Microsoft

Microsoft Cognitive Services

Vision

KC Munnings
Cloud Solution Architect – Advanced Analytics & AI

Machine Learning on Azure

Domain specific pretrained models
To reduce time to market

Vision

Speech

Language

Search

Familiar Data Science tools
To simplify model development

PyCharm

Jupyter

Visual Studio Code

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 Databricks

Azure Machine Learning

Machine Learning VMs

Powerful infrastructure
To accelerate deep learning

CPU

GPU

FPGA

From the Intelligent Cloud to the Intelligent Edge

Demo – Intelligent Kiosk

GitHub - https://github.com/Microsoft/Cognitive-Samples-IntelligentKiosk

Microsoft Store (Windows 10 Install) - https://www.microsoft.com/en-us/p/intelligent-kiosk/9nblggh5qd84#activetab=pivot:overviewtab

Vision

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

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

Vision

Computer Vision

Distill actionable information from images

Video Indexer

Process and extract smart insights from videos

Face

Detect, identify, analyze, organize, tag faces in photos, and even recognize emotions

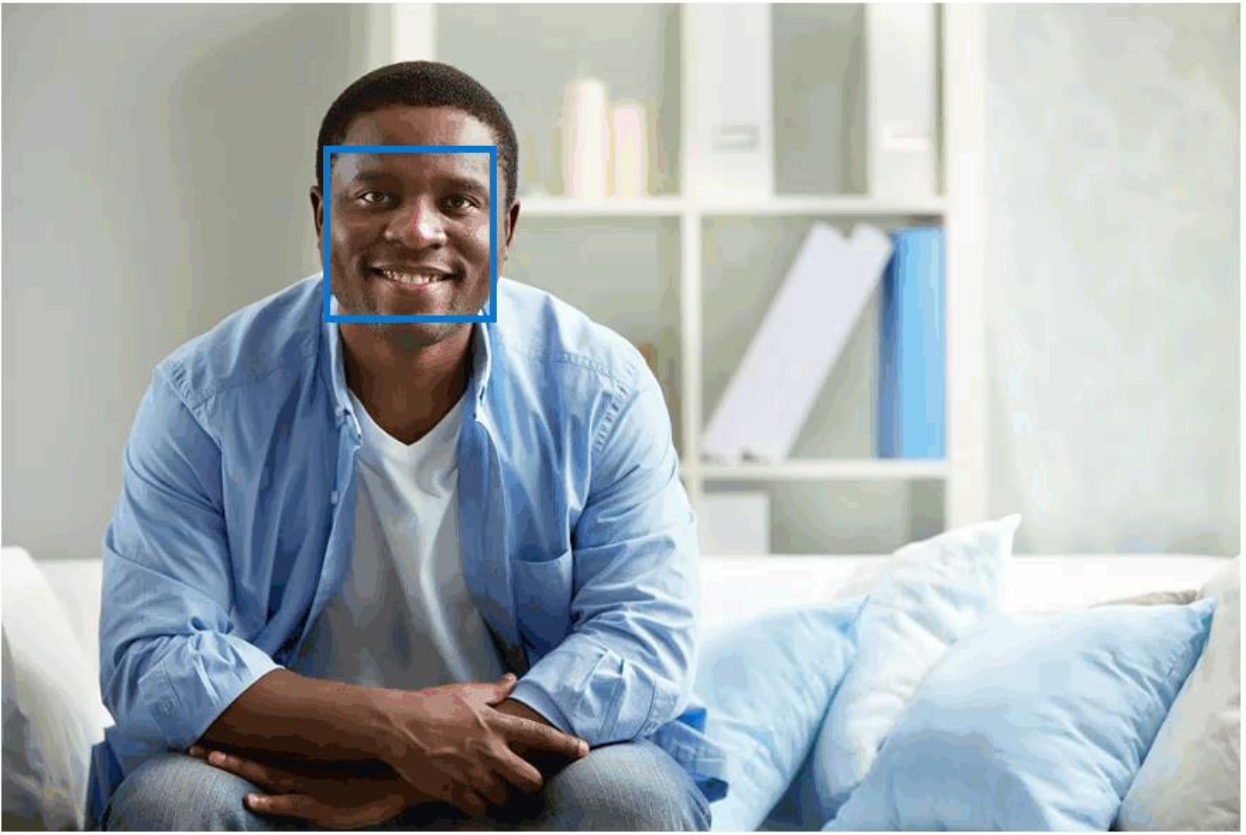
Content Moderator

Machine-assisted moderation of text and images, augmented with human review tools

Custom Vision

Customizable web service that learns to recognize specific content in imagery

Face




```
    },
    "smile": 1.0,
    "headPose": {
      "pitch": 0.0,
      "roll": 3.2,
      "yaw": 11.4
    },
    "gender": "male",
    "age": 30.0,
    "facialHair": {
      "moustache": 0.4,
      "beard": 0.4,
      "sideburns": 0.4
    },
    "glasses": "NoGlasses",
    "makeup": {
      "eyeMakeup": false,
      "lipMakeup": false
    },
    "emotion": {
      "anger": 0.0,
      "contempt": 0.0,
      "disgust": 0.0,
      "fear": 0.0,
```

Face

Face detection

Detect faces and their attributes within an image

Face verification

Check if two faces belong to the same person

Similar face searching

Find similar faces within a set of images

Face grouping

Organize many faces into groups

Face identification

Search which person a face belongs to

Face

Detection

```
"faceRectangle": {"width": 193, "height": 193,
"left": 326, "top": 204}
                    …
```

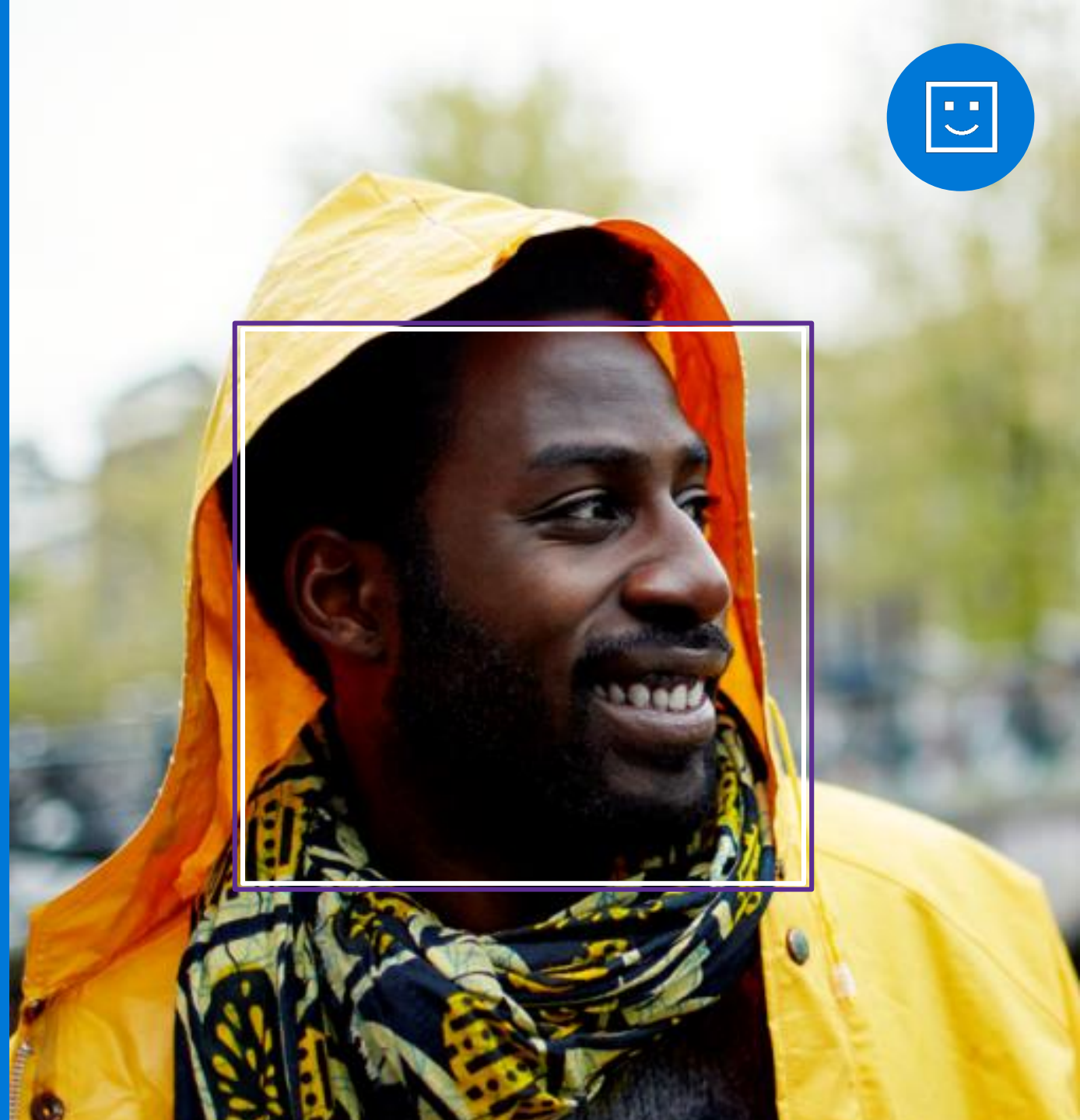
Feature attributes

```
"attributes": { "age": 42, "gender": "male",
"headPose": { "roll": "8.2", "yaw": "-37.8",
"pitch": "0.0" }}
```

Grouping

Identification

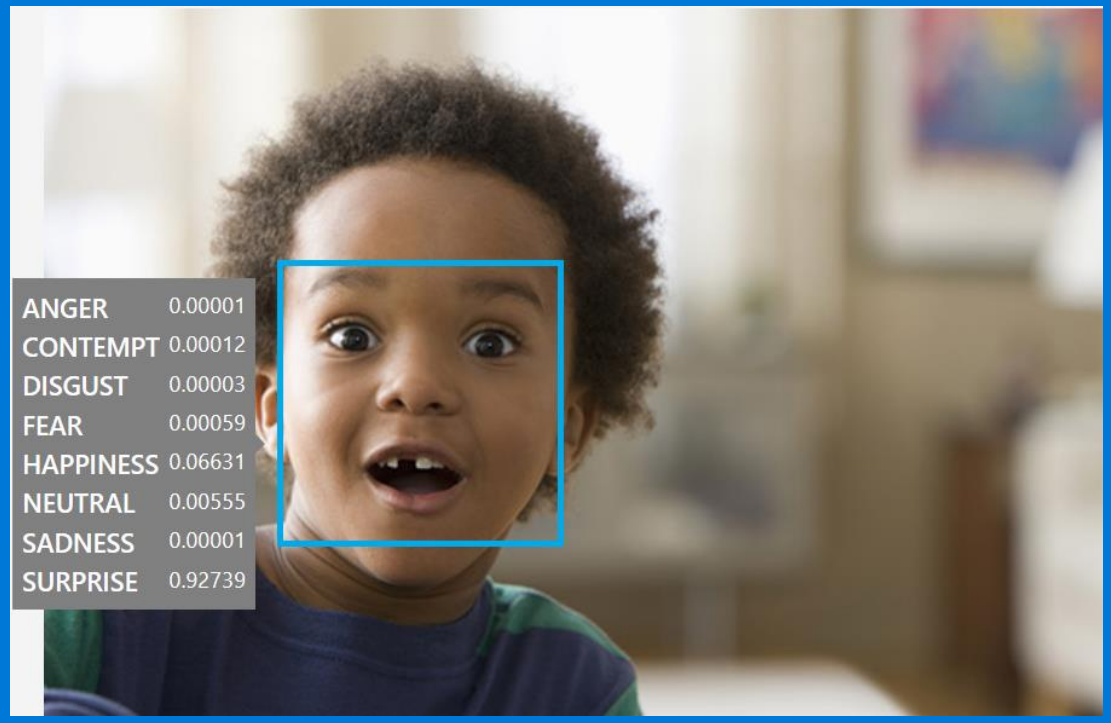
Jasper Williams



Emotion

Recognize emotions

Understand content within an image



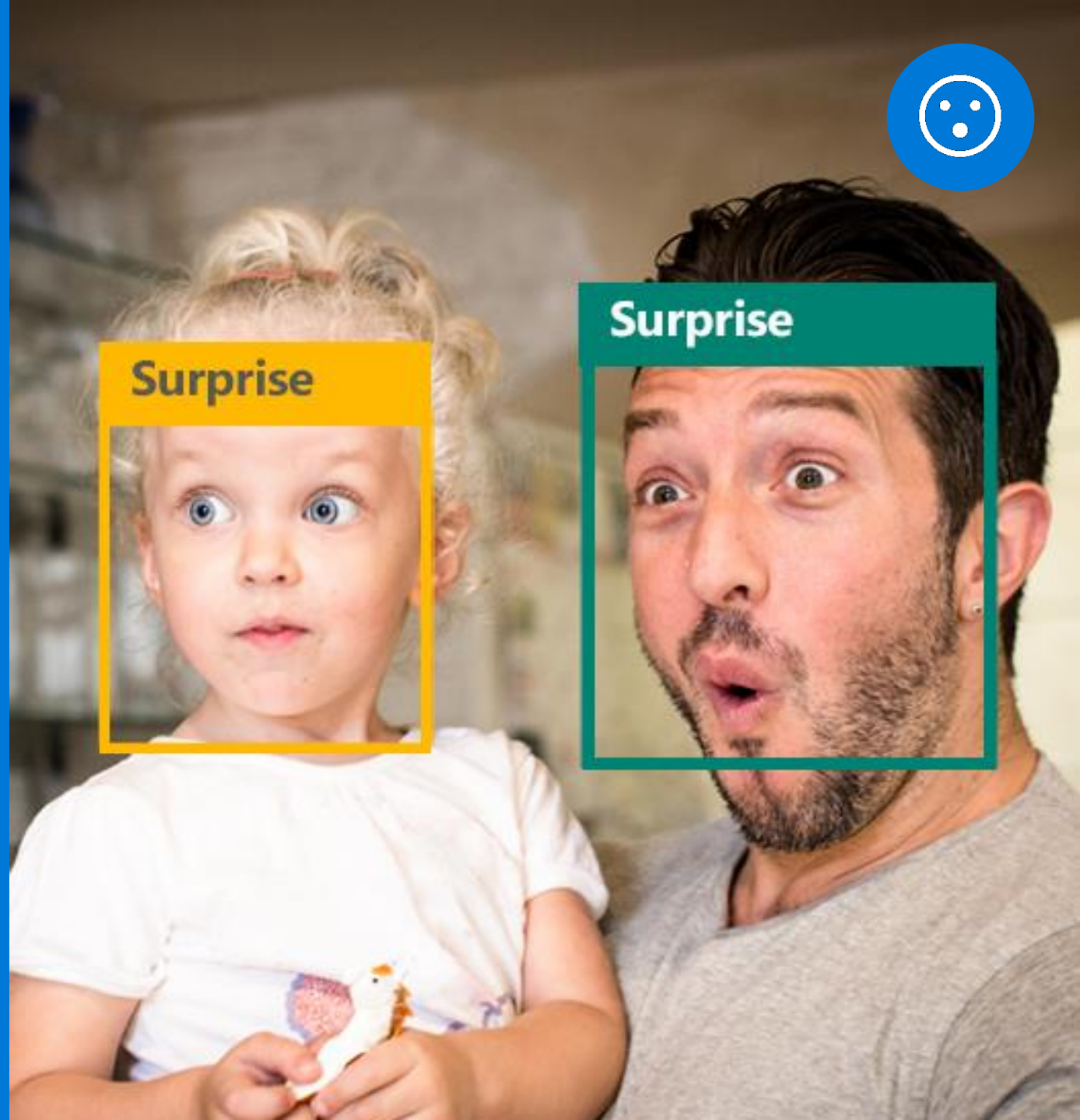
Emotion

Face detection

```
"faceRectangle": {"width": 193,
                  "height": 193,
                  "left": 326,
                  "top": 204} …
```

Emotion scores

```
"scores": { "anger": 5.182241e-8,
            "contempt": 0.0000242813,
            "disgust": 5.621025e-7,
            "fear": 0.00115027453,
            "happiness": 1.06114619e-8,
            "neutral": 0.003540177,
            "sadness": 9.30888746e-7,
            "surprise": 0.9952837}
```



Video Indexer

Unlock video insights

Upload your video and go

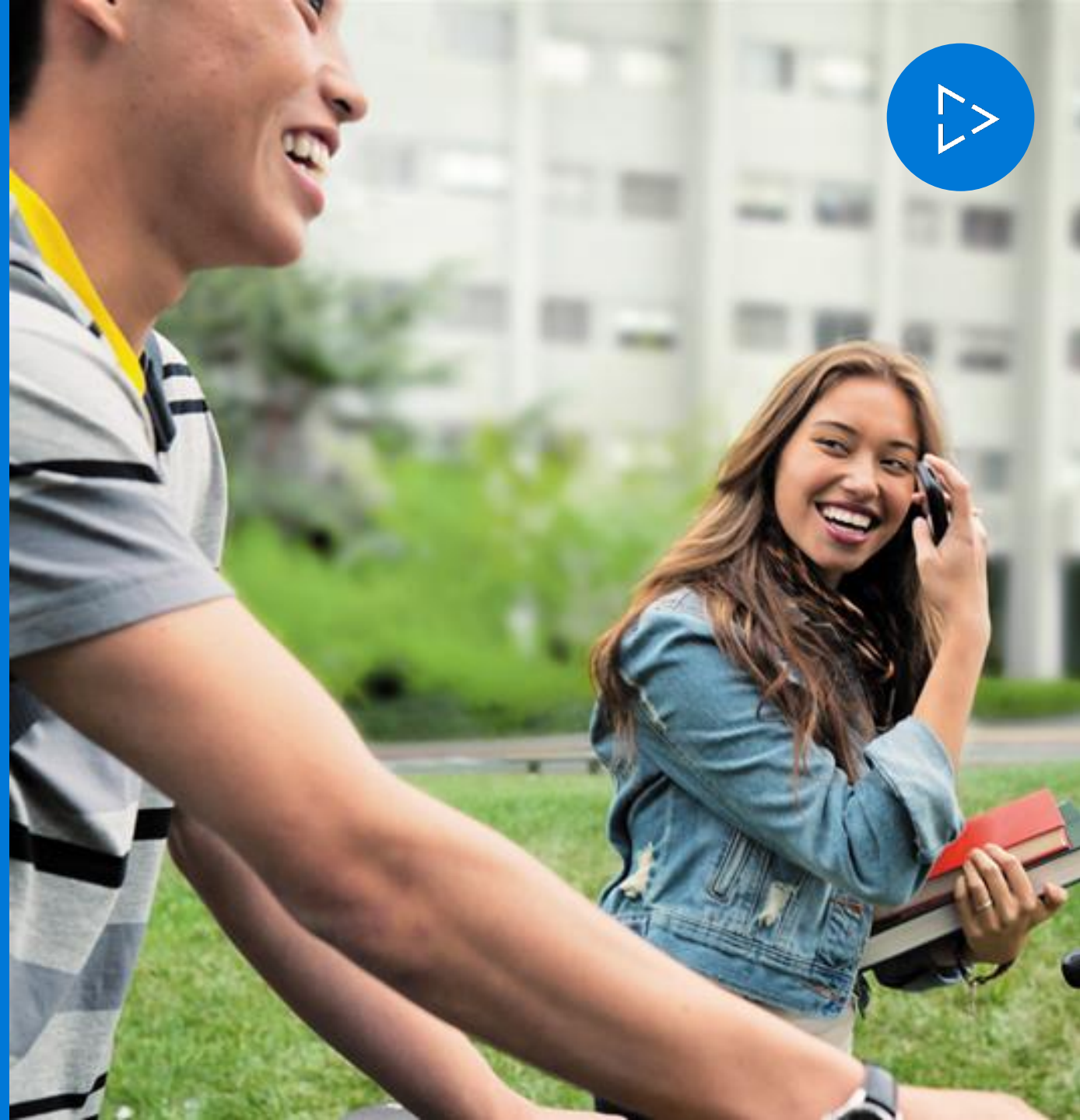
Start turning your video into insights right away.

Make your content more discoverable

Enhance content discovery experiences such as search results by detecting spoken words, faces, characters, and emotions

Improve engagement with your video

Metadata extracted by Video Indexer can be used to build powerful engagement experiences with recommendations, highlight clips, and interactive videos



Computer Vision

FEATURE NAME:	VALUE
Description	{ "tags": ["train", "platform", "station", "building", "indoor", "subway", "track", "walking", "waiting", "pulling", "board", "people", "man", "luggage", "standing", "holding", "large", "woman", "yellow", "suitcase"], "captions": [{ "text": "people waiting at a train station", "confidence": 0.833099365 }] }
Tags	[{ "name": "train", "confidence": 0.9975446 }, { "name": "platform", "confidence": 0.995543063 }, { "name": "station", "confidence": 0.9798007 }, { "name": "indoor", "confidence": 0.927719653 }, { "name": "subway", "confidence": 0.838939846 }, { "name": "pulling", "confidence": 0.431715637 }]
Image format	"Jpeg"

Computer Vision

Analyze an image

Understand content within an image

OCR

Detect and recognize words within an image

Generate thumbnail

Scale and crop images, while retaining key content

Recognize celebrities

Thanks to domain-specific models, ability to recognize 200K celebrities from business, politics, sports, and entertainment around the world

Analyze image

Type of image

Clip Art Type	0 Non-clipart
Line Drawing Type	0 Non-Line Drawing
Black & White Image	False

Content of image

Categories	[{ “name”: “people_swimming”, “score”: 0.099609375 }]
Adult Content	False
Adult Score	0.18533889949321747
Faces	[{ “age”: 27, “gender”: “Male”, “faceRectangle”: {“left”: 472, “top”: 258, “width”: 199, “height”: 199}}]

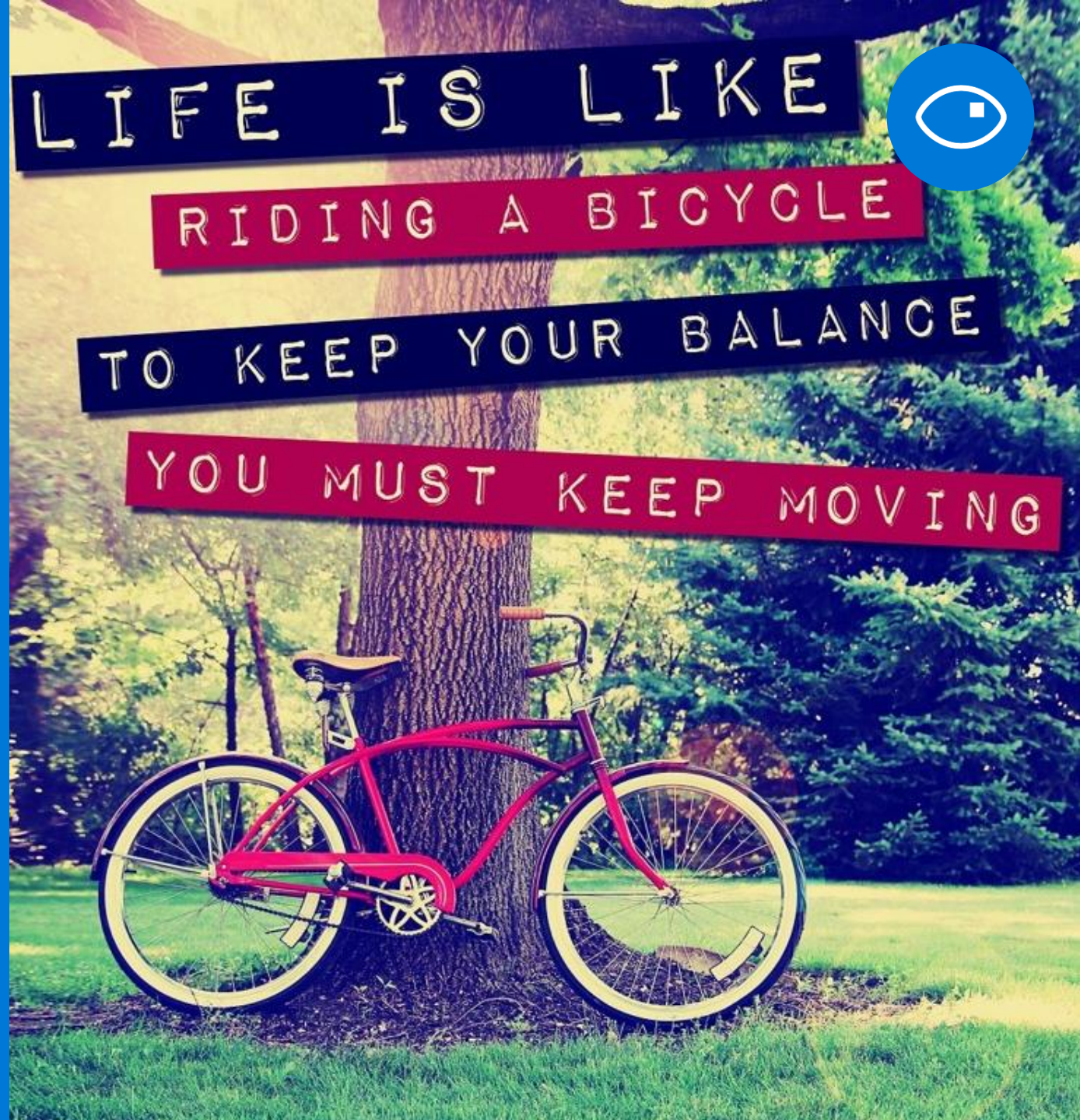
Image colors

Dominant Color Background	White
Dominant Color Foreground	Grey
Dominant Colors	White
Accent Color	

OCR

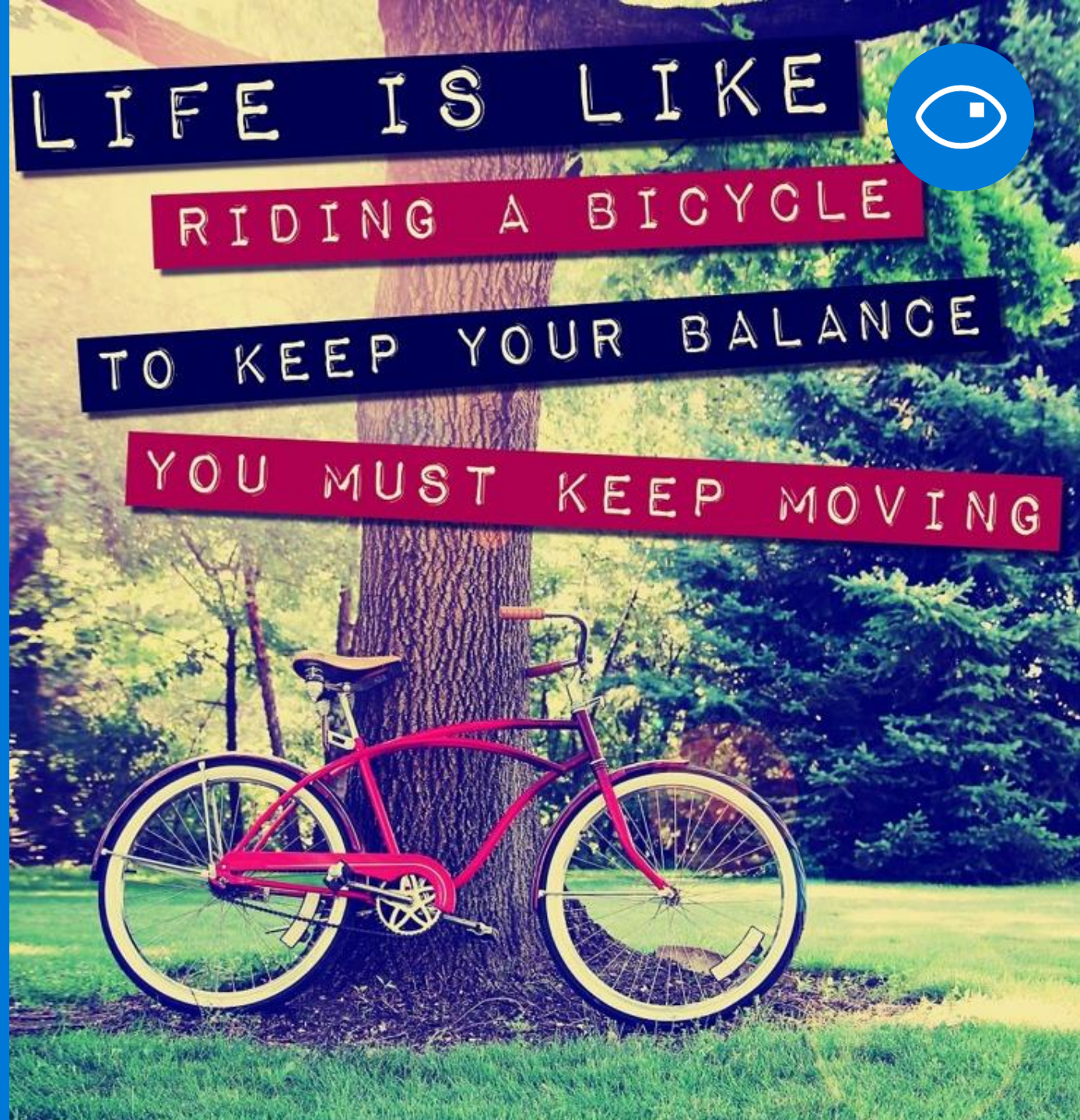
Life is like riding a bicycle

To keep your balance you must keep moving



OCR

```
JSON:
{
 "language": "en",
 "orientation": "Up",
 "regions": [
  {
   "boundingBox": "41,77,918,440",
   "lines": [
    {
     "boundingBox": "41,77,723,89",
     "words": [
      {
       "boundingBox": "41,102,225,64",
       "text": "LIFE"
      },
      {
       "boundingBox": "356,89,94,62",
       "text": "IS"
      },
      {
       "boundingBox": "539,77,225,64",
       "text": "LIKE"
      }
. . .
```



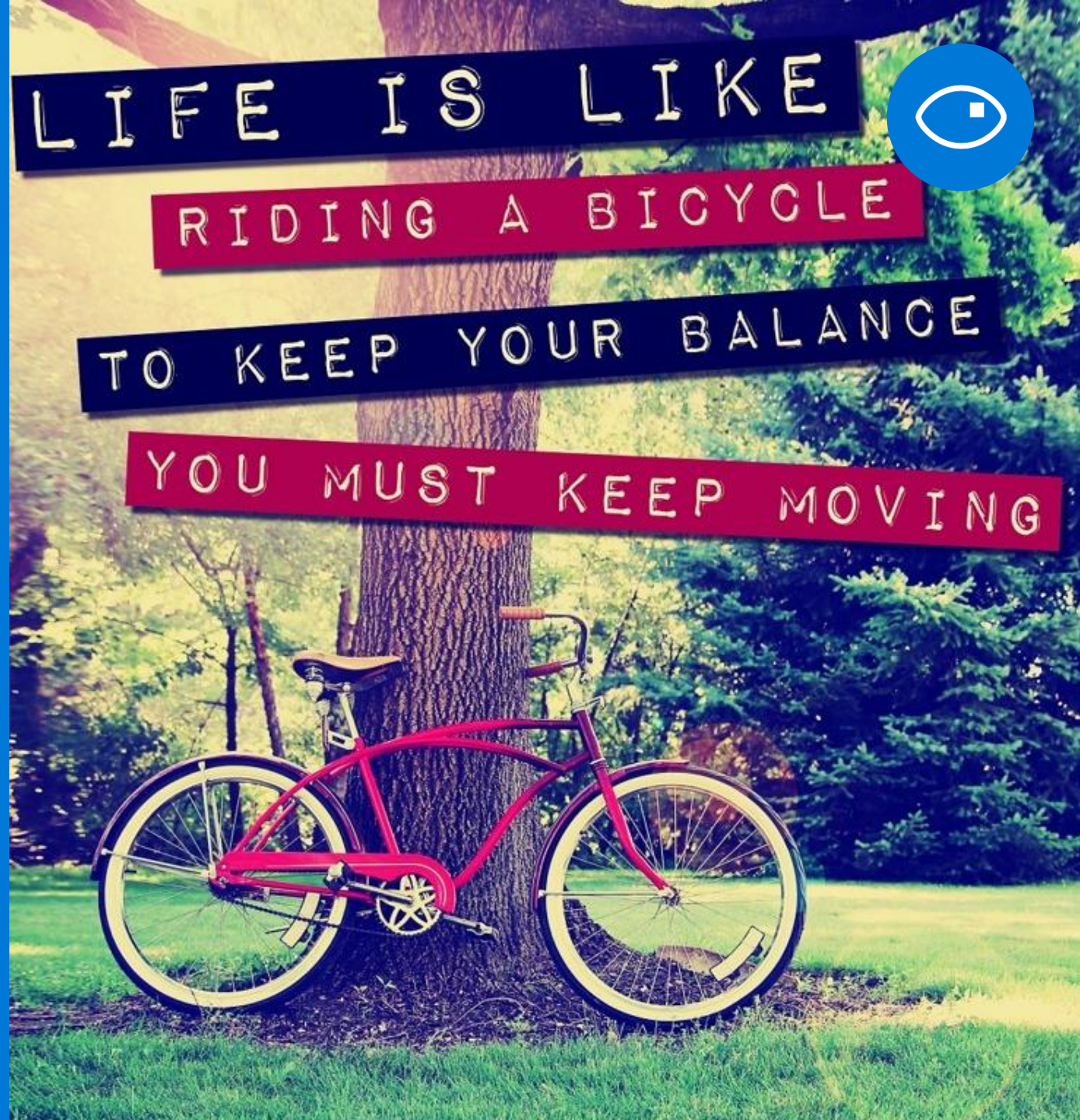
OCR

Good at

Scanned documents

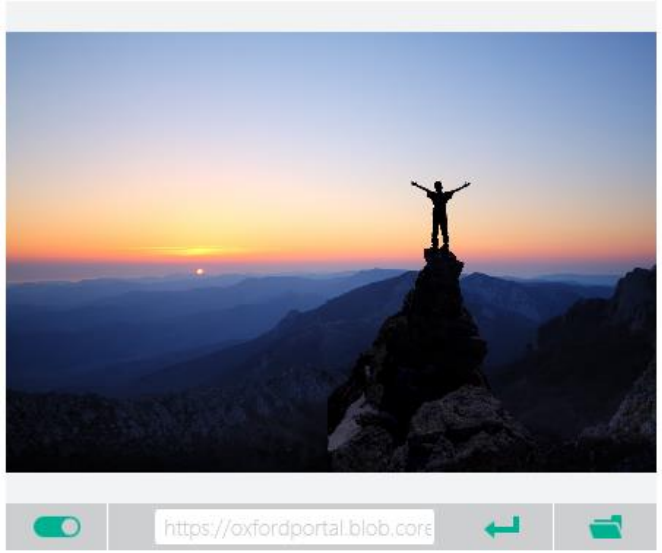
Photos with text

Fine-grained location information



Smart thumbnail

Smart cropping **off**



Content Moderator

Machine-assisted moderation of text and images, augmented with human review tools

Image moderation

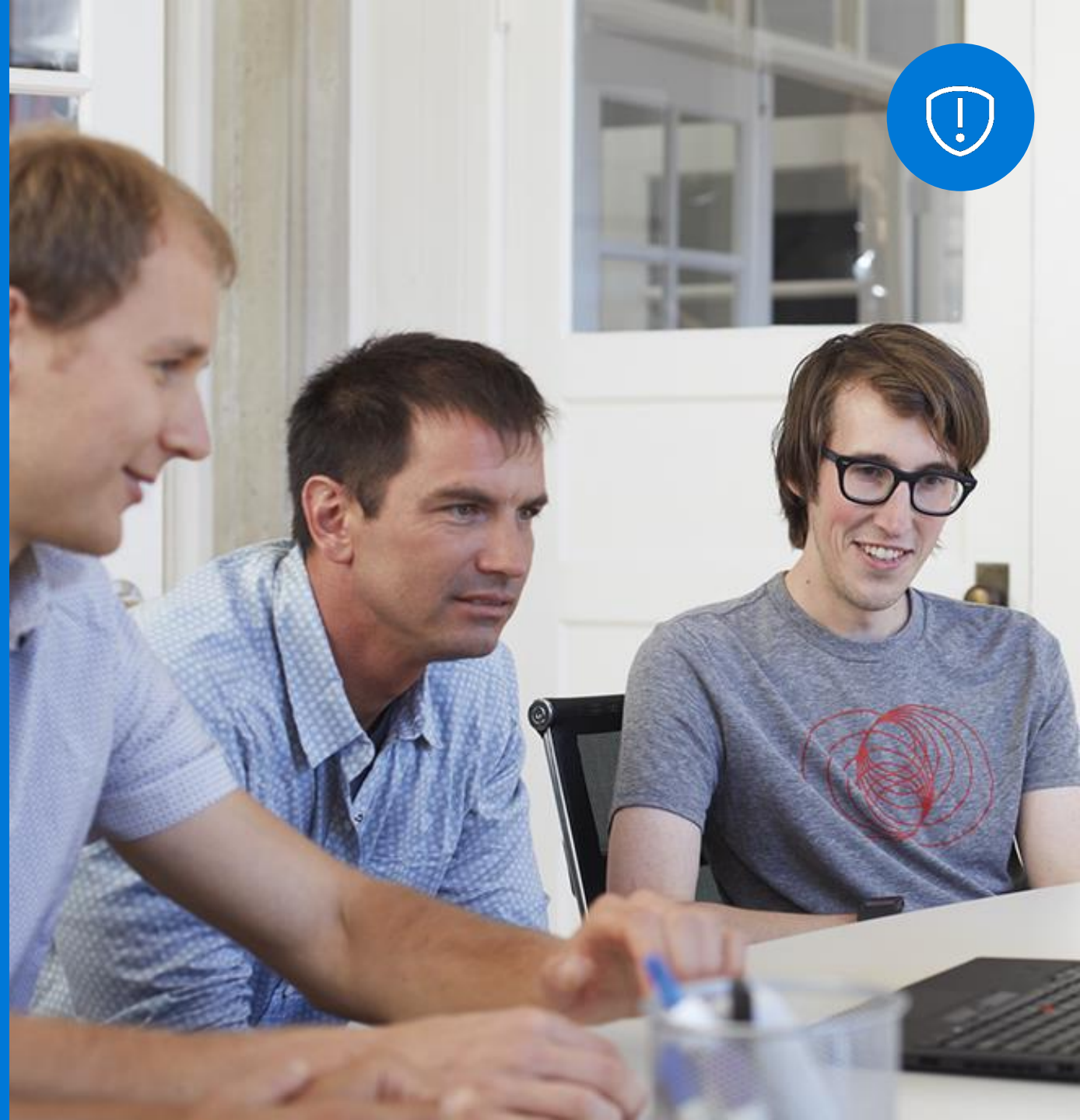
Machine-learning based classifiers, custom blacklists, and Optical Character Recognition (OCR)

Text moderation

Helps you detect potential profanity in more than 100 languages and match text against your custom lists automatically.
Identification of possible Personally Identifiable Information (PII)

Video moderation (in Azure Media Services)

Scoring of possible adult content in videos.
Video moderation is currently deployed in preview on Azure Media Services

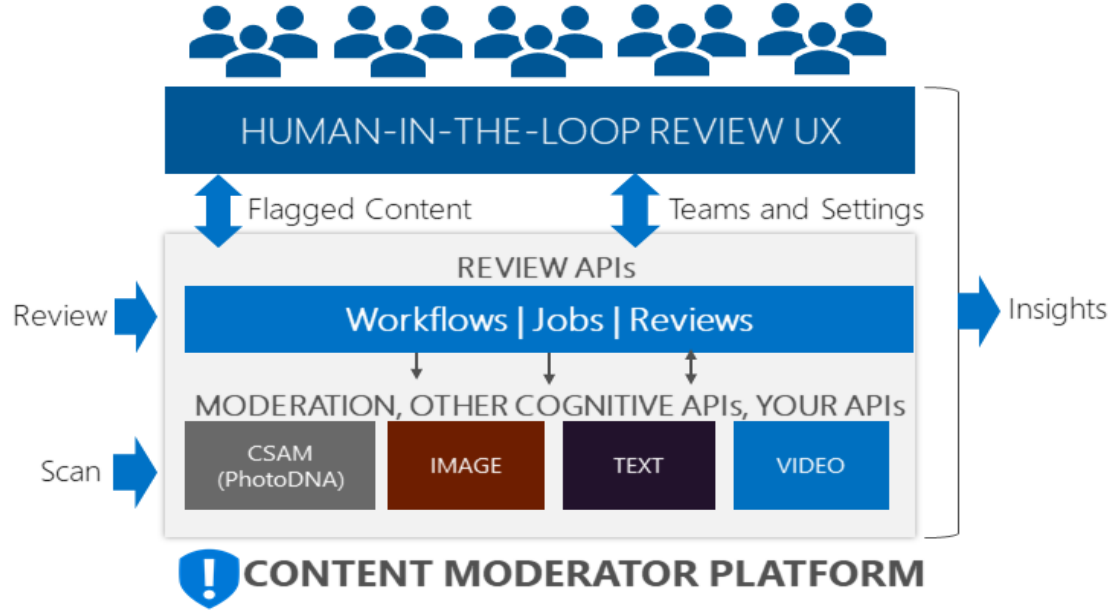


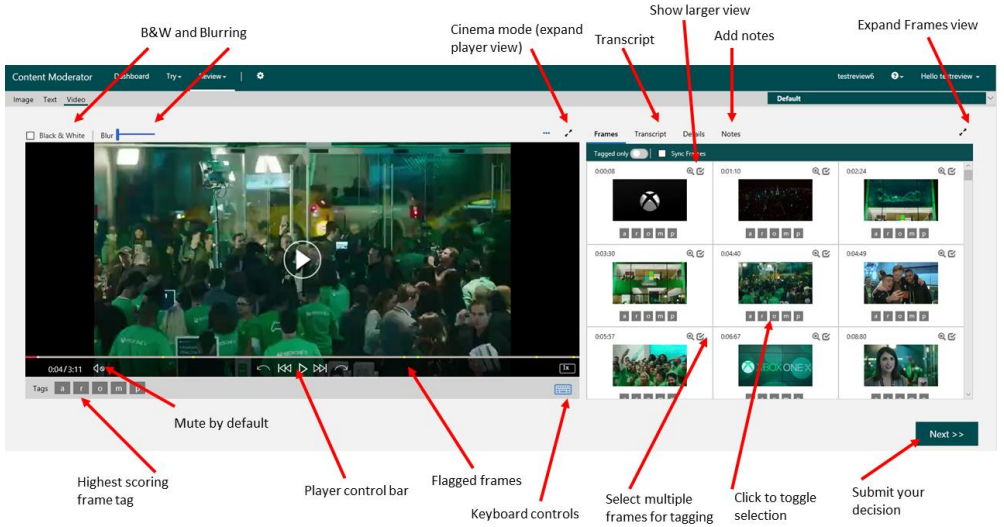
Content Moderator

Moderate
Utilize automated results to reduce time and detect unwanted or offensive content

Configure
Combine automated content moderation with human review and workflows

Review
Approve and reject flagged content to confidently improve filtering





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

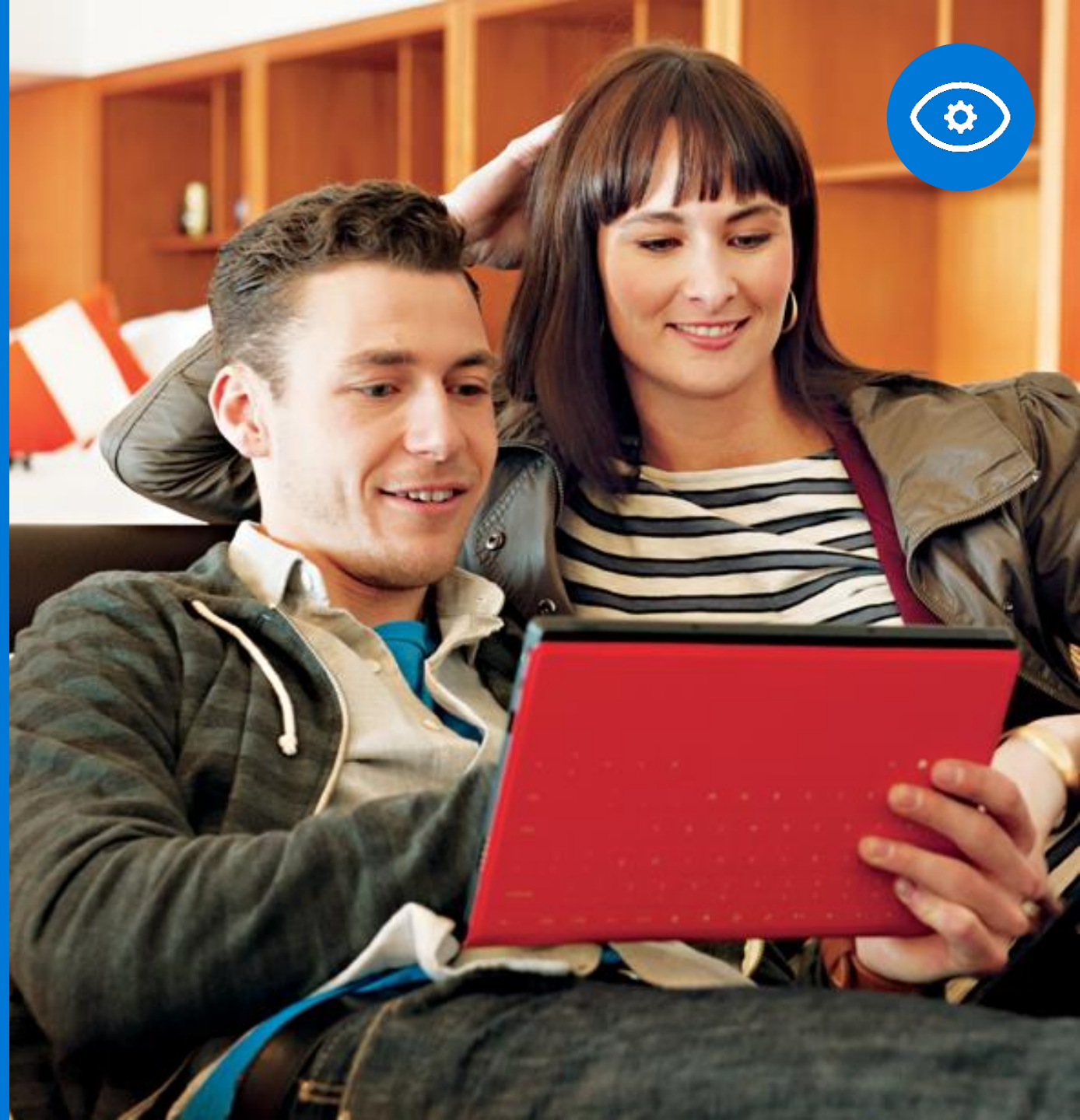
Use your labeled images to teach Custom Vision Service the concepts you want it to learn

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

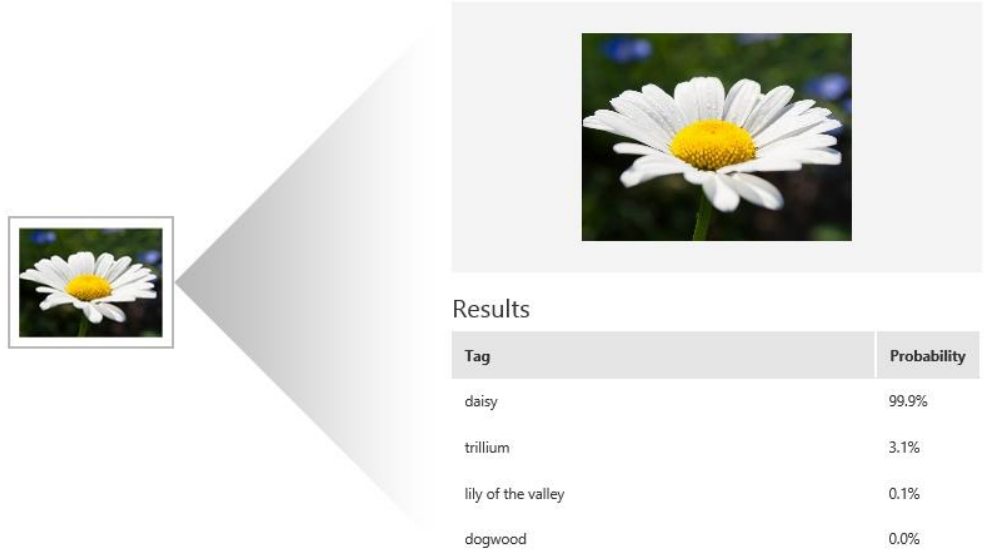


Custom Vision

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

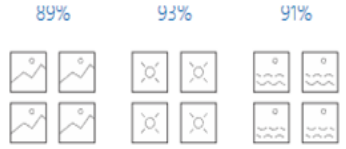
Upload
Use labeled images to quickly train and update your models

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



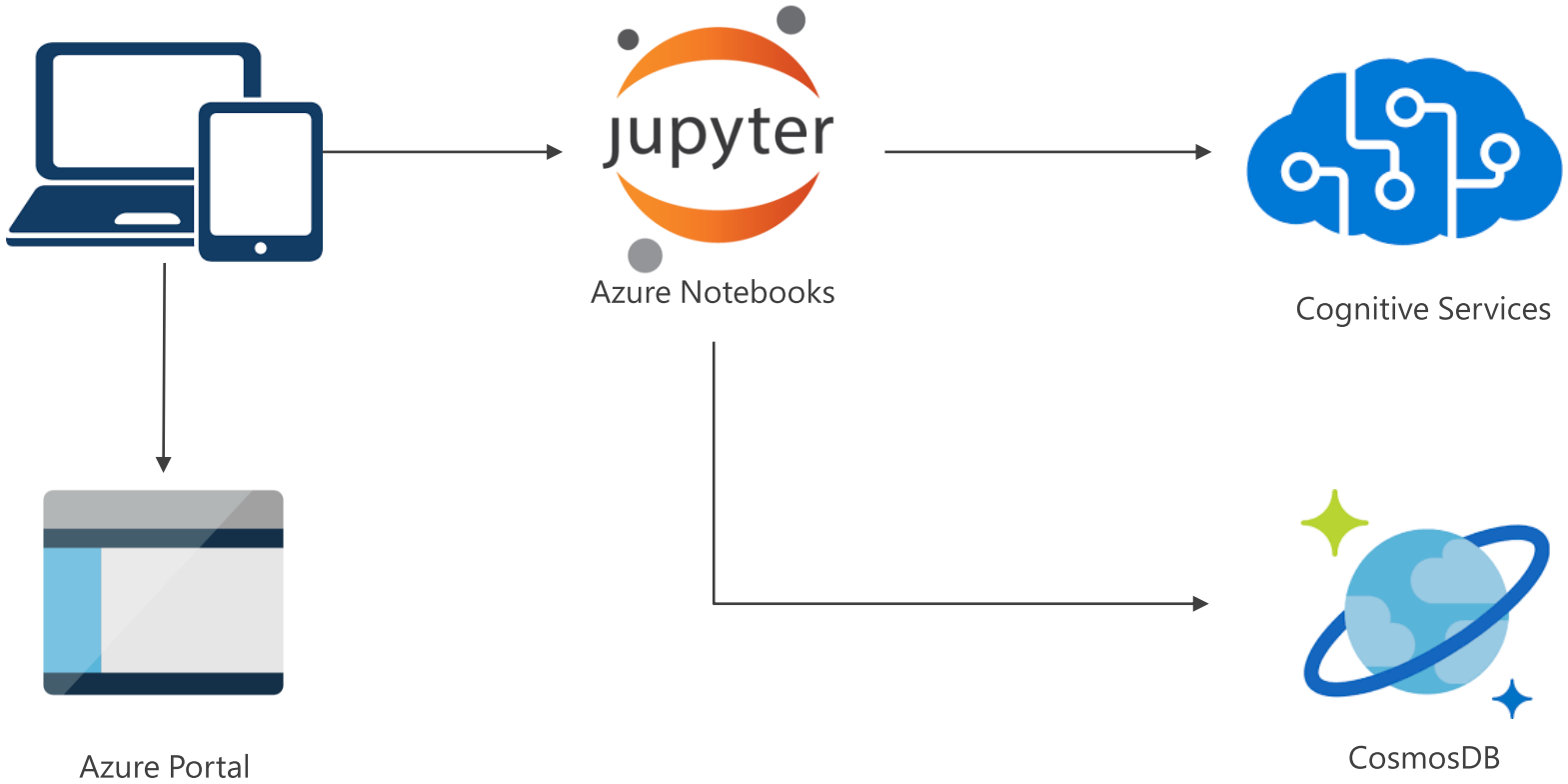
Upload Images
Bring your own labeled images, or use Custom Vision to quickly add tags to any unlabeled images.

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.

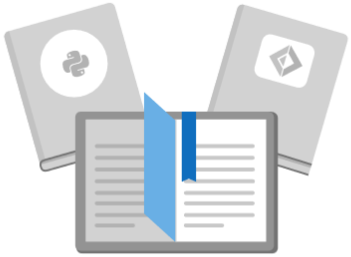
Hands on Lab Architecture



Azure Notebooks - https://notebooks.azure.com/

Useful for any workspace

Perfect for data scientists, developers, students, or anyone. Develop and run code in your browser regardless of industry or skillset.

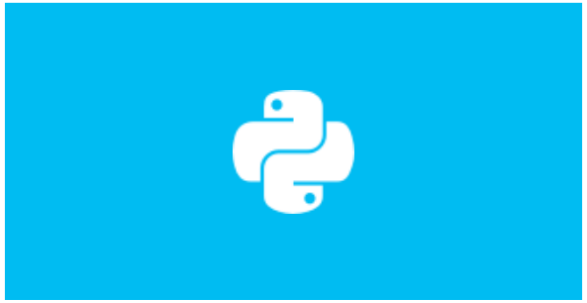


Multiple language support

Supporting more languages than any other platform including Python 2, Python 3, R, and F#.

Microsoft Azure Cloud Services

Created by Microsoft Azure: Always accessible, always available from any browser, anywhere in the world.



Python 2

Python is a dynamically typed programming language designed by Guido Van Rossum. Much like the programming language Ruby, Python was designed to be easily read by programmers.

LEARN ABOUT PYTHON 2 >

Python 3

Python is a dynamically typed programming language designed by Guido Van Rossum. Much like the programming language Ruby, Python was designed to be easily read by programmers.

LEARN ABOUT PYTHON 3 >

R

R is an open source programming language and software environment for statistical computing and graphics that is supported by the R Foundation for Statistical Computing.

LEARN ABOUT R >

F#

F# is a strongly typed, multi-paradigm programming language that encompasses functional, imperative, and object-oriented programming methods.

LEARN ABOUT F# >

Hands on Lab

https://aka.ms/kcvision

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