

# What is Visual Recognition?

# Video and Image data is Growing exponentially

# \$105B

2019 cloud-based video market<sup>1</sup>

# 2.5 Quin-tillion

bytes ( $10^{18}$ ) of data is created everyday.

# 1.3 Trillion

photos were taken in 2017.<sup>5</sup>

Watson / IBM Watson Visual Recognition

Video will represent **80%** of global Internet Traffic by 2019<sup>3</sup>

## Social & Video



**150 million** daily active users  
**301 million** monthly active users

Video is increasingly a communal experience, with social media connecting audiences viewing live and on-demand content.<sup>4</sup>

## MINUTE OF INTERNET

**266K**

Hours watched

**NETFLIX**

**4.3M**

Videos viewed

**YouTube**

**2.4M**

Snaps created



**176K**

Scrolling Instagram



## MEDIA DATA

**97%** growth in 2017

**82%** unstructured

Media data comes from sources such as:



Video and Film



Images



Audio

# Market Challenges

In 2017, more than 1.3 trillion photos were taken, with 4.7 trillion photos supposedly to be stored.



Analysis of visual data requires advanced machine learning and computer vision algorithms that require significant training.



Creating custom machine learning systems can require specialized and detailed knowledge and have a significant learning curve for new users.



# Different Flavors of Computer Vision

Image Tagging

Similarity Search

People Counting

OCR

Visual Learning

Geo fencing

Color Detection

Face Detection

Abandoned bag

Content Classification

Facial Recognition

License Plate  
recognition

Text from Images

Facial Sentiment

Object Tracking

Media Enrichment

Group forming

# Use Computer Vision to answer these questions

- What is this a picture/video/image of?
- Which ones and how many pictures/videos/images do I have which are similar to this one?
- What is the relevance to my bottom line of using one image vs. another image?
- What are the common themes in this batch of 1MM photos?
- Is this ship a known entity?
- What is my audience interested in?
- What user-generated content matches which products I sell?
- Which images will resonate best in a marketing campaign?
- Which image should I feature on my front page of my app?

# Use Cases & Case Studies

# Visual Recognition Use Cases

## Visual Inspections

An **Insurance** company builds an image recognition solution to automate visual inspections for damage, defects, and quality assurance.

## Resource Identification

A **Mining & Minerals** company uses image recognition to automatically identify assets and sites in satellite imagery.

## Autonomous Vehicles

A **Car** equipped with computer vision to safely drive in our environment, capable of reading road signs, detecting pedestrians, other cars...

## Social Media Listening

An **Advertising** agency analyzes visual content in social media posts to understand content, sentiment, and trends.

## Content Enrichment

A **Media** company uses image recognition to automatically append metadata to visual content, turning dark data into searchable content.

## Assisted Maintenance

An **Energy Producer** uses mobile application to empower technicians on the field to rapidly identify, report and solve maintenance issues with rapid access to contextual documentation and maintenance guidance.

## Demographics

A **Retailer** uses face detection capabilities to gather age and gender estimates of its shoppers.

## Calorie Counting

A **Health & Nutrition** company automatically identifies foods and meals in order to more quickly return nutrition facts.

## Visual Assistance

A **Car Manufacturer** uses augmented reality and computer vision to educate new car owners on the devices and capabilities of their new car.

## Fraud Detection

An **Insurance** company authenticate claims using image forensic search.

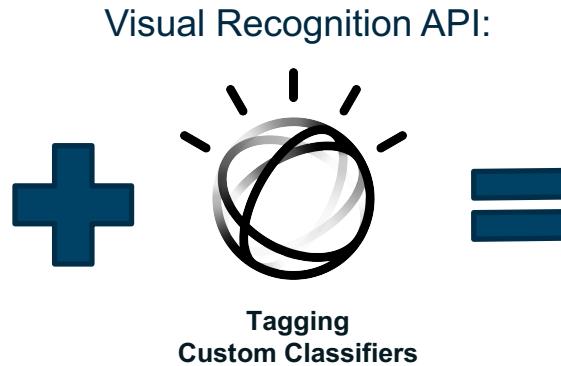
# IBM Watson Advertising - Social Media Monitoring



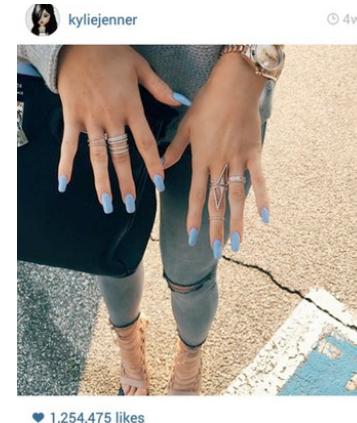
Companies are looking to understand what is trending on social media and how they can use that for advertising their own products:



photos often have more information than the associated captions



Can use trend insights in advertising campaigns to better target certain customer segments:



this photo with over a million likes shows a celebrity wearing skinny jeans

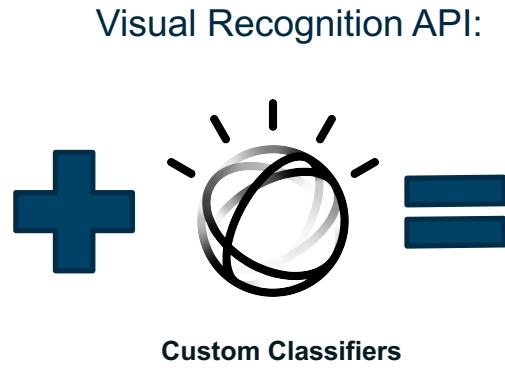
**monitor the top trends on social media**

get to know your customers' **interests**

# IBM Watson Natural Resources - Resource Monitoring



A mining or oil company has a number of facilities it sends people to inspect on a regular basis:



must perform regular inspections of oil wells for leaks/spills to comply with regulations

Identify through satellite/security images when a leak has occurred at a facility:



instead of sending people out periodically, a resource manager can know in real time when a leak has occurred

## quickly evaluate current state of facilities

improve margins by **reducing** resource **waste**

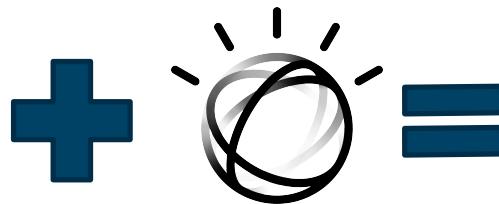
Equipment and infrastructure monitoring requires manual, time-intensive inspections:



lack of automation means monitoring takes time away from other tasks



Visual Recognition API:



Tagging  
Custom Classifiers

Automatically inspect infrastructure and assets to identify areas that need maintenance:



this includes the ability to custom train on specific infrastructure

Puncture  
98% Confident

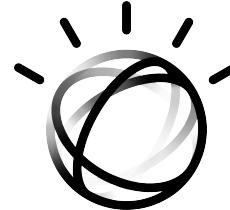
## preventative measures help decision makers

address issues **before** they become problems

A survey of 1,000 homes in the bay area has been ordered with ~20 images/property:



Visual Recognition API:



Custom Classifier

around 20,000 images not clearly labeled or organized

Instead of looking through 20,000 images manually, an underwriter can organize by specific attributes like “roof damage”:



House #145  
House #267  
House #325  
etc...

list of houses with images that show roof damage

**focus** on the parts that matter

find what you need **faster**

# OmniEarth uses Watson Visual Recognition to process satellite images 40x faster than manual methods.



## Company Description

OmniEarth provides global Earth observation and analytics to help subscribers assess, manage and predict change. The company delivers analytics-ready, multispectral imagery from everywhere on Earth every day, enabling subscribers to see, analyze and react to change in real time.

## Business Challenge

OmniEarth worked with the State of California to combat drought by identifying parcels of land from satellite images and providing water usage recommendations. To uncover insights that would help combat drought in a profound new way, OmniEarth Inc. needed to process and categorize massive amounts of aerial data quickly and accurately.

## Business Benefits

By feeding aerial imagery into the IBM Watson Visual Recognition service and training the software to differentiate between pools, grass, gravel and other terrain features, OmniEarth can automatically evaluate land parcels and help water districts identify properties that use more water than necessary, then help owners adjust usage accordingly. Watson Visual Recognition enabled higher capacity for analyzing terrain on a massive scale, creating new business opportunities all over the world.

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**With Watson Visual Recognition, OmniEarth is able to process and categorize 150,000 images in 12 minutes, a task that normally requires days to complete.**

# Visual Recognition Customers



**AERIALTRONICS**  
REMOTELY PILOTED AIRCRAFT SYSTEMS



Netherlands-based drone manufacturer Aerialtronics uses Watson Visual Recognition to automate aerial visual inspections, speeding up the process while reducing cost and increasing safety.

[Full case study](#)

**BlueChasm**



Digital development company BlueChasm uses Watson Visual Recognition to analyze video data streams and recognize specific objects, themes, or events—converting a simple video camera into an intelligent analytics tool.

[Full case study](#)

  
**BELRON**



International vehicle glass repair company Belron uses Watson Visual Recognition to automatically generate estimates of repair costs based on customer-provided images of superficial car damage.

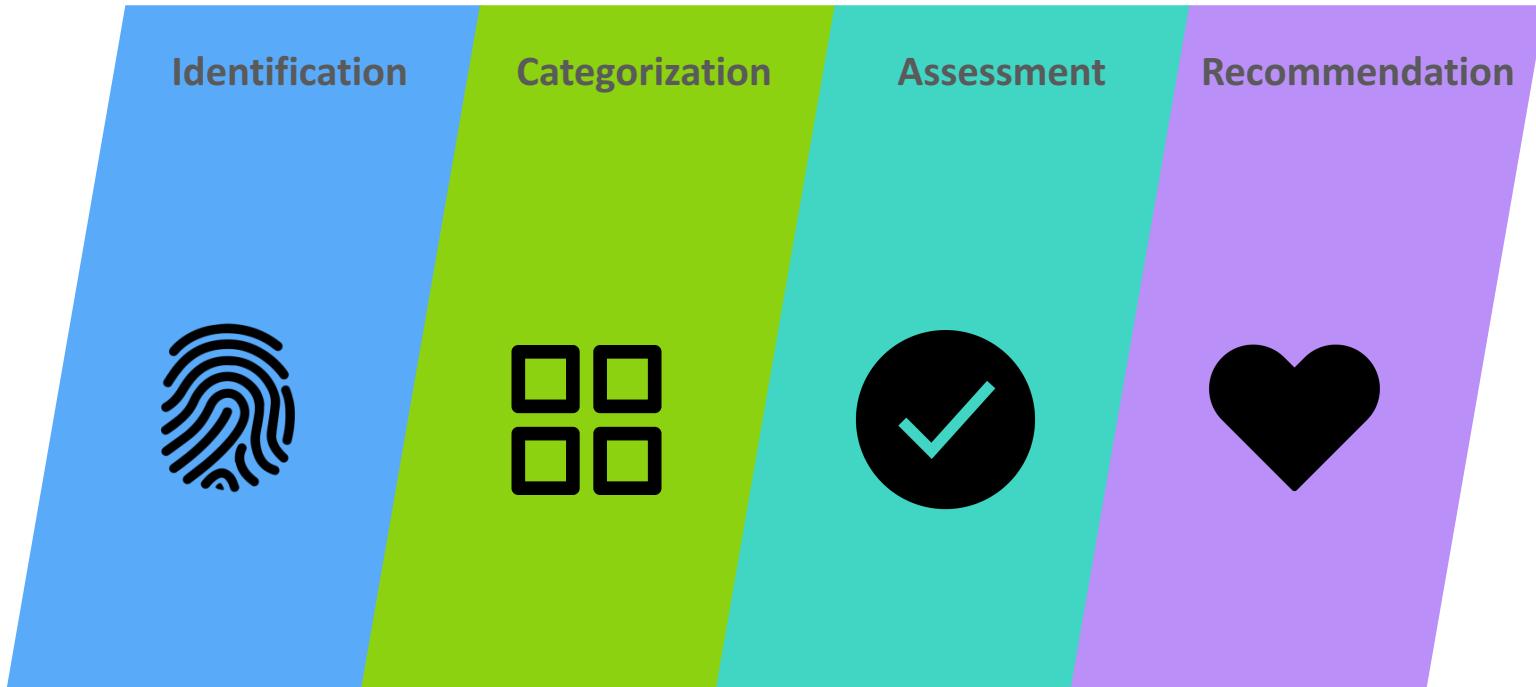
# Watson Visual Recognition

# Watson Visual Recognition



An **image recognition** service that enables users to quickly and accurately **tag, classify, and train visual content** using machine learning.

# Watson Visual Recognition focuses on...



Watson Visual Recognition **identifies** objects and people.

hatchback  
compact car  
vehicle  
claret red color



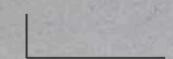
Watson Visual Recognition **categorizes** for easy organization.



vintage

modern

**Watson Visual Recognition assesses for better problem-solving.**



counterfeit, 78% confident

# Watson Visual Recognition **recommends** for faster decision-making.

A close-up photograph of the front left corner of a dark-colored car. The bumper is significantly damaged, with a large dent and some paint chipped off. The headlight is also visible, and the overall condition appears to be that of an accident-damaged vehicle.

Historically, we've paid  
\$7,500 for similar  
types  
of damage

# Visual Recognition Features

## General Model

Quickly understand the contents, scenes, and actions within an image.

English, Spanish, Arabic, Japanese, Korean, Italian, French, and German are supported today.

## Face Model

Locate faces within an image and receive age and gender estimates.

## Text Model (private beta)

Locate and read natural scene text within images. [Apply for access.](#)

## Custom Model

Train Watson to understand and classify your own custom content.

## Food Model (beta)

Recognize foods and meals with enhanced accuracy.

## Color Model (beta)

Identify up to two most prominent colors that appear within an image.

## Explicit Model (beta)

Determine if an image contains inappropriate content.

# Watson Visual Recognition Service

Visual Recognition : visual-recognition-wws

Associated project : WasteSorter

Overview    Credentials

**Custom**  
Create custom, unique visual classifiers, custom, unique visual concepts that are not available with general model.

**General**  
**Faces**  
Copy model ID Generate class keywords that describe the image. Use your own images, or extract relevant images from publicly accessible webpages for analysis.

**Faces**  
Copy model ID Detect human faces in the image. This service also provides a general indication of age range and gender of faces.

**Food** BETA  
Copy model ID Utilize a specialized vocabulary of over 2000 foods to identify meals, food items, and dishes with enhanced accuracy.

**Explicit** BETA  
Copy model ID Assess whether an image contains objectionable or adult content that may be unsuitable for general audiences.

**Text** PRIVATE BETA  
Automatically detect and extract recognized words within natural scene images.

**Custom Models**

**Default Custom Model**

## Out of the box tooling

### General

Associated Service : VRN-Workshop\_1

Overview    Test    Implementation

Filter

Threshold

0.01

1

Clear results

x

Class

ash grey color  
 auto racing  
 body (of vehicle)  
 body parts  
 bumper (of vehicle)  
 bumper (of vehicle)  
 car  
 charcoal color  
 clear red color  
 compact car  
 compartment  
 convertible car  
 coupe car  
 dark red color  
 drinking glass  
 elevator car  
 four-wheel drive  
 furniture  
 gear cluster

Q2== (1).jpg	Q2== (2).jpg	Q2== (3).jpg	Q2== (4).jpg
claret red color 0.90 lemon yellow color 0.85 vehicle 0.84 wheeled vehicle 0.84	ash grey color 0.94 charcoal color 0.72 vehicle 0.72 wheeled vehicle 0.72	wheeled vehicle 0.91 car 0.91 wheeled vehicle 0.82 mechanism 0.82	claret red color 0.94 vehicle 0.91 wheeled vehicle 0.81 mechanism 0.79
sports car 0.46 body (of vehicle) 0.41 cab (vehicle) 0.58 compartiment 0.58 indoors 0.58	mechanism 0.40 sport utility 0.56 four-wheel drive 0.55 transmission system 0.55	indian red color 0.85 sports car 0.80 body (of vehicle) 0.62	indian red color 0.70 sports car 0.79 coupe car 0.57 looser car 0.55
cab 0.54 bodywork 0.52 bodyparts 0.50	gear mechanism 0.55 race car 0.55 racecar 0.53	motor vehicle 0.56 motor vehicle 0.53	motor vehicle 0.53 gas guzzler 0.50
gear mechanism 0.50			

≡ See all features

1/2

Pre-trained models

Watson Visual Recognition's category-specific models enable you to analyze images for scenes, objects, faces, colors, foods, and other content.

Paste an image URL here...



General Model

Quickly understand objects, actions, scenes, and colors within an image.

photographic film	0.98
photographic equipment	0.98
roll	0.94
bottle green color	0.89
electrical device	0.79
greenishness color	0.57
roll film	0.50

Face Model (no results)

Food Model (beta) +

Explicit Model (beta) +

Text Model (private beta) -

Extract text from natural scene images. To learn more, please request access at [ibm.biz/request-text](http://ibm.biz/request-text)

← →

# Visual Recognition Tools

The screenshot shows the Watson Studio interface for the Visual Recognition service. At the top, there's a navigation bar with 'IBM Watson', 'Projects', 'Tools', 'Community', and 'Services'. Below it, a breadcrumb trail shows 'Services / Watson Services / Visual Recognition-ps'. The main area is titled 'Visual Recognition : Visual Recognition-ps' and 'Associated Project : Fruit Classifier'. A 'Overview' tab is selected, showing four sections: 'Custom' (selected), 'General', 'Food', and 'Explicit'. Each section has a brief description and a 'Test' button. Below these is a 'Text' section with a 'Copy model ID' button. A blue dashed box highlights the 'Custom' section.

## Watson Studio

Easily provision a Visual Recognition instance and interact with the service through your browser.

Classify images using IBM's pre-trained models or train and manage your own Custom Models.

[Try it now](#)



## IBM Watson Services for Core ML

Build apps that leverage Watson models on iOS devices, even when offline.

Export Custom Models for Core ML through Watson Studio. Core ML exports are free during our promotional period.

[Get started](#)

# Key Capabilities of Watson Visual Recognition



## Tooling

Not a developer? No problem! Our tooling allows anyone to get started immediately using your own API key.



## Flexibility and Customizability

Whether you're looking to get started right away with IBM's models or custom train your own, we offer options for every user.



## Privacy and Security

IBM ensures that images and data passed through our services remain secure. Your data is never used to train IBM models.



## Simplified query language

Our API service and best practices guides make it easy to get started with your preferred language.

# IBM Cloud 101 Jumpstart

## The basics

## (Code-)Examples

Homepage: <http://www.bluemix.net/> (create account there unless you already have one)

The docs: <http://console.bluemix.net/docs>

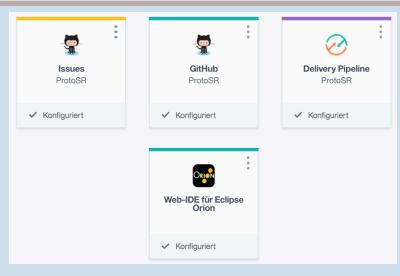
<http://developer.ibm.com/recipes/tutorials>

<http://ibm-bluemix.github.io/#/>

## Build your Apps

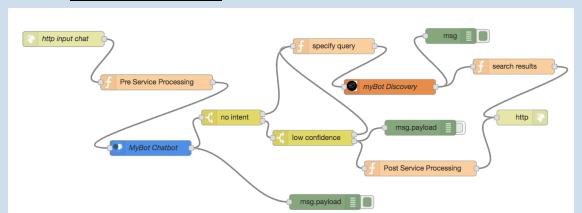
**Deploy your apps +DevOps Tooling**

java liberty  
Runtimes tomcat  
.php .py .rb  
.js .swift .xsp



Prototype/Develop almost without coding  
[Node-RED Starter](#)

### Node-RED



## Cool/useful stuff



# Cool Watson stuff in the cloud

## The basics

Watson Developer Cloud overview: <https://www.ibm.com/watson/products-services/>

The docs: <http://console.bluemix.net/docs>

Stackoverflow: <https://stackoverflow.com/questions/tagged/ibm-watson-cognitive>

## (Code-)Examples

<https://github.com/watson-developer-cloud>

Also look for tutorials and demo apps in the documentation of the individual services!

## Build your apps with Watson APIs

### [Build your own Chatbot](#)



### [extract meta-data from content such as concepts, entities, keywords and more](#)



#### [Discover content](#)



#### [Dynamic news content](#)



文

### [Translate](#)



#### [Interpret and classify natural language](#)



### [Predict personality characteristics & understand habits](#)



#### [Understand emotions and communication style](#)



### [tag, classify and search visual content](#)

### [Speech to text](#)

### [Text to speech](#)



# Data Science with Watson Studio

## The basics

Homepage: <http://datascience.ibm.com/>

## (Code-)Examples

Tutorials, notebooks, articles <https://apsportal.ibm.com/community?context=analytics>  
Blog: <https://datascience.ibm.com/blog/>



### Learn

Built-in learning to get started or go the distance with advanced tutorials

Find tutorials and datasets

Fork and share projects

Read articles and papers

+ Deep Learning



### Create

The best of open source and IBM value-add to create state-of-the-art data products

Code in Scala/Python/R/SQL

RStudio IDE and Shiny

Managed Spark Service

Jupyter Notebooks

Your favorite libraries



### Collaborate

Community and social features that provide meaningful collaboration

Projects and Version Control

Share your notebooks

Work together

+ IBM Machine Learning

# Watson Recognition Pricing Model

## Lite

- 1,000 free images per month toward Custom and Pre-Trained Models included
- Create and retrain two free Custom Models
- Free Core ML exports as a special promotional offer

## Standard

- Image Classification  
\$0.002 / image
- Face Detection  
\$0.004 / image
- Custom Classifier Training  
\$0.10 / image
- Custom Image Classification  
\$0.004 / image
- Free Core ML exports as a special promotional offer

## Premium

Contact Sales

Watson Premium plans offer a higher level of security and isolation to help customers with sensitive data requirements.

# Thank You

# Useful Links & Resources

## External

### Getting Started:

[Service Homepage](#)  
[Feature Requests / Suggestions](#)

### Case Studies:

[OmniEarth](#)  
[Aerialtronics](#)  
[BlueChasm](#)  
[iTrend](#)

### Tutorials & Best Practices:

[Training models with Watson Studio](#)  
[Getting started with Watson + Core ML](#)  
[Stacking Multiple Custom Models](#)  
[Create a Calorie Counting App](#)  
[Watson Visual Recognition & Twilio](#)  
[Best Practices for Custom Models](#)

### Code Patterns:

[Classify vehicle damage](#)  
[Analyze industrial equipment for defects](#)  
[Create an Android calorie-counter app](#)

## External continued

### Books:

[Redbook: Building Cognitive Application using IBM Watson Services vol3 – Watson Visual Recognition](#)

### Blogs:

[IBM Watson on Medium](#)

## Internal

[Slack Channel: #ibmvisual-recognition](#)  
[Service Roadmap](#)  
[IBMer key limit increase request form](#)  
[ZACS portal](#)  
[Digital Sales Play](#)  
[Content Request & Feedback Form](#)