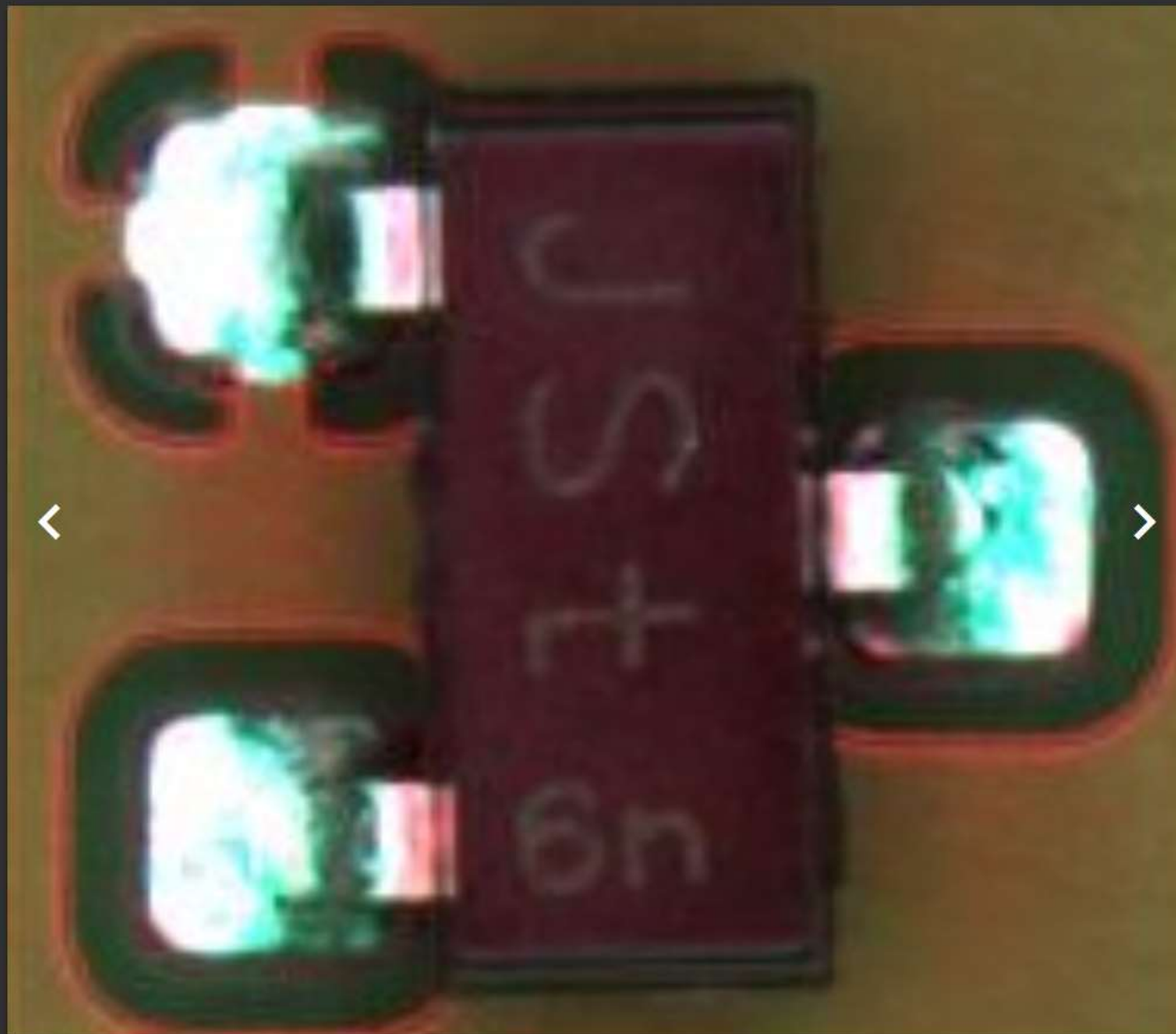
RKZ123610-1-2017-02-22

RKZ323220-1-2017-02-22

RYN901641-2-2017-04-01

RKZ123210-1-2017-05-10

## Optical Image Analysis





RKZ123610-1-2017-02-22



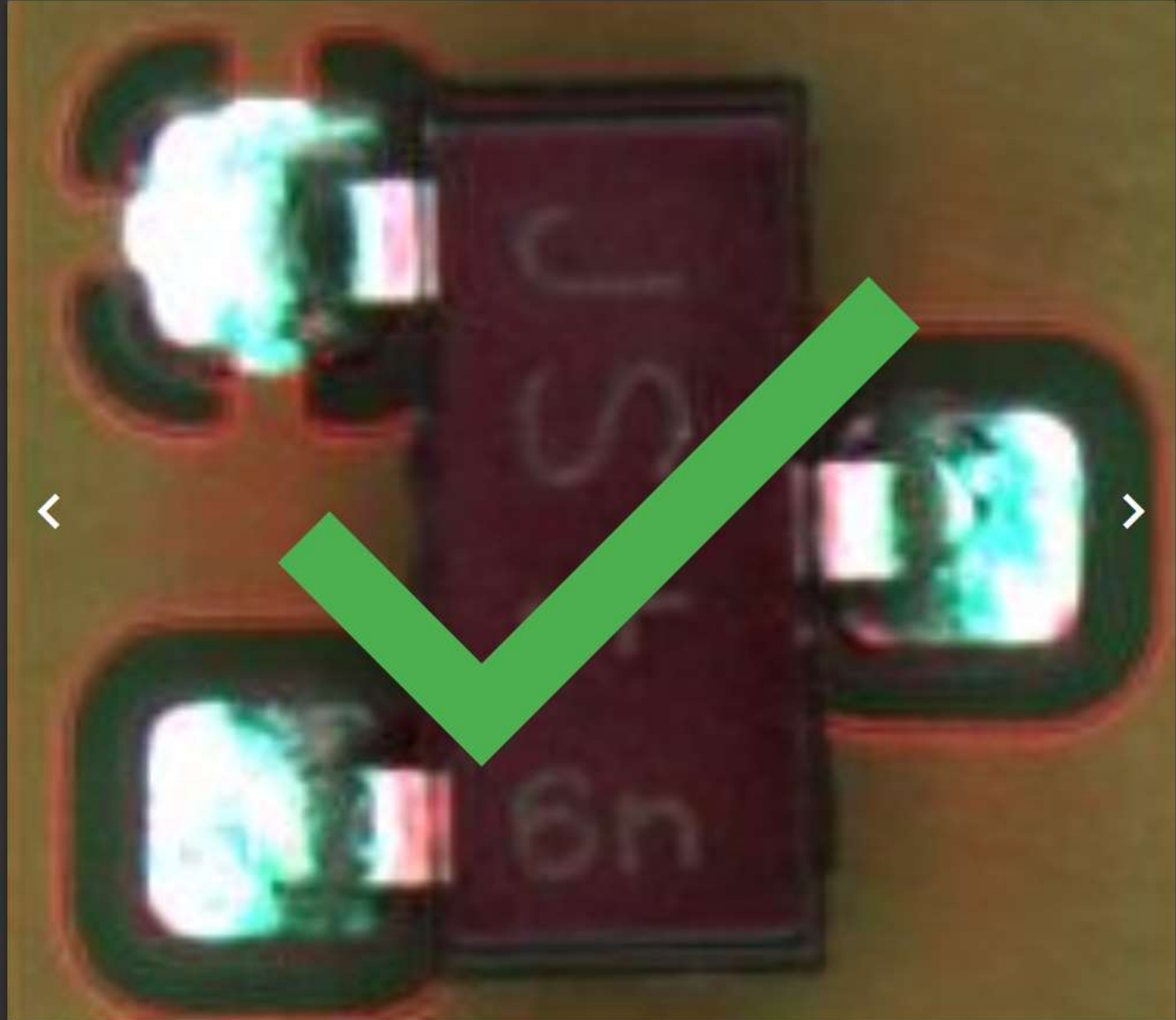
RKZ323220-1-2017-02-22

RYN901641-2-2017-04-01

RKZ123210-1-2017-05-10



## Optical Image Analysis



RKZ123610-1-2017-02-22



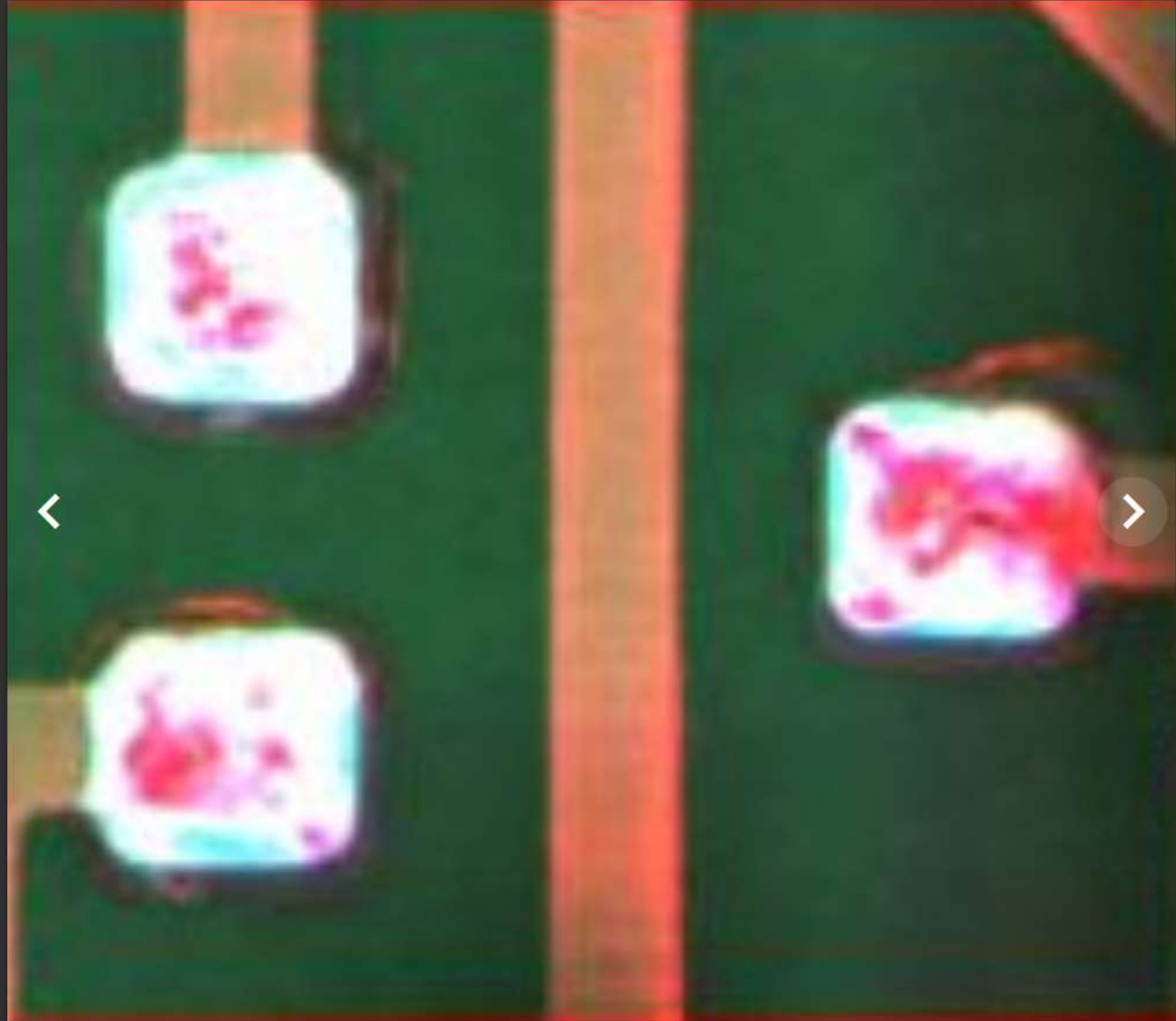
RKZ323220-1-2017-02-22

RYN901641-2-2017-04-01

RKZ123210-1-2017-05-10



## Optical Image Analysis



RKZ123610-1-2017-02-22 ✓

RKZ323220-1-2017-02-22 ✗

RYN901641-2-2017-04-01

RKZ123210-1-2017-05-10

## Optical Image Analysis



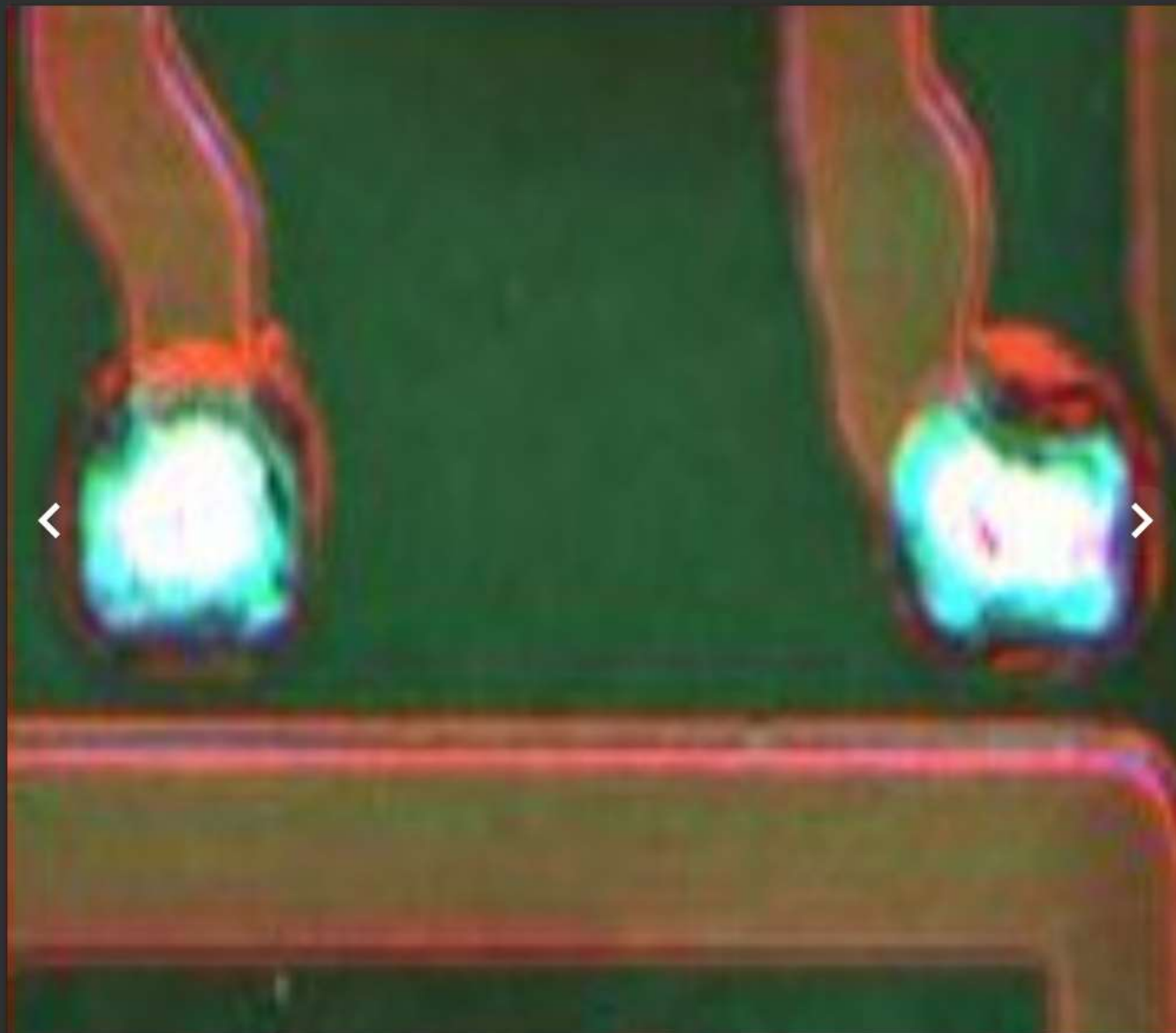
RKZ123610-1-2017-02-22 ✓

RKZ323220-1-2017-02-22 ✗

RYN901641-2-2017-04-01 ✓

RKZ123210-1-2017-05-10

## Optical Image Analysis





RKZ123610-1-2017-02-22 ✓

RKZ323220-1-2017-02-22 ✗

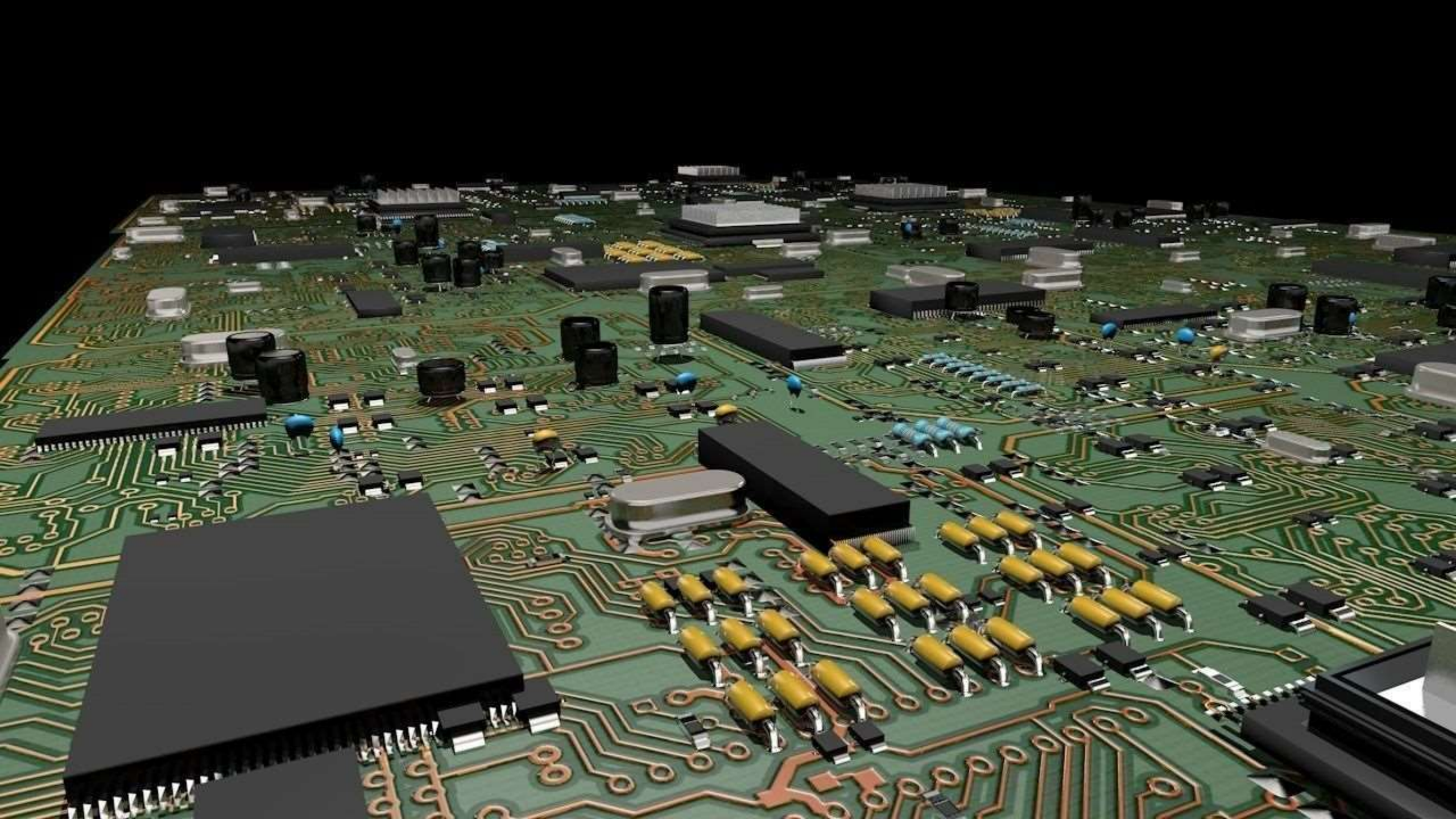
RYN901641-2-2017-04-01 ✓

RKZ123210-1-2017-05-10 ✗

## Optical Image Analysis







*Creating a Machine Learning Model*

# Data Science Virtual Machines

## Azure Machine Learning Workbench

### Azure Notebooks

*Azure Machine Learning Case Study:*

# Jabil Circuitboards

*Creating a Machine Learning Model*

# Data Science Virtual Machines

## Azure Machine Learning Workbench

### Azure Notebooks



*Data Science Virtual Machines*

[https://aka.ms/](https://aka.ms/DSVMs)  
**DSVMs**

---

Experience Level: *Intermediate* -- // -- *Developers, Data Analysts*



*Data Science Virtual Machines*

<https://aka.ms/>

AMLWorkbench

---

Experience Level: *Intermediate* -- // -- *Developers, Data Analysts*

*Azure Notebooks*

<https://aka.ms/>

# AzureNotebooks

---

Experience Level: *Advanced* -- // -- *Data Scientists, Data Analysts*

# Deploying Someone Else's

*Deploying Machine Learning Models on Azure*

# Microsoft Excel

## Azure Machine Learning Studio

### Cognitive Services





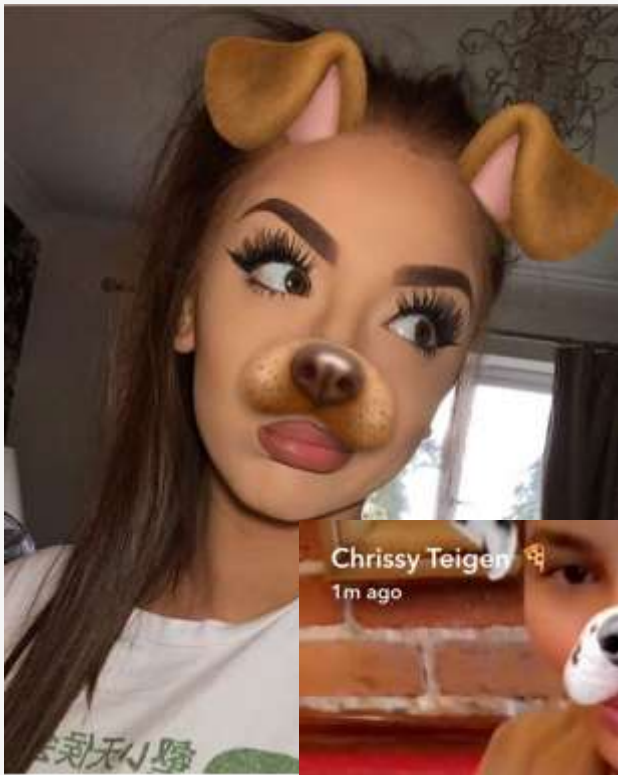




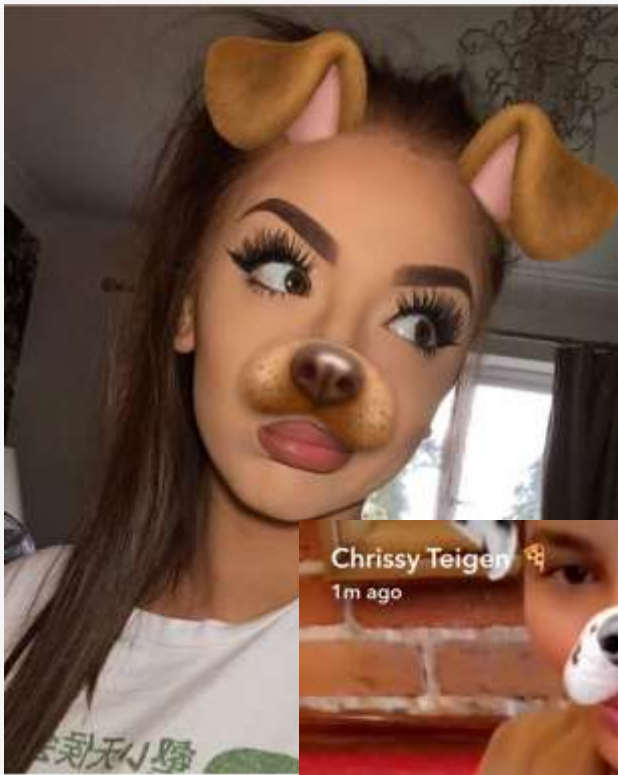
*Why, you stuck-up, half-witted, scruffy-looking nerf herder!*



*Why, you stuck-up, half-witted, scruffy-looking nerf herder!*





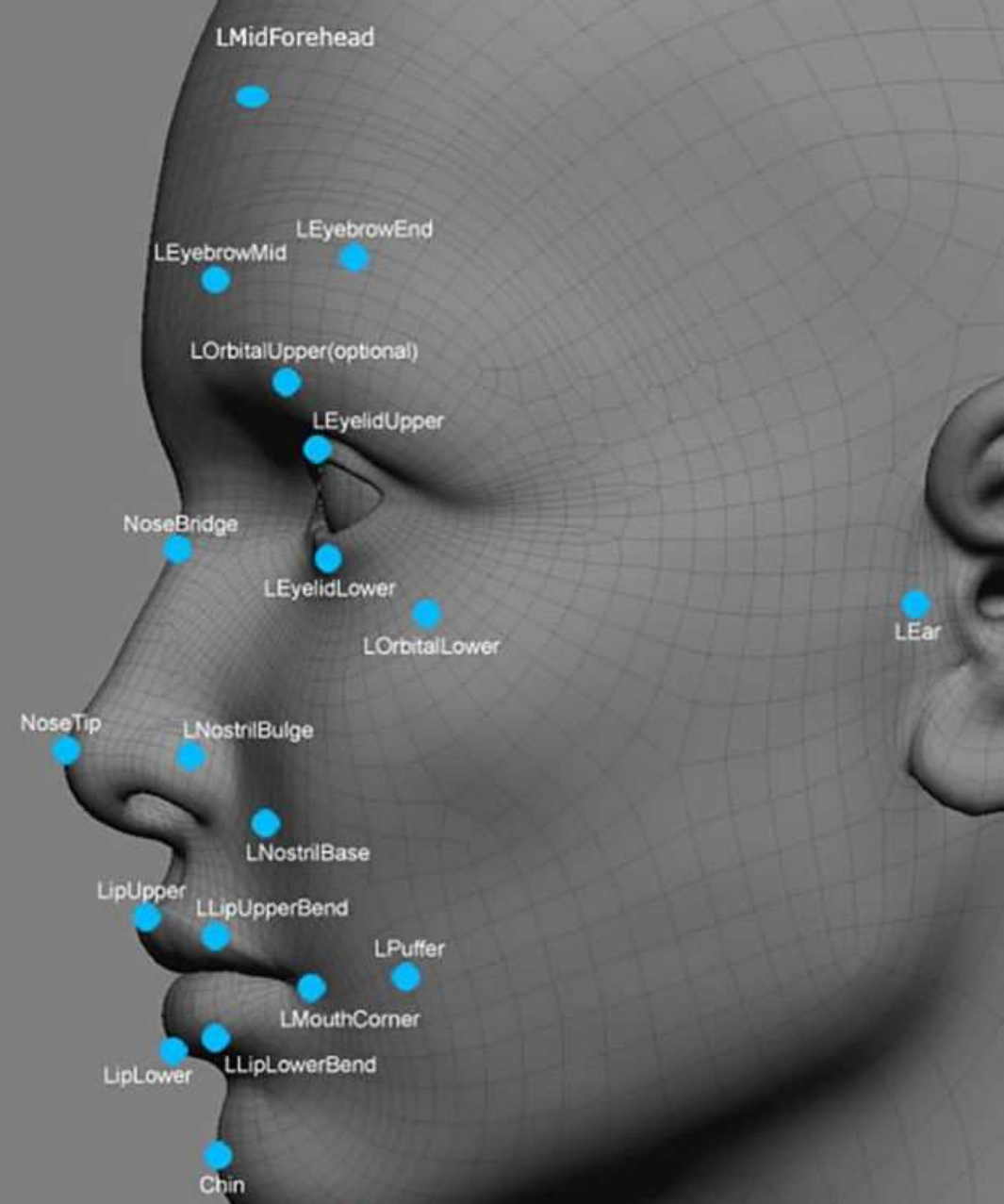
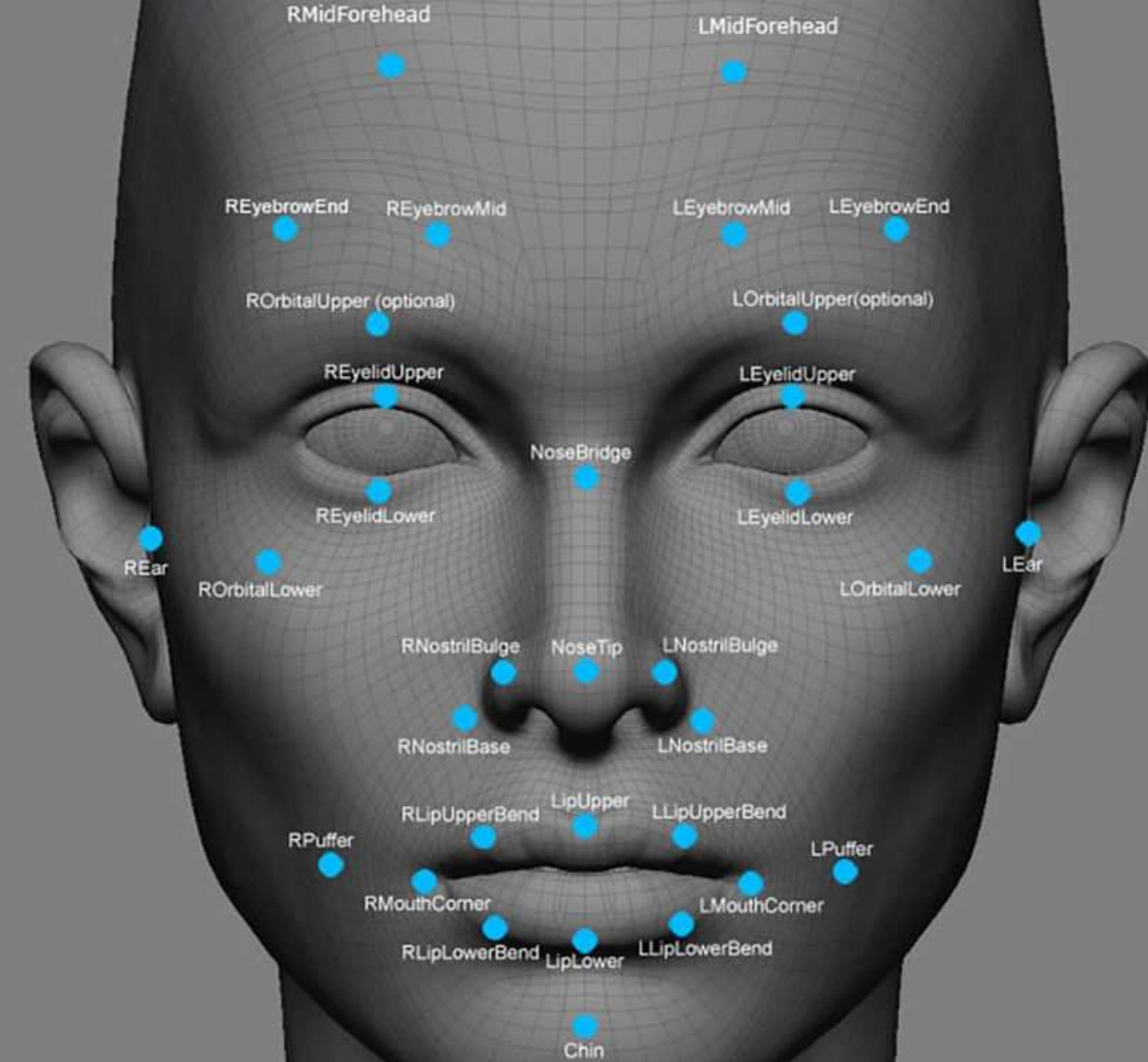












*Microsoft Azure Cognitive Services*

# Some Examples



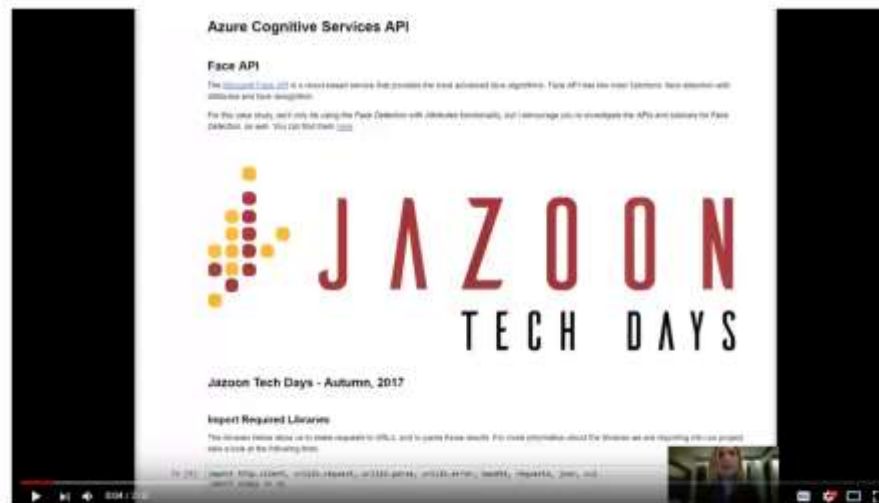


## Computer Vision API

Distill actionable information from images



## Microsoft Translator Text API



Day 2: Face API - Emotions  
25 mins



## Emotion API PREVIEW

Personalize user experiences with emotion recognition



## Language Understanding Intelligent Service PREVIEW

Teach your apps to understand commands from your users



**Paige Bailey**

@DynamicWebPaige

Meet D4N, the ever-charming artificial intelligence FAQ chat bot I'm building for @DayForNightFest. [dayfornight.io](http://dayfornight.io) @Azure

## Chat



Hi! I'm D4N (Day for Night 2017 FAQ Bot). Say "hi" if you'd like to chat.

D4N (Day for Night 2017 FAQ Bot) · Now

hi

You · Now



Hello

D4N (Day for Night 2017 FAQ Bot) · Now

[Download chat logs](#) | [Upload chat logs](#)

Type your message...





```

import http.client, urllib.request, urllib.parse, urllib.error, base64, json

# Replace the subscription_key string value with your valid subscription key.
subscription_key = secret

# Replace to match your region.

uri_base = 'westcentralus.api.cognitive.microsoft.com'

headers = {
    # Request headers.
    'Content-Type': 'application/json',
    'Ocp-Apim-Subscription-Key': subscription_key,
}

params = urllib.parse.urlencode({
    # Request parameters. All of them are optional.
    'visualFeatures': 'Categories,Description,Color',
    'language': 'en',
})

body = '{"url": "http://paigevie.ws/zurich_rolls.JPG"}'

try:
    # Execute the REST API call and get the response.
    conn = http.client.HTTPSConnection('westcentralus.api.cognitive.microsoft.com')
    conn.request("POST", "/vision/v1.0/analyze?%s" % params, body, headers)
    response = conn.getresponse()
    data = response.read()

    # 'data' contains the JSON data. The following formats the JSON data for display.
    parsed = json.loads(data.decode())
    print("Response:")
    print(json.dumps(parsed, sort_keys=True, indent=2))
    conn.close()

except Exception as e:
    print('Error:')
    print(e)

```

```

import requests

# Get the key from tab Keys on Azure portal
key = "INSERT YOUR KEY HERE"

url4authentication = 'https://api.cognitive.microsoft.com/sts/v1.0/issueToken'
headers4authentication = {'Ocp-Apim-Subscription-Key': key}
resp4authentication = requests.post(url4authentication, headers=headers4authentication)
token = resp4authentication.text

# Call the Text Translate API
text = ""

This woman needs steak, immediately.
Can you please assist?

"""
come = "en"
to = "sk"

url4translate = 'https://api.microsofttranslator.com/v2/http.svc/Translate'
params = {'appid': 'Bearer '+token, 'text': text, 'from': come, 'to': to}
headers4translate = {'Accept': 'application/xml'}
resp4translate = requests.get(url4translate, params=params, headers=headers4translate)
print(resp4translate.text)

```

*Code and Examples available at:*

# @DynamicWebPaige



**Suz** 🐧 vim witch ❄️

@noopkat

Following

Using some silly code I wrote to stress test the face api + hotel wifi. Surprisingly responsive!



**Asim Hussain**

@jawache

Following

Just released my first web component! [smiletounlock.com](https://smiletounlock.com) built using [@stenciljs](#). Want to give away free content on your site? How about asking for a smile in return 😊

# Cognitive Services

# Vision

*Image processing algorithms to smartly identify, caption, and moderate your pictures.*



## Computer Vision API

Distill actionable information from images

[Try Computer Vision API](#) | [Use with an Azure subscription](#)



## Content Moderator

Automated image, text, and video moderation

[Use with an Azure subscription](#)



## Custom Vision Service PREVIEW

Easily customize your own state-of-the-art computer vision models for your unique use case



## Face API

Detect, identify, analyze, organize, and tag faces in photos

[Try Face API](#) | [Use with an Azure subscription](#)



## Emotion API PREVIEW

Personalize user experiences with emotion recognition

[Try Emotion API](#) | [Use with an Azure subscription](#)



## Video Indexer PREVIEW

Unlock video insights





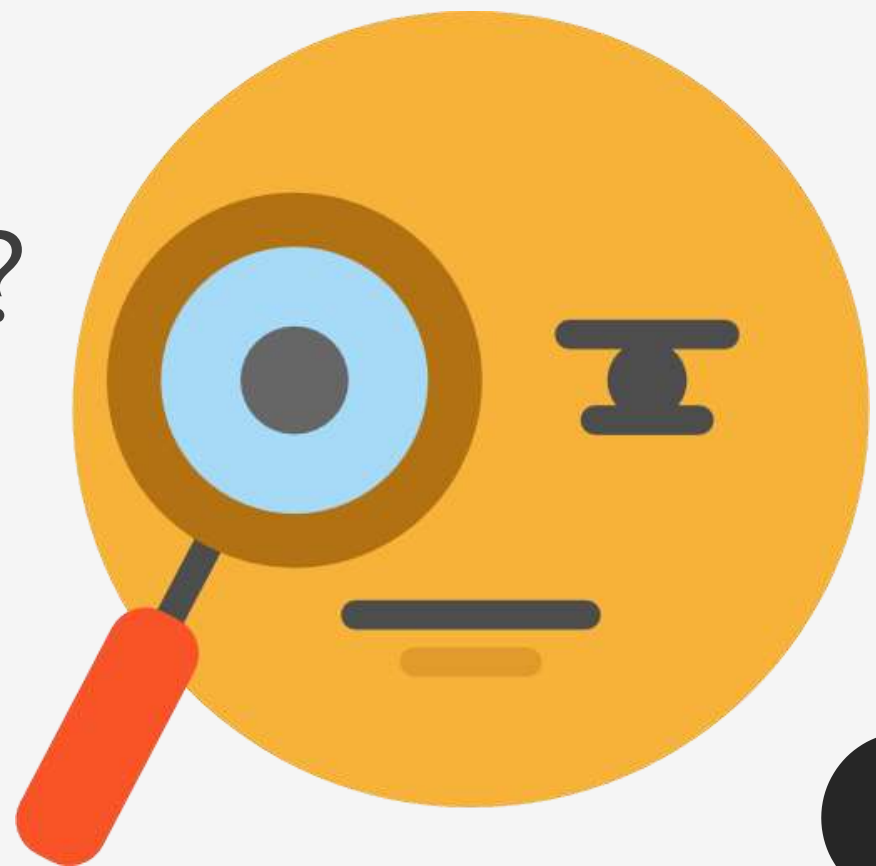
---

*LIVE DEMO: the most terrifying experience of them all*

Right about now,  
you should be wondering:

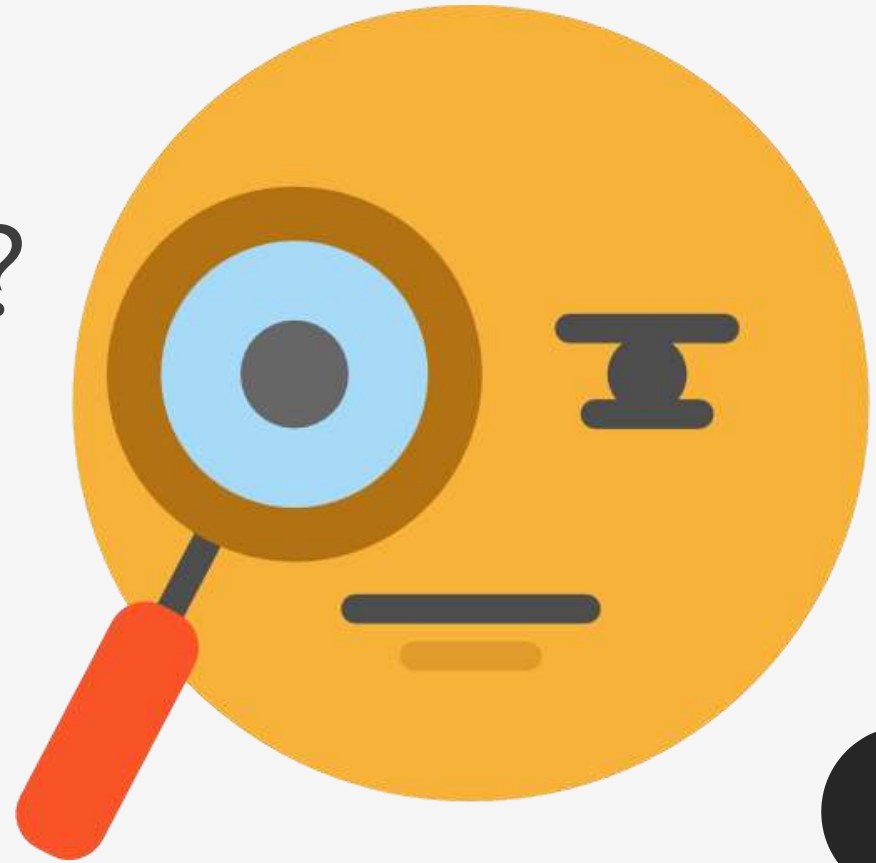


...what is this strange magic?



*why should I trust this*

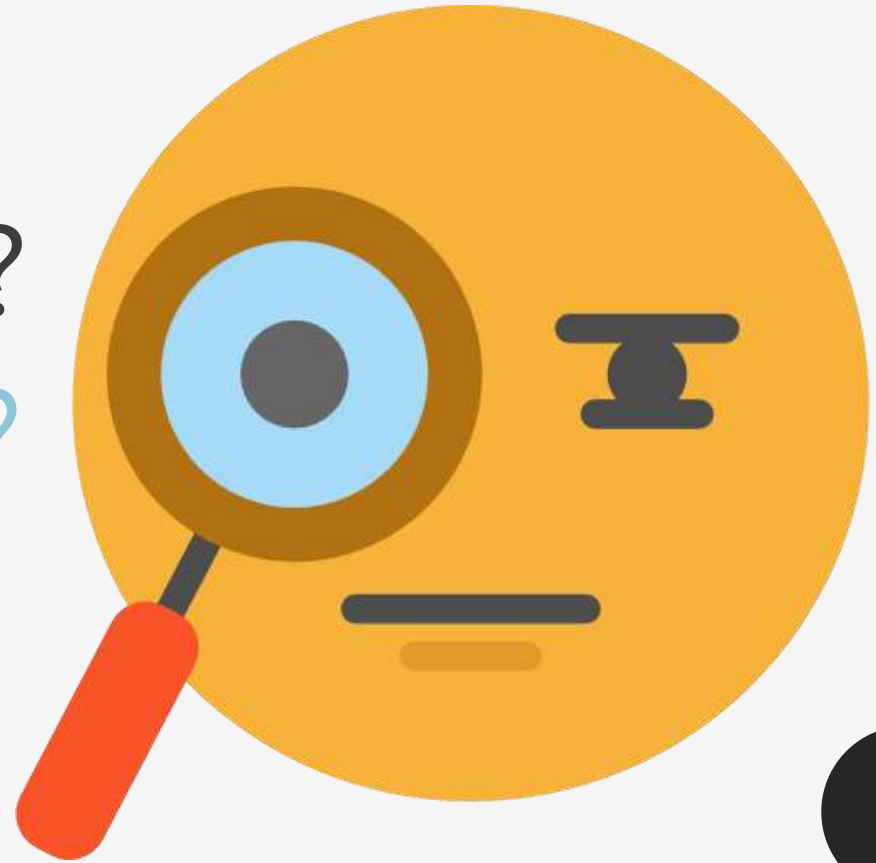
...what is this strange magic?



*why should I trust this*

...what is this strange magic?

what confidence do you have?

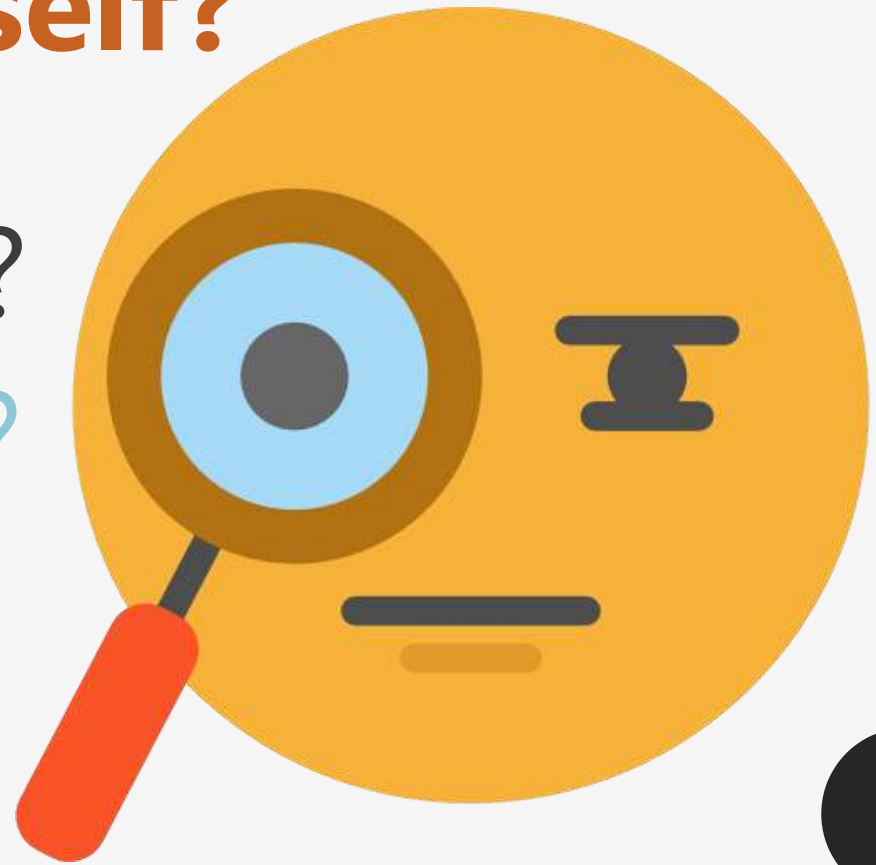


*why should I trust this*

**Couldn't I build this myself?**

...what is this strange magic?

*what confidence do you have?*



- **Built on top of CNTK.**

...which is **open-source**, and completely transparent.

If you have a question about how the model is working, you can look directly at source code.

- **Trained on massive amounts of data.**

Ex: Bing Image searches, billions of webpages.

Your company likely doesn't have that kind of volume just lying around as a training data set.

- **Each API call also returns a confidence level.**

...which means that you can understand uncertainty.

- **Additional perks:**

- Flexibility and customization
- Ease of use
- [Free tier](#)
- Legal indemnification

# Speech

*Convert spoken audio into text, use voice for verification, or add speaker recognition to your app.*



## Translator Speech API

Easily conduct real-time speech translation with a simple REST API call

[Use with an Azure subscription](#)



## Bing Speech API

Convert speech to text and back again to understand user intent

[Try Bing Speech API](#) | [Use with an Azure subscription](#)



## Speaker Recognition API PREVIEW

Use speech to identify and authenticate individual speakers

[Try Speaker Recognition API](#) | [Use with an Azure subscription](#)



## Custom Speech Service PREVIEW

Overcome speech recognition barriers like speaking style, background noise, and vocabulary

[Try Custom Speech Service](#) | [Use with an Azure subscription](#)



# Language

*Allow your apps to process natural language with pre-built scripts, evaluate sentiment and learn how to recognize what users want.*



## Language Understanding Intelligent Service PREVIEW

Teach your apps to understand commands from your users

[Try Language Understanding Intelligent Service](#) | [Use with an Azure subscription](#)



## Bing Spell Check API

Detect and correct spelling mistakes in your app

[Try Bing Spell Check API](#) | [Use with an Azure subscription](#)



## Web Language Model API PREVIEW

Use the power of predictive language models trained on web-scale data



## Text Analytics API

Easily evaluate sentiment and topics to understand what users want

[Try Text Analytics API](#) | [Use with an Azure subscription](#)



## Translator Text API

Easily conduct machine translation with a simple REST API call

[Use with an Azure subscription](#)



## Linguistic Analysis API PREVIEW

Simplify complex language concepts and parse text with the Linguistic Analysis API



---

*LIVE DEMO: the most terrifying experience of them all*

# Knowledge

*Map complex information and data in order to solve tasks such as intelligent recommendations and semantic search.*



## Recommendations API PREVIEW

Predict and recommend items your customers want

[Try Recommendations API](#) | [Use with an Azure subscription](#)



## Knowledge Exploration Service PREVIEW

Enable interactive search experiences over structured data via natural language inputs

[Try Knowledge Exploration Service](#)



## Entity Linking Intelligence Service API PREVIEW

Power your app's data links with named entity recognition and disambiguation



## Academic Knowledge API PREVIEW

Tap into the wealth of academic content in the Microsoft Academic Graph

[Try Academic Knowledge API](#) | [Use with an Azure subscription](#)



## QnA Maker API PREVIEW

Distill information into conversational, easy-to-navigate answers

[Try QnA Maker API](#)










## Custom Decision Service PREVIEW

A cloud-based, contextual decision-making API that sharpens with experience

# Search

*Add Bing Search APIs to your apps and harness the ability to comb billions of webpages, images, videos, and news with a single API call.*

-  **Bing Autosuggest API**  
Give your app intelligent autosuggest options for searches  
[Try Bing Autosuggest API](#) | [Use with an Azure subscription](#)
-  **Bing News Search API**  
Search for news and get comprehensive results  
[Try Bing News Search API](#) | [Use with an Azure subscription](#)
-  **Bing Web Search API**  
Get enhanced search details from billions of web documents  
[Try Bing Web Search API](#) | [Use with an Azure subscription](#)
-  **Bing Entity Search API** PREVIEW  
Enrich your experiences by identifying and augmenting entity information from the web
-  **Bing Image Search API**  
Search for images and get comprehensive results  
[Try Bing Image Search API](#) | [Use with an Azure subscription](#)
-  **Bing Video Search API**  
Search for videos and get comprehensive results  
[Try Bing Video Search API](#) | [Use with an Azure subscription](#)
-  **Bing Custom Search API**  
An easy-to-use, ad-free, commercial-grade search tool that lets you deliver the results you want



# Labs

*Rad cool new stuff in beta*



## Project Johannesburg

*Experimental*

Calculate route logistics with deeper location intelligence to account for enterprise requirements, like weight, height, and hazardous materials.



## Project Nanjing

*Experimental*

Calculate isochrones - time and distance-based recommendations for enterprise route optimization.



## Project Wollongong

*Experimental*

Score the attractiveness of a location, based on how many of a particular amenity are within a specific distance.



## Project Abu Dhabi

*Experimental*

Create distance matrices, enabling you to calculate a histogram of travel times, and serve as stepping stone for enterprise route optimization.



## Project Cuzco

*Experimental*

Find events associated with Wikipedia entities. Begin with a Wikipedia entity, and receive a list of related events organized by time.

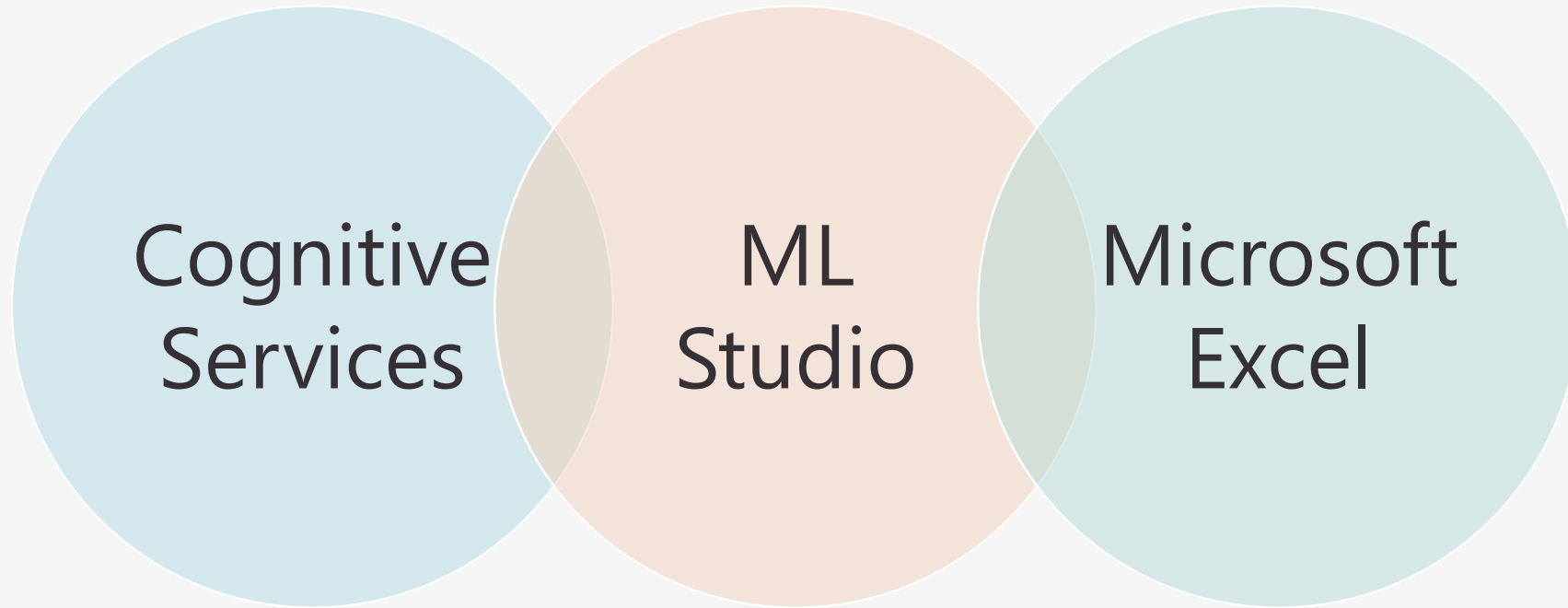


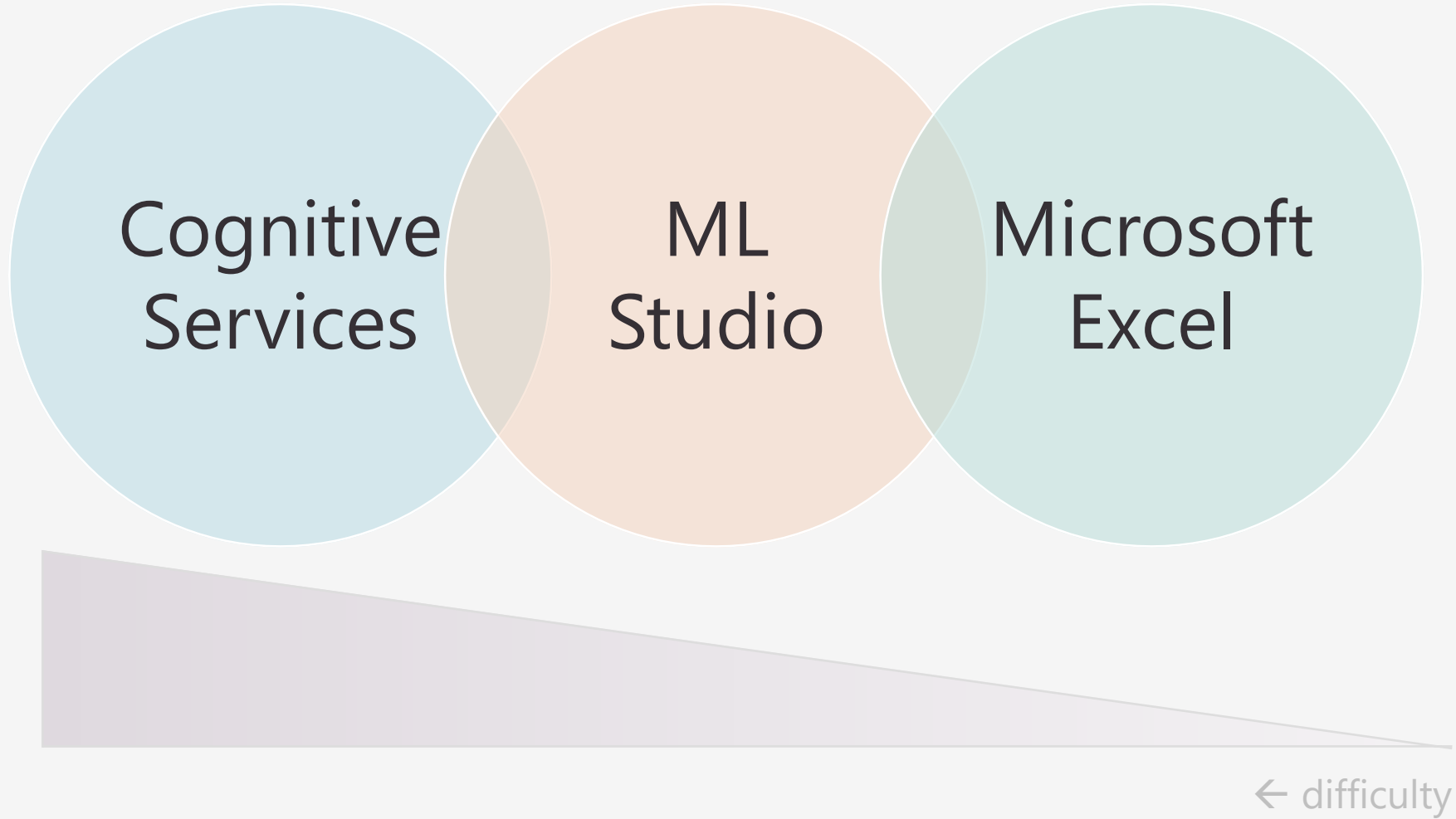
## Project Prague

*Experimental*

Incorporate gesture-based controls into your apps. Quickly define and implement customized hand gestures, creating a more natural user experience.







*Azure Notebooks*

<https://aka.ms/>

CognitiveServices

*Azure ML Studio*

<https://aka.ms/>

AzureMLStudio

---

Experience Level: *Intermediate* -- // -- *Business Intelligence Analysts*

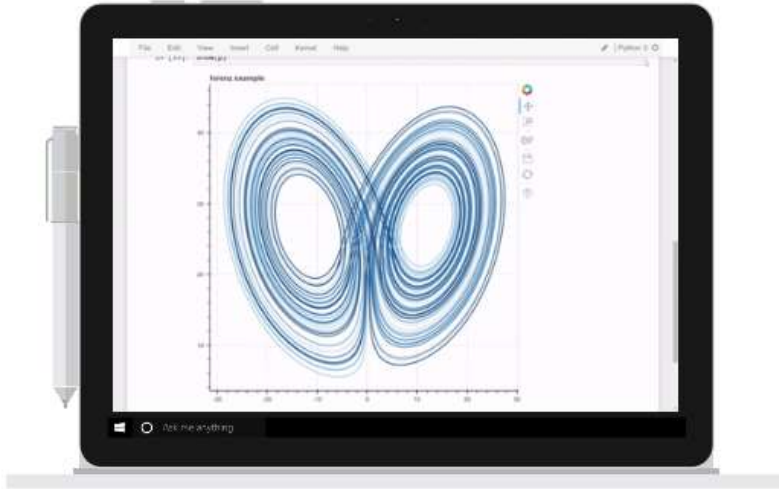
*Microsoft Excel*

[https://aka.ms/](https://aka.ms/ExcelML)  
ExcelML

---

Experience Level: *Beginner* -- // -- *Business Intelligence Analysts, ML Enthusiasts*





## Sharing Your Ideas Made Easy

With Azure Notebooks, unleash your ideas in the cloud with the [Jupyter Notebook](#)

[Get Started](#)[Featured Libraries](#)

For Data Science  
and Analysis



For Teaching  
and Learning



For Research  
and Development

# Getting Started

- [Azure Notebooks](#)
- [DevReach 2017 Library](#)
- [Dev Reach 2017 Presentation](#)

## AI on Azure

- [Azure ML Studio](#)
- [Cortana Intelligence Gallery](#)
- [Data Science Virtual Machines](#)
- [Microsoft Docs](#)

Thank you!