



# Introduction to Azure Cognitive Services

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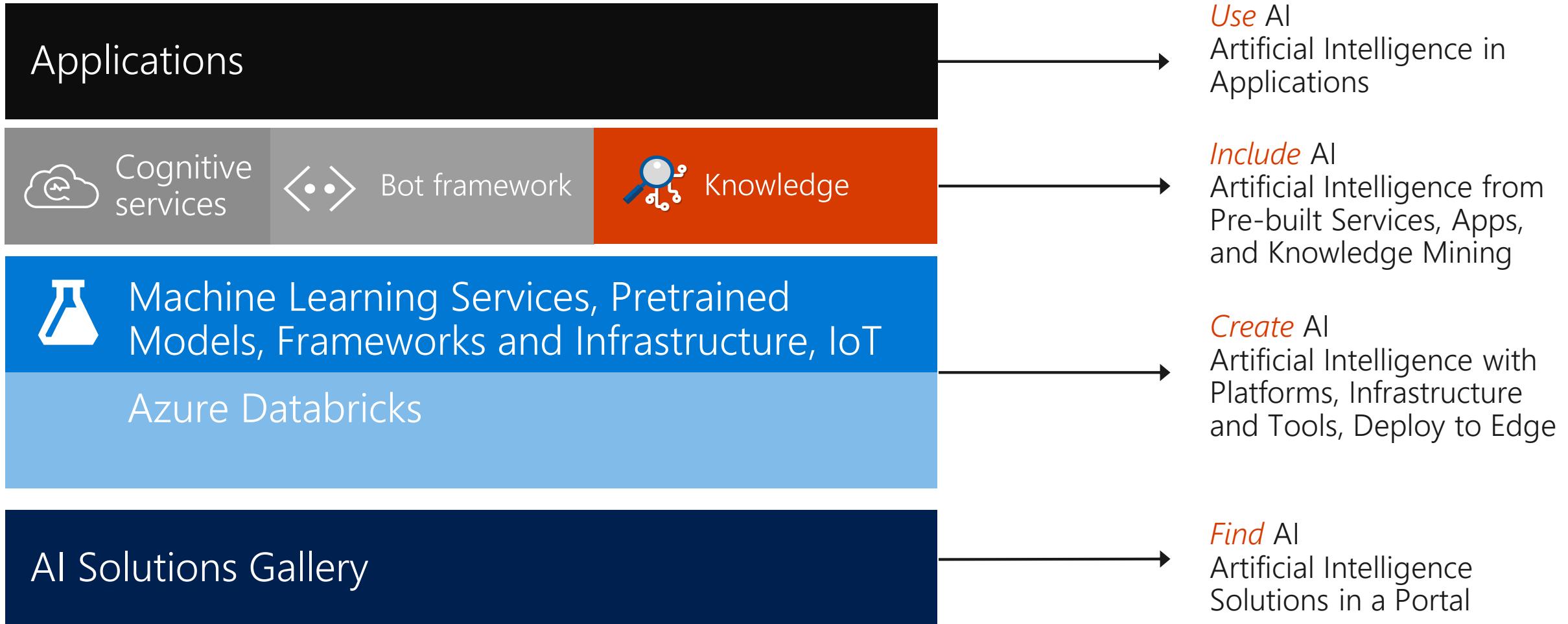


@nithinmohantk



/in/nithinmohantk

# The Azure AI Landscape





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# Include AI - Services

Cognitive Services  
Cognitive Services Customizations

# Microsoft Cognitive Services

Give your apps a human side



## Vision

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



## Speech

Hear and speak to your users by filtering noise, identifying speakers, and understanding intent



## Language

Process text and learn how to recognize what users want



## Knowledge

Map complex information and data in order to solve specific tasks



## Search

Access billions of web pages, images, videos, and news with the power of Bing



## Labs

An early look at emerging Cognitive Services technologies: discover, try, and give feedback on new technologies before general availability

# Microsoft Cognitive Services



## Vision

Video Indexer
Computer Vision
Face
Emotion
Content Moderator
<b>Custom Vision</b>



## Speech

Speaker Recognition
Bing Speech
Custom Speech
Translator Speech
Unified Speech
Speech to Text w. Custom Speech
Text to Speech w. Custom Voice
Speech Translation w. Custom Translator



## Language

Text Analytics
Bing Spell Check
Translator Text
<b>Language Understanding (LUIS)</b>
<b>Custom Vision</b>



## Knowledge

QnA Maker
Azure Search



## Search

Bing Entity Search
Bing Autosuggest
<b>Bing Search</b>
Web Search
Image Search
News Search
Video Search
<b>Bing Statistics add-in</b>
<b>Bing Visual Search</b>
<b>Bing Custom Search</b>



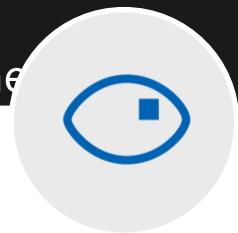
## Labs

Project Gesture
Project Local Insights
Project Academic Knowledge
Project Entity Linking
Project Knowledge Exploration
Project Event Tracking
Project Answer Search
Project URL Preview
Project Anomaly Finder
Project Conversation Learner
Project Personality Chat

# Microsoft Cognitive Services

## Customization

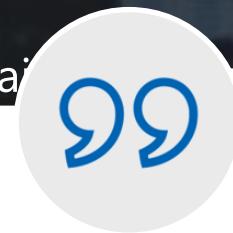
The Microsoft Cognitive Services team has created a set of customizable services available to developers around the world.



**Vision**



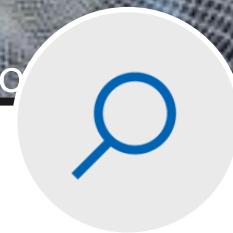
**Speech**



**Language**



**Knowledge**



**Search**



**Labs**

Custom Vision  
Service

Custom Speech  
Service

Language  
Understanding

Custom Decision  
Service

Bing Custom  
Search

# Why Microsoft Cognitive Services?

Easy

Roll your own with REST APIs

Simple to add: just a few lines of code required



Flexible

Integrate into the language and platform of your choice  
Breadth of offerings helps you find the right API for your app  
Bring your own data for your custom experience



Tested

Built by experts in their field from Microsoft Research, Bing, and Azure Machine Learning

Quality documentation, sample code, and community support

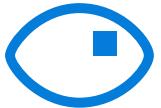


# Combining Services for real-world applications

Vision	Speech	Language	Knowledge	Search
 What is in the image or video?  Intelligent Image insights  Category: People; 5 faces Adult/Racy?: False/False Dominant colors: #F0A0A0, #A0C0F0, #A0A0D0 Accent color: #A0A0A0  Computer Vision	 Give me directions to the nearest local branch  Speech to text  Convert spoken audio to text Convert text to spoken audio Extract intent of user	 Play today's customer call recording  Natural Language Processing  Intent: PlayCall Content: Customer# DateTime.date: today  Now Playing 11/29/2016 Customer Call	 QnA Pair of this site?  Automatic extraction of questions and answers  What are your hours today? Today we are open from 7:00 AM to 10:00 PM. Do you have vegetarian options? Yes, we have vegetarian options available.	 Search for 'fraud prevention'  Intelligent web search  Information Communications Media Market News It also investigates the top three expected Fraud Detection and Prevention programs, in terms of demand in key markets...  The Big Question: In-House or Outsourced Fraud Protection? First, let's point out that there is not one absolute answer—there are "pros" and "cons" to each. Those who favor in-house...  How to Protect Your Business from Online Fraud this Holiday Season Michael heads fraud prevention tool. Online and mobile shopping are expected to continue growing apace...

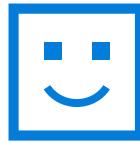


# Vision



## Computer Vision API

Distill actionable information from images



## Face API

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



## Emotion API

Personalize experiences with emotion recognition



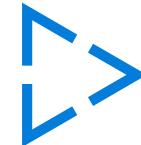
## Content Moderator

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



## Custom Vision Service

Customizable web service that learns to recognize specific content in imagery



## Video Indexer

Process and extract smart insights from videos



# Speech



## Bing Speech API

Convert speech to text and back again, and understand its intent



## Speaker Recognition API

Give your app the ability to know who's talking



## Custom Speech Service

Fine-tune speech recognition for anyone, anywhere



## Bing Spell Check API

Detect and correct spelling mistakes within your app



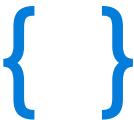
## Web Language Model API

Leverage the power of language models trained on web-scale data



## Linguistic Analysis API

Easily parse complex text with language analysis



## Language Understanding Intelligent Service

Teach your apps to understand commands from your users



## Text Analytics API

Detect sentiment, key phrases, topics, and language from your text

## Translator

Easily perform speech and text translation



# Knowledge



## Academic Knowledge API

Explore relationships among academic papers, journals, and authors



## Knowledge Exploration Service

Add interactive search over structured data to your project



## Entity Linking Service

Contextually extend knowledge of people, locations, and events



## Recommendations API

Provide personalized product recommendations for your customers



## Custom Decision Service

Create custom experiences with adaptive, contextual decision-making



## QnA Maker

Distill information into conversational, easy-to-navigate answers

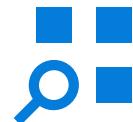


# Search



## Bing Web Search API

Connect powerful search to your apps



## Bing Image Search API

Bring advanced image and metadata search to your app



## Bing Video Search API

Trending videos, detailed metadata, and rich results



## Bing News Search API

Link your users to robust and timely news searches

## Bing Autosuggest API

Give your app intelligent autosuggest options for searches

## Bing Entity Search

Enrich user experiences with contextual entity search results

## Bing Custom Search

Create a highly-customized web search experience



# Microsoft Cognitive Services Labs

An early look at emerging Cognitive Services technologies:  
discover, try, and give feedback on new technologies before general availability



## Project Prague

Gesture based controls



## Project Cuzco

Event associated with Wikipedia



## Project Johannesburg

Route logistics



## Project Nanjing

Isochrones calculations



## Project Abu Dhabi

Distance matrices



## Project Wollongong

Score location attractiveness



# VISION

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

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



# Computer Vision API

## 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

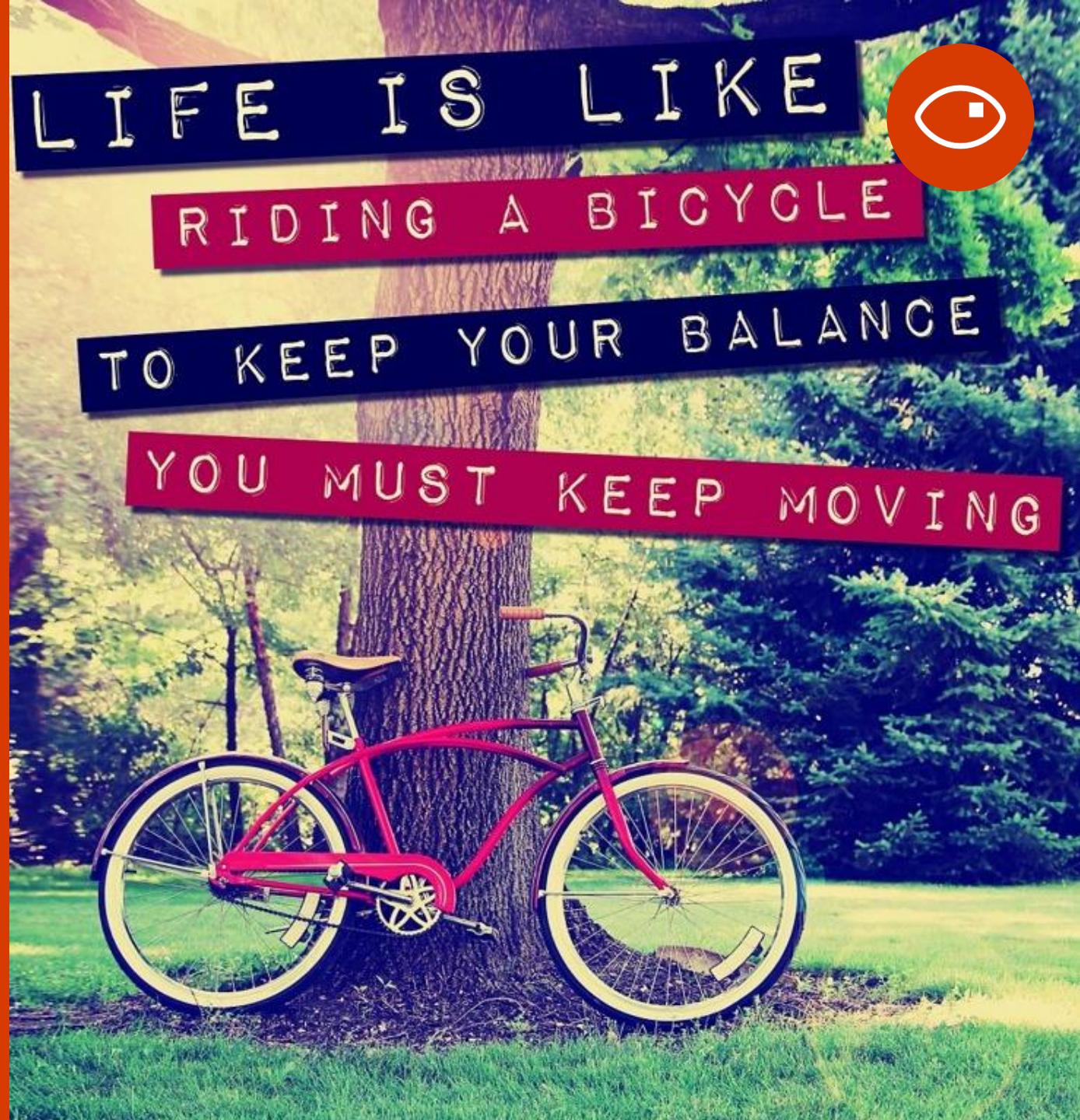
Dominant Color Background	White
Dominant Color Foreground	Grey
Dominant Colors	White
Accent Color	



# OCR

Life is like riding  
a bicycle

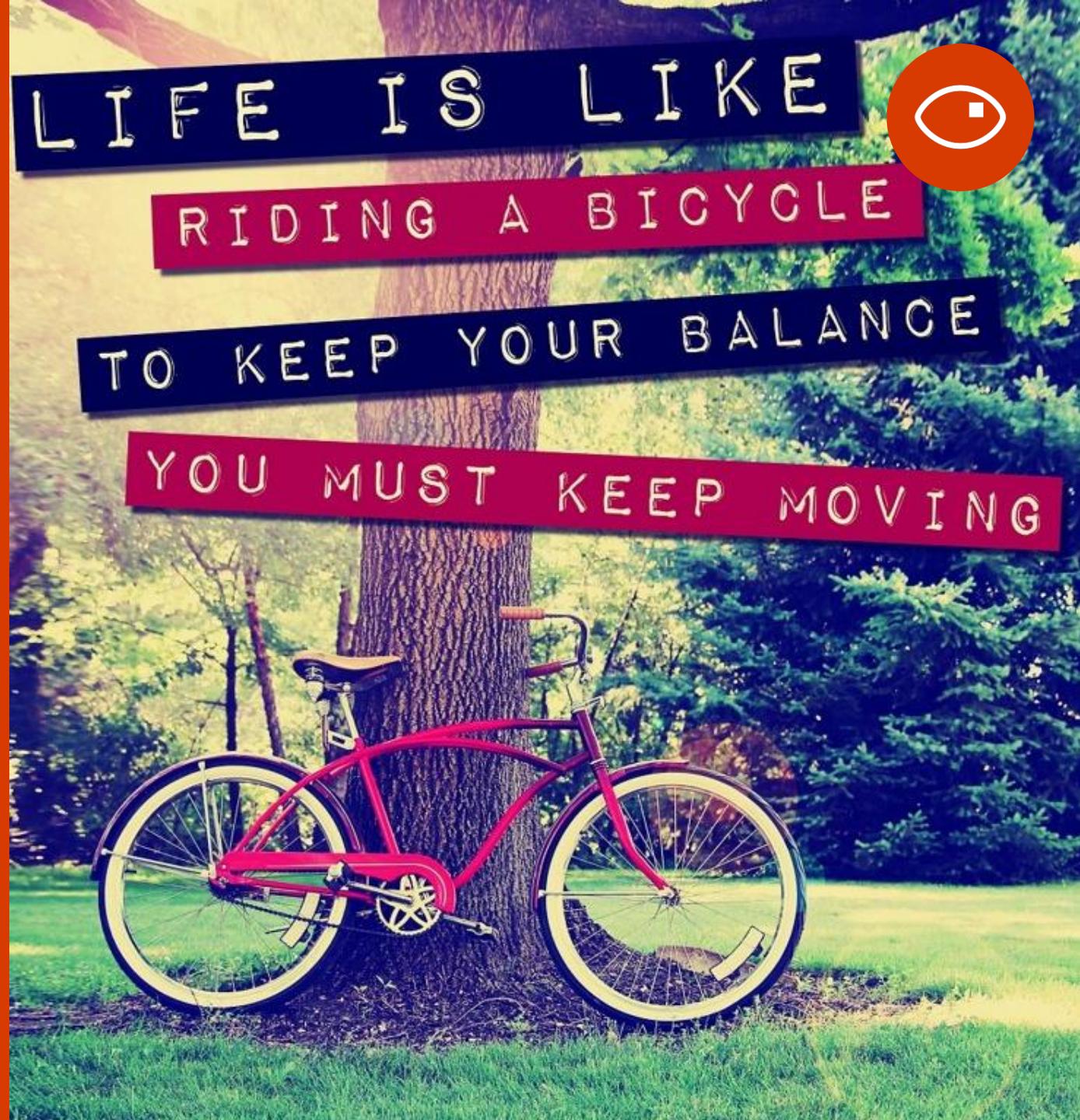
To keep your  
balance you must  
keep moving



# 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"  
            }  
          ...  
        ]  
      ]  
    }  
  ]  
}
```



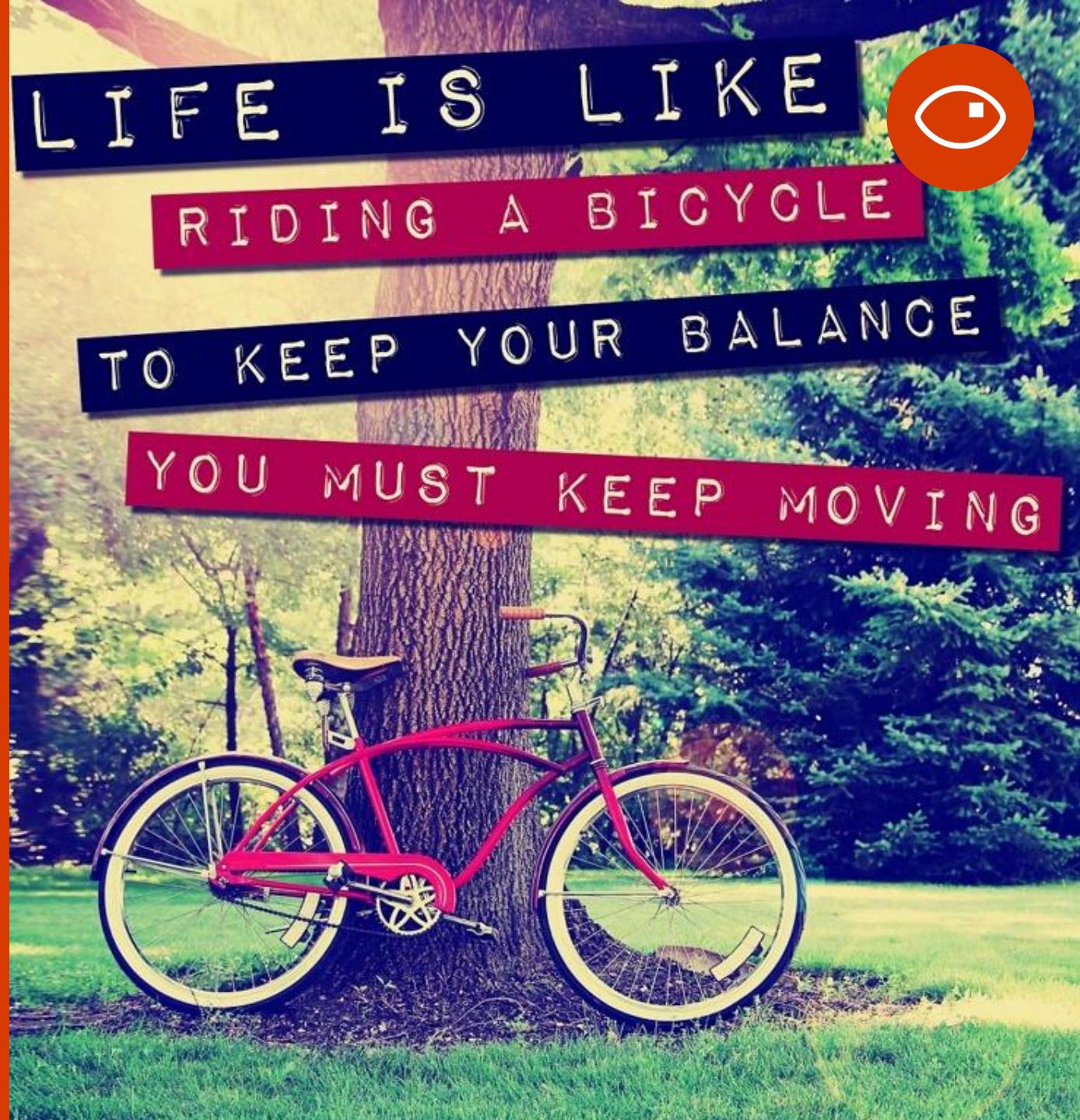
# OCR

Good at

Scanned documents

Photos with text

Fine grained  
location information



# Smart thumbnail

Smart cropping off



# Emotion API



**Recognize  
emotions**

Understand content  
within an image



# Emotion API

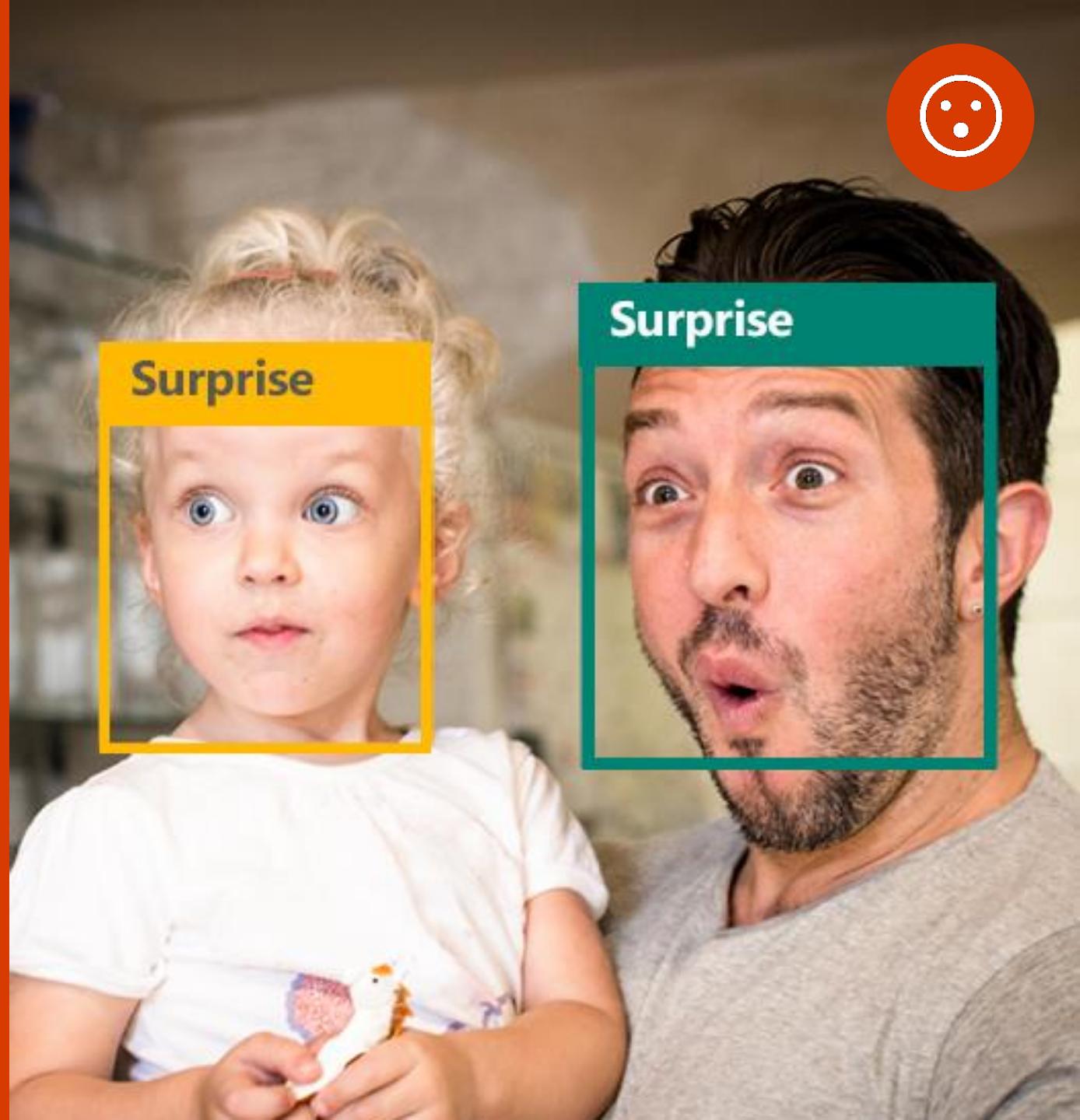


## Face detection

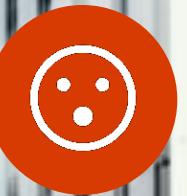
```
"faceRectangle": {"width": 193,  
                 "height": 193,  
                 "left": 326,  
                 "top": 204} ...
```

## 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}
```



# Face API



## 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 API



## Detection

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

## Feature attributes

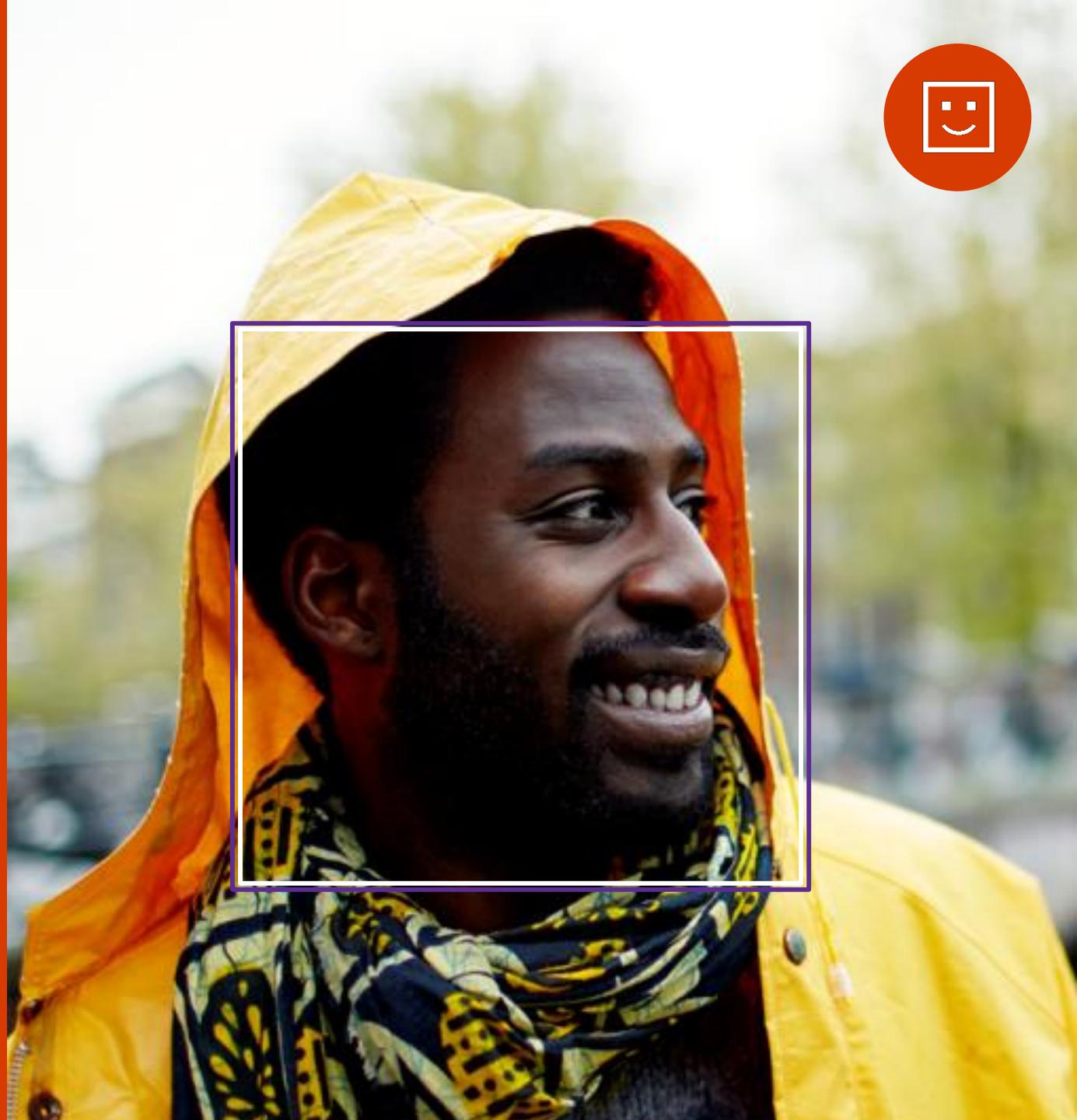
```
"attributes": { "age": 42, "gender": "male",  
"headPose": { "roll": "8.2", "yaw": "-37.8",  
"pitch": "0.0" }}
```

## Grouping



## Identification

Jasper Williams



# Content Moderator

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

## Image moderation

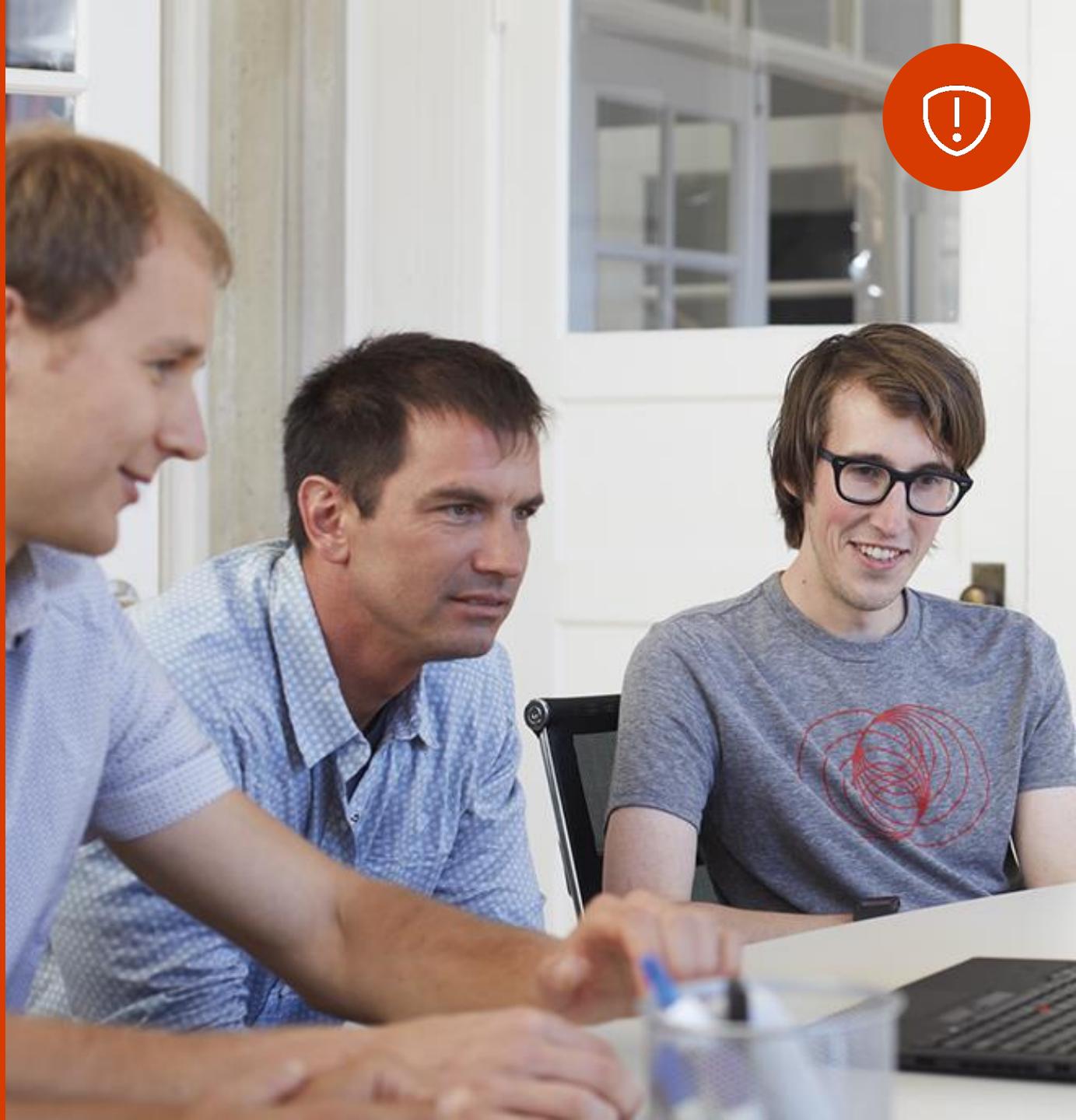
Enhance your ability to detect potentially offensive or unwanted images through machine-learning based classifiers, custom blacklists, and Optical Character Recognition (OCR)

## Text moderation

Helps you detect potential profanity in more than 100 languages and match text against your custom lists automatically. Content Moderator also checks for possible Personally Identifiable Information (PII)

## Video moderation (in Azure Media Services)

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



# Custom Vision Service

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



# Video Indexer

Unlock video insights

## Upload your video and go

Start turning your video into insights right away. No more tedious and error-prone manual indexing. And no need for specialized expertise. With Video Indexer, just upload your video, and start finding insights right away, without writing a single line of code

## Make your content more discoverable

Quickly and easily extract insights from videos using artificial intelligence. 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



{ }

# Language Understanding Intelligent Service

**Understand what  
your users are saying**

Use pre-built Bing and Cortana  
models or create your own



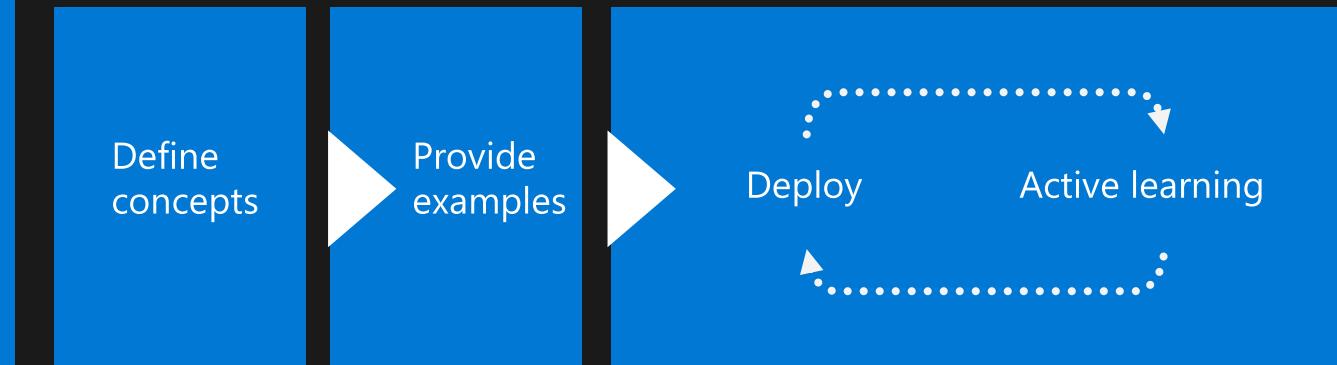
# Language Understanding Intelligent Service

Reduce labeling effort  
with interactive featuring

Use visualizations to gauge  
performance and improvements

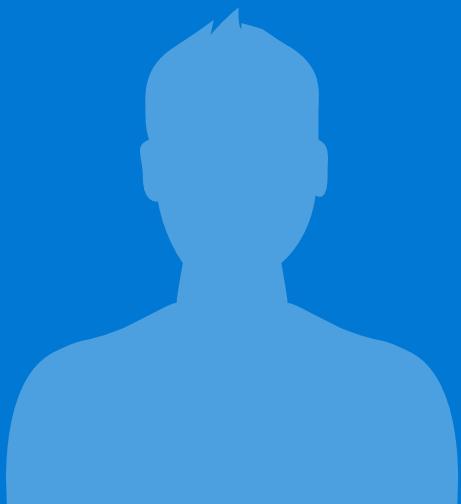
Leverage speech recognition  
with seamless integration

Deploy using just a few  
examples with active learning



# Language understanding models

“News about  
flight delays”



```
{  
  "entities": [  
    {  
      "entity": "flight_delays",  
      "type": "Topic"  
    }  
  ],  
  "intents": [  
    {  
      "intent": "FindNews",  
      "score": 0.99853384  
    },  
    {  
      "intent": "None",  
      "score": 0.07289317  
    },  
    {  
      "intent": "ReadNews",  
      "score": 0.0167122427  
    },  
    {  
      "intent": "ShareNews",  
      "score": 1.0919299E-06  
    }  
  ]  
}
```



[My apps](#) [My keys](#) [Docs](#) [Pricing](#) [Support](#) [About](#)

# Pizza Bot

Version: 0.1

 [Settings](#)[Dashboard](#)[Intents](#)[Entities](#)[Prebuilt domains](#) PREVIEW[Features](#)**Train & Test**[Publish App](#)[← Back to App list](#)

## Test your application

Use this tool to test the current and published versions of your application, to check if you are progressing on the right track ... [Learn more](#)

[Train Application](#)

Last train: Jan 18, 2017 2:41:01 PM | Last publish: Jan 18, 2017 2:41:25 PM

[Interactive Testing](#)    [Batch Testing](#) [Enable published model](#)[Labels view \(Ctrl+E\)](#)[Entities](#)[Reset console](#)

Type a test utterance &amp; press Enter →

i'd like a [\$Size] pie with [\$Toppings]

i need a [\$Size] pizza with [\$Toppings] and tomatoes

i need a [\$Size] pizza

### Current version results

Top scoring intent  
Order-Pizza (0.88)

Other intents  
None (0.06) Cancel (0)

# Linguistic analysis

**Analysis tools for natural language processing**

Access to part-of-speech tagging and parsing, identifying concepts, and actions



# Linguistic analysis



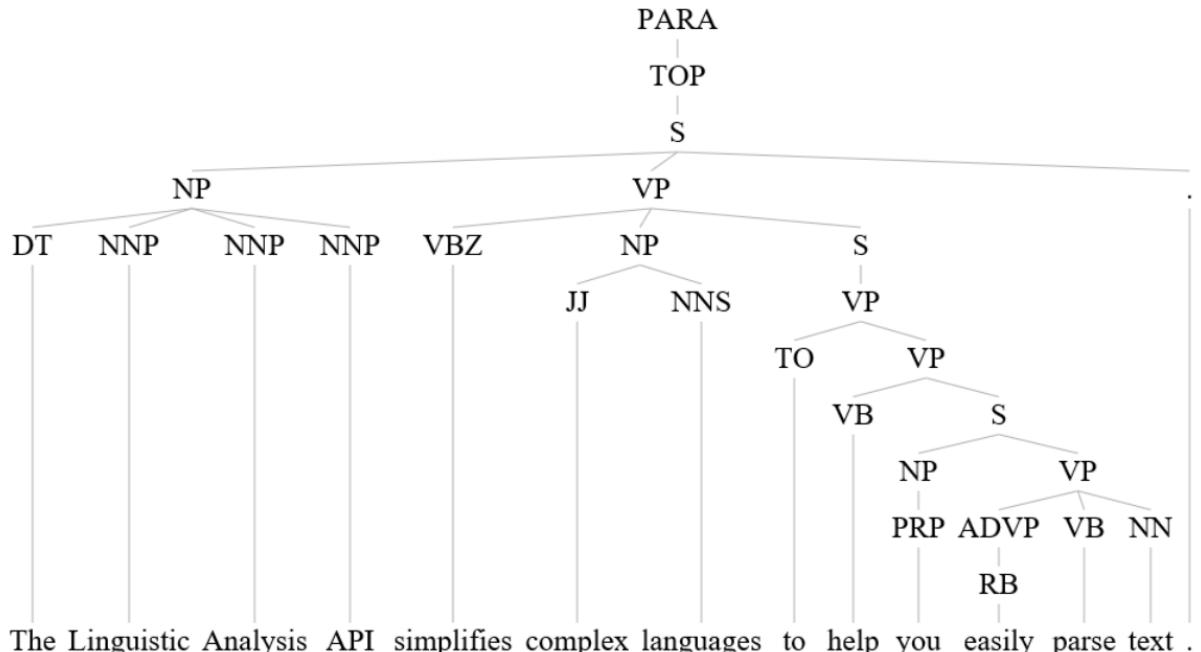
Enter a sentence

The Linguistic Analysis API simplifies complex languages to help you easily parse text.

POS tags

```
[["DT","NNP","NNP","NNP","NNP","VBZ","JJ","NNS","TO","VB","PRP","RB","VBP","NN","."]]
```

Constituency tree





# Text analytics

## Sentiment analysis

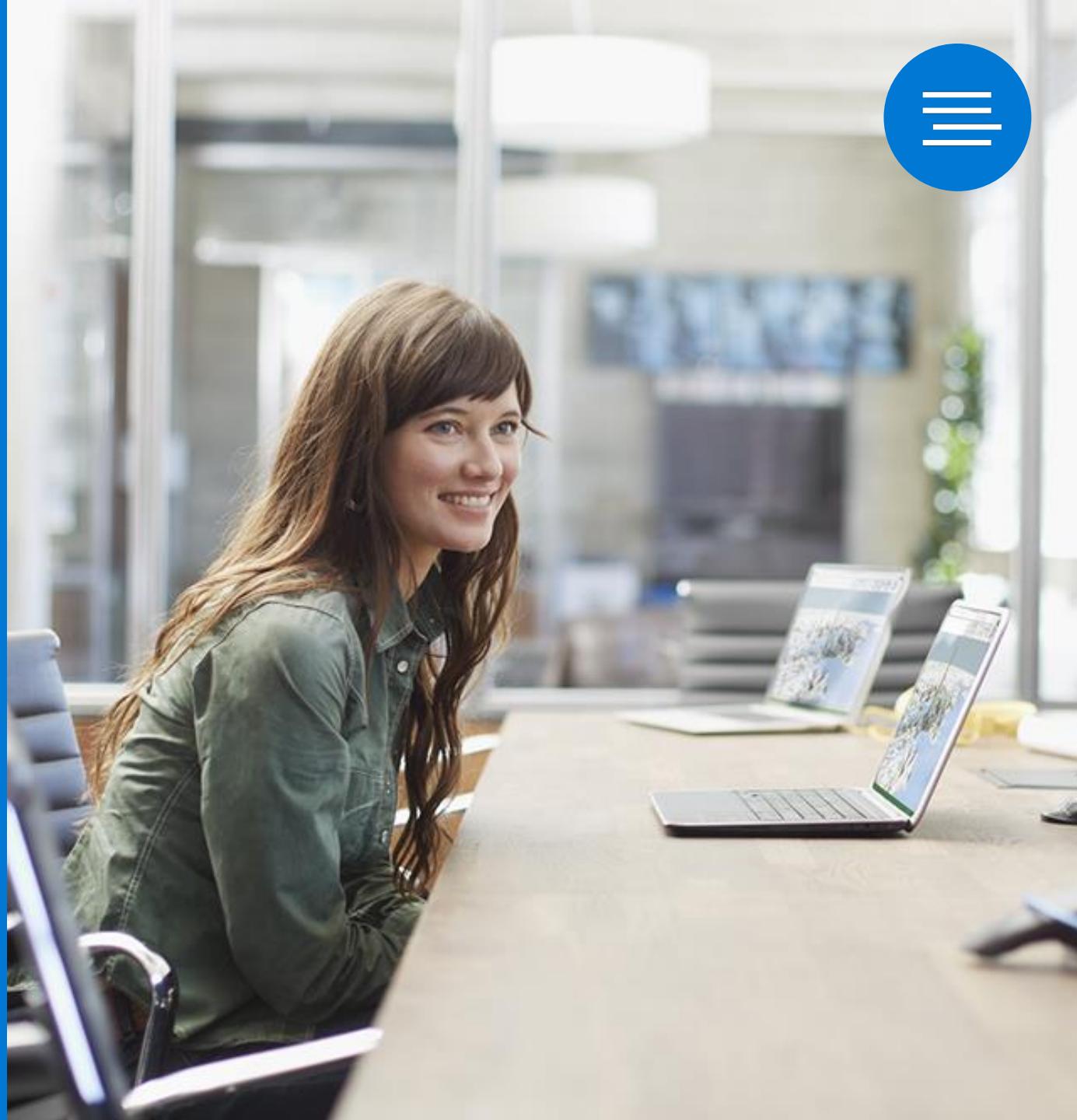
Understand if a record has positive or negative sentiment

## Key phrase extraction

Extract key phrases from a piece of text, and retrieve topics

## Language detection

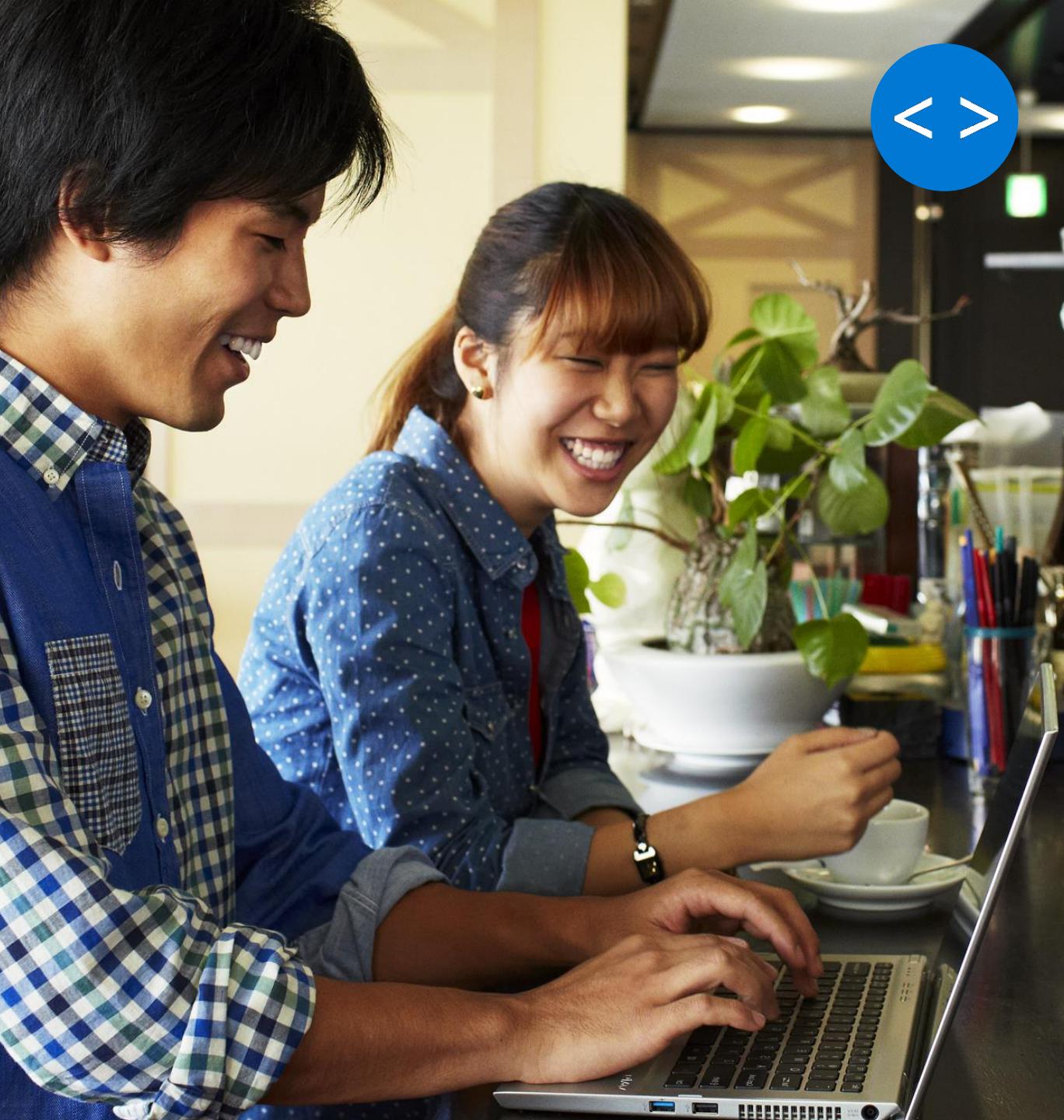
Identify the language, 120 supported languages



# Web language model

**Automation of a variety of standard natural language processing tasks using state-of-the-art language modeling APIs**

Word breaking, joint probability of natural language expressions, scoring, and predicting following words in a sequence



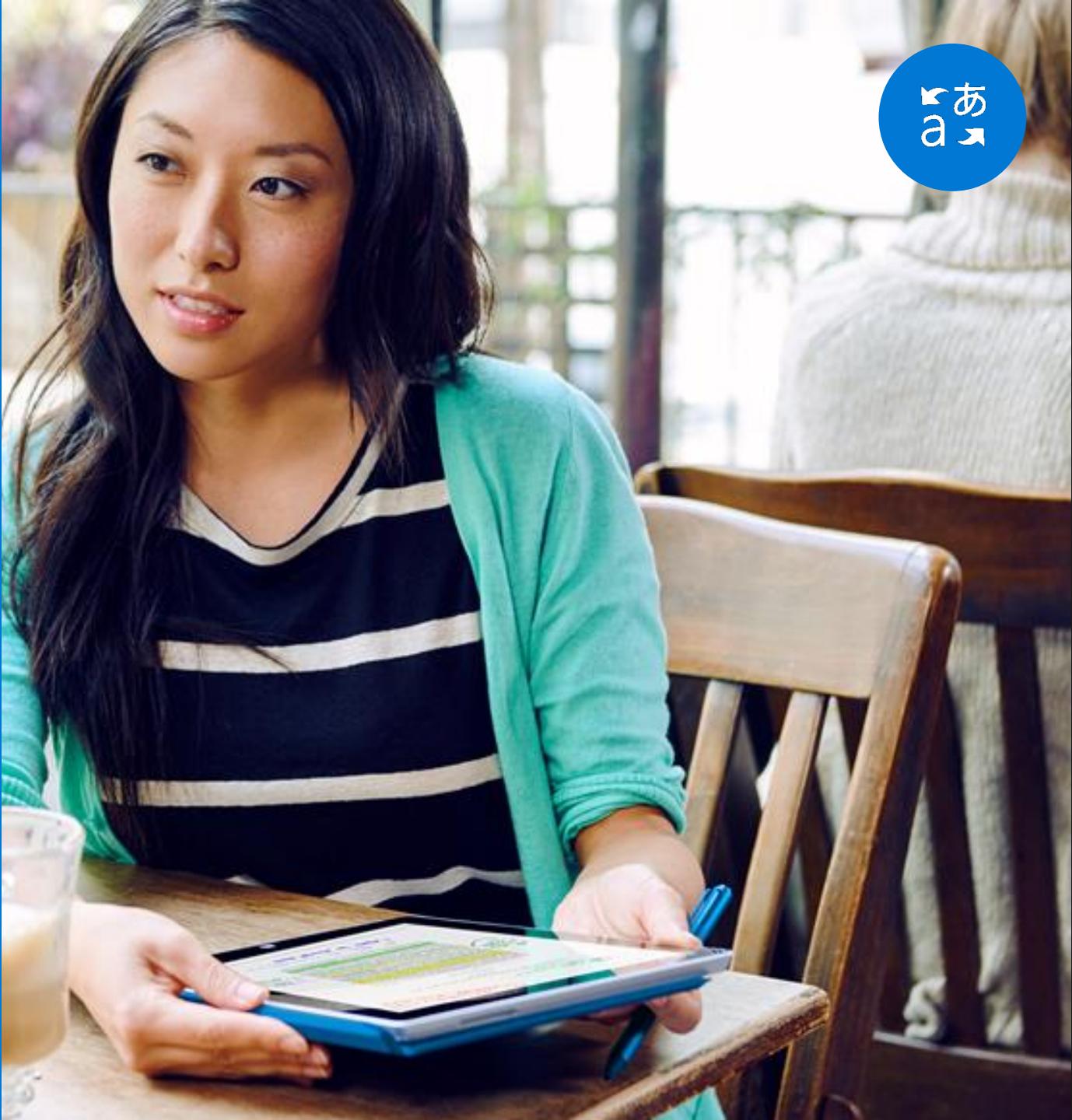
# Microsoft Translator

## Translator Text API

Automatically detect language  
and easily power translation to and  
from 60 supported text languages

## Translator Speech API

Easily translate real-time speech  
conversations in 9 support languages





Get started for free at  
<http://azure.com/Cognitive>



Learn more on the Cortana Intelligence Suite [website](#) and Cognitive Services [website](#)



Schedule a workshop to identify areas in your business where analytics and intelligence can drive transformation



Talk with your Microsoft contact about licensing options and partners



# DEVELOPER RESOURCES

## Pricing

<https://azure.microsoft.com/en-us/pricing/details/cognitive-services/>

## Documentation

<https://docs.microsoft.com/en-us/azure/#pivot=products&panel=cognitive>

## Client SDKs

<https://azure.microsoft.com/en-us/resources/samples/?sort=0&term=cognitive+services>  
<https://github.com/southwood/project-oxford-python>

## Example Code

<https://github.com/jsturtevant/happy-image-tester-django>  
<https://github.com/Microsoft/Cognitive-Face-Android>  
<https://github.com/Microsoft/Cognitive-Samples-IntelligentKiosk>

## Join Our Community

<https://stackoverflow.com/questions/tagged/microsoft-cognitive>  
<https://cognitive.uservoice.com/>

# Resources, Tutorials & Demos

- AI & Cognitive Services Tutorials: <https://aka.ms/aicog>
- Code Samples on Cognitive Services: <https://aka.ms/cogsamples>
- C# Tutorial: <https://aka.ms/face-cs>
- Java Tutorial: <https://aka.ms/face-jv>
- Python Tutorial: <https://aka.ms/face-py>
- APIs in Action:
- How Old Bot: <https://how-old.net/>
- Celebs Like Me: <https://www.celebslike.me>
- What Dog? <https://www.what-dog.net>
- Try Vision API: <https://aka.ms/tryvision>

# Q&A



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[www.bootcamplk.com](http://www.bootcamplk.com)

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#GlobalAIBootcamp