

# Content Moderation & Machine Learning

How AWS algorithms can automate  
solutions to a growing problem



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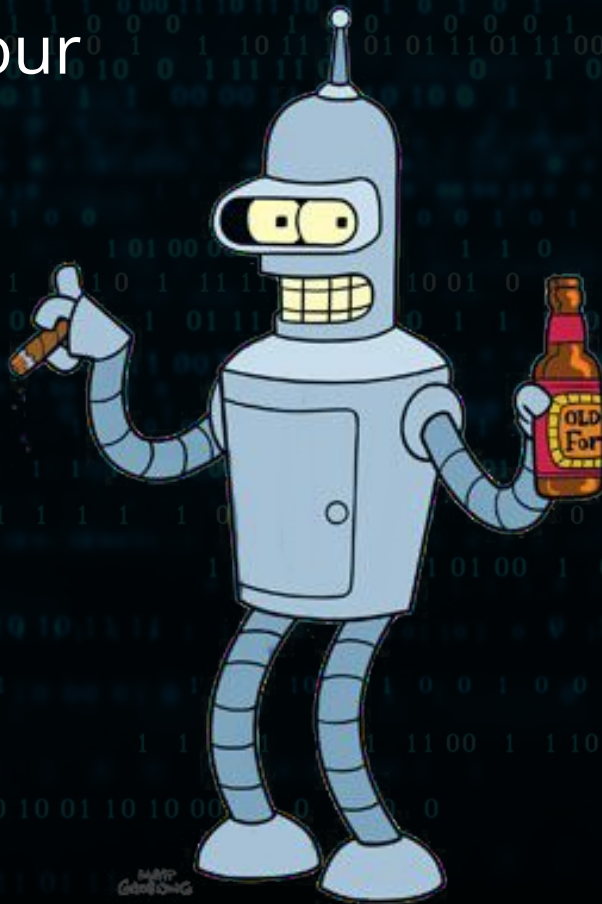
# How does it work?

AWS provides products and services, including a visual machine learning algorithm called **Amazon Rekognition** which can check media —both images and video— for various types of content.



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A robot to do our  
dirty work!



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# What can Amazon Rekognition check for?

1. Nudity or suggestive content
2. Violence or visually disturbing images
3. Drug, tobacco, or alcohol use
4. Gambling
5. Rude gestures or hate symbols



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# How does it work?

1. Create an AWS account
2. Download an SDK
3. Write some code
4. Voila!



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Search or enter website name

Search for services, features, blogs, docs, and more [option+S]

Amazon Rekognition

- Custom Labels
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  - Image moderation
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# Amazon Rekognition

Deep learning-based visual analysis service  
Search, verify, and organize millions of images and videos

[Try Demo](#)

[Download SDKs](#)

## FEATURED SERVICE

### Amazon Rekognition Custom Labels

Quickly build custom machine learning models to detect objects and scenes unique to your business.

[Learn More](#)

#### Leverage proven image and video analysis

You don't need computer vision or deep learning expertise to take advantage of Rekognition's high quality image and video analysis for your web, mobile, enterprise or device applications. Amazon Rekognition removes the complexity of building visual recognition capabilities by making powerful and accurate analysis available with easy to use APIs.

#### Detect objects unique to your business

Use Amazon Rekognition Custom Labels to quickly build your own custom ML model to detect objects and scenes unique to your business, simply by bringing your own training data. Leverage a guided experience, no machine learning expertise is required.

#### Integrated with AWS Services

Amazon Rekognition is designed to work seamlessly with other AWS services. Rekognition integrates directly with Amazon S3 and AWS Lambda so you can build scalable, affordable, and reliable visual analysis applications. You can start analyzing images and videos stored in Amazon S3 without moving any data. You can also run real-time video analysis on streams coming from Amazon Kinesis Video Streams.

## Feature Spotlight

### Amazon DevOps Guru

Improve Amazon Rekognition model health via S3, discover...

## Learning Content

### Amazon Rekognition Developer Guide

Provides instructions on how to use Amazon...

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RESOURCES

AWS SDK for Python

RELATED LINKS

Documentation

Tools

Get Started for Free

Create Free Account

## AWS SDK for Python (Boto3)

Get started quickly using AWS with `boto3`, the AWS SDK for Python. Boto3 makes it easy to integrate your Python application, library, or script with AWS services including Amazon S3, Amazon EC2, Amazon DynamoDB, and more.



Getting Started »



API Reference »



Community Forum »

### Install

```
pip install boto3
```

Or get the [latest tarball on PyPI](#)

[Find the source on GitHub »](#)

### Key Features

#### Resource APIs

Boto3 has two distinct levels of APIs. Client (or "low-level") APIs provide one-to-one mappings to the underlying HTTP API operations. [Resource APIs](#) hide explicit network calls but instead provide resource objects and collections to access attributes and perform actions. For example:

```
for i in ec2.instances.all():
    if i.state['Name'] == 'stopped':
        i.start()
```

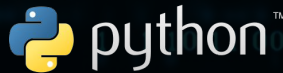
#### Up-to-date and Consistent Interface

Boto3's 'client' and 'resource' interfaces have dynamically generated classes driven by JSON models that describe AWS APIs. This allows us to provide very fast updates with strong consistency across all supported services.



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# What languages are supported?





# What video services are supported?

Almost anything! Including:

Custom Feeds



# About the SDKs

- The SDKs are not service specific – they will allow you to connect to any of Amazon’s 200+ services.
- **Amazon Rekognition** can be called from the **AWS CLI** or **Powershell**, but we don’t recommend it for Production



Let's see it in action!

## Amazon Rekognition



## ▼ Custom Labels

[Use Custom Labels](#)

## ▼ Demos

[Label detection](#)[Image moderation](#)[Facial analysis](#)[Celebrity recognition](#)[Face comparison](#)[Text in image](#)[PPE detection](#)

## ▼ Video Demos

[Stored Video Analysis](#)[Streaming Video Events](#)

## ▼ Metrics

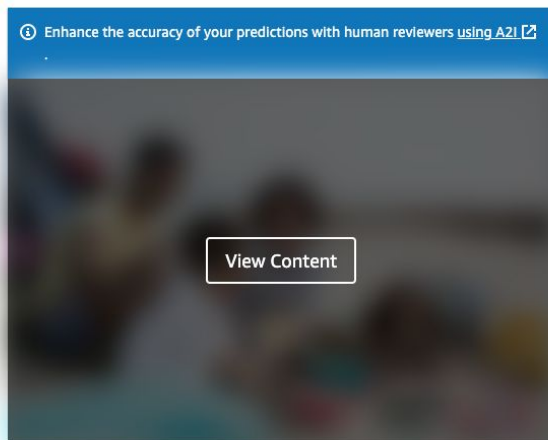
[Metrics](#)

## ▼ Additional Resources

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## Image moderation

Rekognition automatically detects explicit or suggestive adult content, or violent content in your images, and provides confidence scores. [Learn more](#)

[Leave us feedback](#)[View Content](#)

## Choose a sample image



## Use your own image

Image must be .jpeg or .png format and no larger than 5MB. Your image isn't stored.

[Upload](#)

or drag and drop

[Go](#)

## ▼ Results

No moderation labels detected

## ▶ Request

## ▶ Response



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## Amazon Rekognition



## Custom Labels

[Use Custom Labels](#)

## Demos

- [Label detection](#)
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- [Celebrity recognition](#)
- [Face comparison](#)
- [Text in image](#)
- [PPE detection](#)

## Video Demos

- [Stored Video Analysis](#)
- [Streaming Video Events](#)

## Metrics

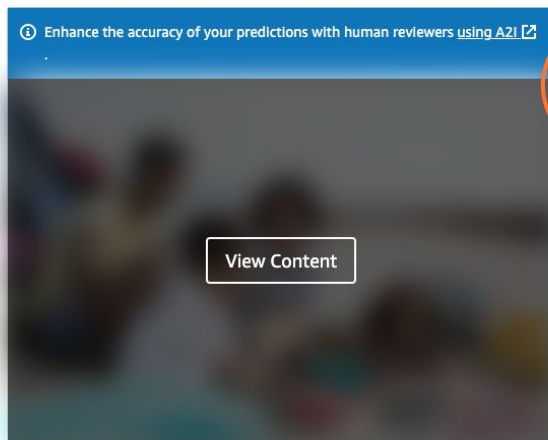
[Metrics](#)

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## Results

No moderation labels detected

## Request

## Response

Hmm. Maybe there is nothing to see here...



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## Amazon Rekognition ×

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[Leave us feedback](#)

📘 Enhance the accuracy of your predictions with human reviewers [using A2I](#)



## Choose a sample image



## Use your own image

Image must be .jpeg or .png format and no larger than 5MB. Your image isn't stored.

 Upload

or drag and drop

[Go](#)

## ▼ Results

No moderation labels detected

## ▶ Request

## ▶ Response

Aha! Just a happy family on a picnic.

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How about something more risqué?

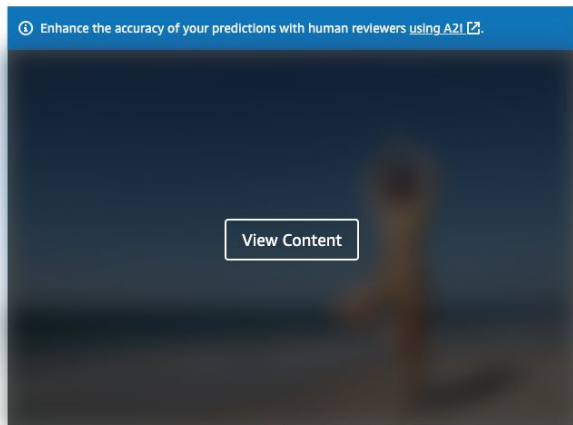
### Amazon Rekognition

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[Leave us feedback](#)

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#### Choose a sample image



#### Use your own image

Image must be .jpeg or .png format and no larger than 5MB. Your image isn't stored.

[Upload](#) or drag and drop

[Go](#)

#### Results

Suggestive	86 %
Female Swimwear Or Underwear	86 %
Revealing Clothes	72.5 %

#### Request

#### Response





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[View Content](#)

▼ Results	
Suggestive	86 %
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► Request	
► Response	

Choose a sample image



Use your own image  
Image must be .jpeg or .png format and no larger than 5MB. Your image isn't stored.

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Uh oh...



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Amazon Rekognition ✕

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## Choose a sample image



## Use your own image

Image must be .jpeg or .png format and no larger than 5MB. Your image isn't stored.

or drag and  
drop

## ▼ Results

Suggestive	86 %
Female Swimwear Or Underwear	86 %
Revealing Clothes	72.5 %

## ▶ Request

## ▶ Response

Scandalous!



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Let's try something else...



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## Amazon Rekognition

## ▼ Custom Labels

Use Custom Labels

## ▼ Demos

Label detection

Image moderation

Facial analysis

Celebrity recognition

Face comparison

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Enhance the accuracy of your predictions with human reviewers using A2I.



## Choose a sample image



## Use your own image

Image must be jpeg or .png format and no larger than 5MB. Your image isn't stored.

Upload

or drag and drop

Use Image URL

Go

## ▼ Results

Suggestive 99.6 %

Barechested Male 99.6 %

## ▶ Request

## ▶ Response



What's happening behind the scenes?

## Request

```
{
  "Image": {
    "S3Object": {
      "Bucket":
"rekognition-console-sample-images-prod-pdx",
      "Name": "yoga_swimwear.jpg"
    }
  }
}
```

## Response

```
{
  "ModerationLabels": [
    {
      "Confidence": 86.06100463867188,
      "Name": "Suggestive",
      "ParentName": ""
    },
    {
      "Confidence": 86.06100463867188,
      "Name": "Female Swimwear Or Underwear",
      "ParentName": "Suggestive"
    },
    {
      "Confidence": 72.55979919433594,
      "Name": "Revealing Clothes",
      "ParentName": "Suggestive"
    }
  ],
  "ModerationModelVersion": "5.0"
}
```

# Categories/Subcategories

- Explicit Nudity
  - Nudity
  - Graphic Male Nudity
  - Graphic Female Nudity
  - Sexual Activity
  - Illustrated Explicit Nudity
  - Adult Toys
- Suggestive
  - Female Swimwear Or Underwear
  - Male Swimwear Or Underwear
  - Partial Nudity
  - Barechested Male
  - Revealing Clothes
  - Sexual Situations
- Drugs
  - Drug Products
  - Drug Use
  - Pills
  - Drug Paraphernalia
- Tobacco
  - Tobacco Products
  - Smoking
- Alcohol
  - Drinking
  - Alcoholic Beverages
- Gambling
- Violence
  - Graphic Violence Or Gore
  - Physical Violence
  - Weapon Violence
  - Weapons
  - Self Injury
- Visually Disturbing
  - Emaciated Bodies
  - Corpses
  - Hanging
  - Air Crash
  - Explosions And Blasts
- Rude Gestures
  - Middle Finger
- Hate Symbols
  - Nazi Party
  - White Supremacy
  - Extremist

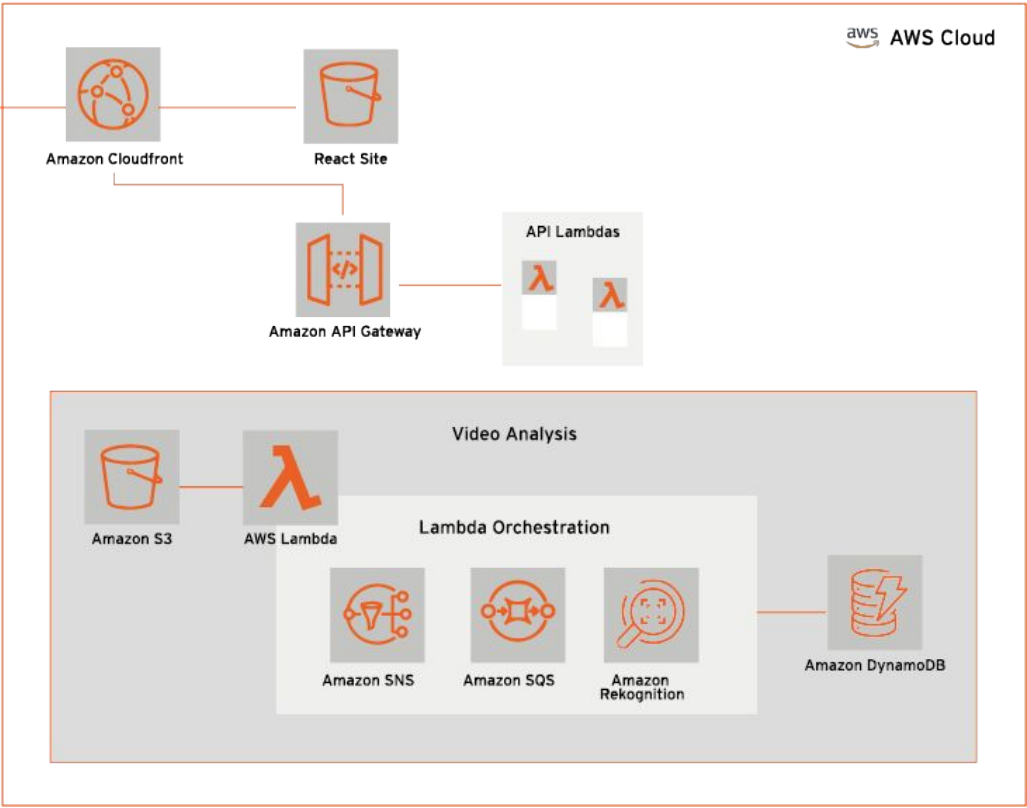


Putting it into action



User

Video Input  
(Mux, etc)

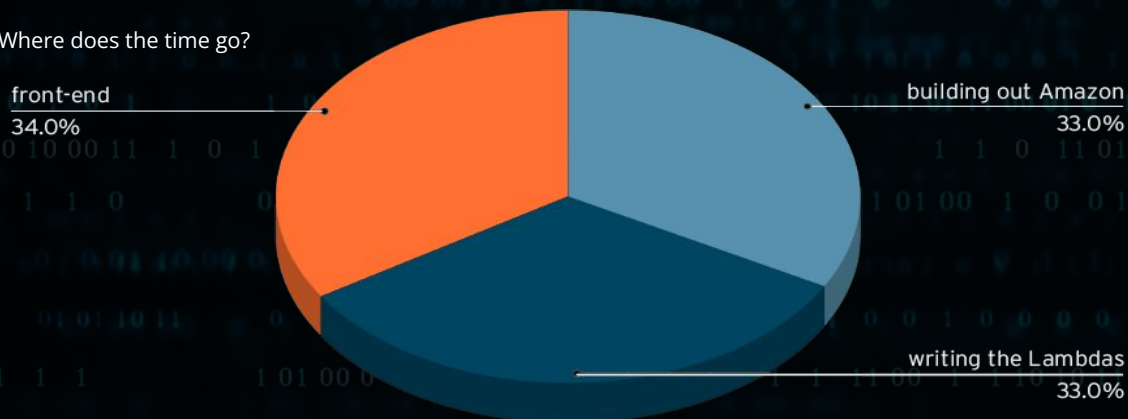


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# How long does it take?

- Your first rollout may take 5 weeks.
- After doing it a few times it can take as little as a week or two.

Where does the time go?



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# How much does it cost?

After setup the primary cost come from using Amazon Rekognition:

- Video processing for content moderation costs \$0.10 per minute.
- Image processing for content moderation costs \$0.001 per image (up to 1 million images).
- The recurring costs for data storage, search, and other services amount to about \$3.00 per day.

Professional setup can range between ~\$5,000 to \$10,000



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# How well does it work?

- We taught the machine about bad behavior by making it watch James Bond movies.
- We tested gambling, alcohol, tobacco, suggestive content, and violence.
- It flagged everything we saw and was highly accurate.
- **IMPORTANT:** the confidence score does not indicate how extreme content is.



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# The future

- We were scanning **video** and **images**, but it doesn't have to stop there.
- Other Amazon services could be used to review **text** (**Amazon Comprehend** – sentiment analysis, etc.)
- **Audio** currently requires transcription into written language (**Amazon Transcribe**) but it's likely that an audio moderation service is coming.



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# Questions?

Scan the QR code to access digital resources: including code, templates, and more.



SCAN ME

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