 Amazon Rekognition

*This document offers a brief outline of Amazon Rekognition as well as a simple Java implementation of the Rekognition API.*

# What It is

* [**Rekognition**](https://aws.amazon.com/rekognition/)is Amazon’s proprietary image and video analysis service. By harnessing heavily-developed **deep learning** technology, Rekognition is capable of detecting, searching, and labelling data on a granular level based on image and video input.
* First introduced to the public in 2016, Rekognition service currently comes in two flavors: Rekognition Image and Rekognition Video (stored and streaming).
* As with most AWS technologies, Rekognition can be **integrated into numerous types of workflows**, utilizing a plethora of different services on AWS and other platforms.

(More on this in section 3. Integration Options below.

# Features and example use cases

* **Abilities and Functions**:
  1. Faces

- Including: *Detect in scene*  • *Search & Match in Collection or Private Repository* • *Verification • Add Facial Attribute Tags (expression, demographic data) • Recognize Celebrity* )

Use Case: Police departments are currently using detection capabilities on images and videos to check faces against public mugshot collections.

Figure a. - Mugshot match-finding

* 1. Object labelling (including custom labels)

Figure b. - No cats found :(

Use Case**:** Disallow video upload to cat video site if label detection for cat-related terms returns 0 detected instances in file.

* 1. Text

Use Case**:** Filtering out personally identifiable info from images.

* 1. Pathing (Video only)

Figure d. - Analysis of customer browsing paths

Use case**:** Identify most common customer routes taken in a store in order to make smart adjustments to section layout, endcap presentation, and so on.

* 1. Unsuitable Content

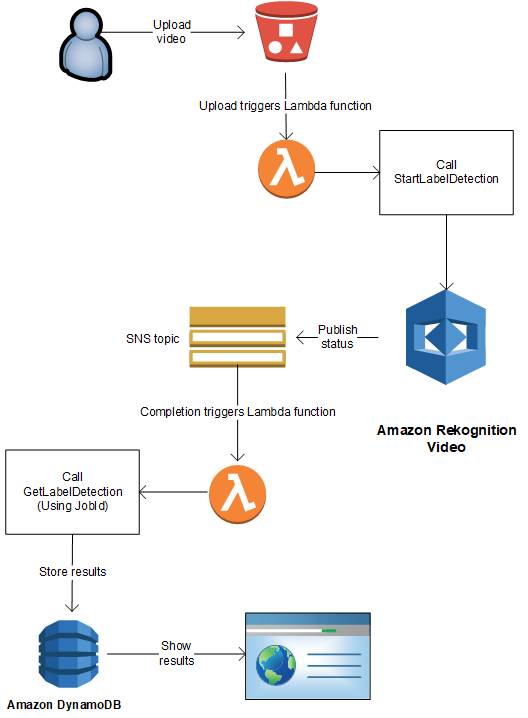
Use case**:** Disallow very young users from accessing videos that have been deemed by way of analysis to contain people wearing risqué clothing.

# Usage Methods and Sample Implementation (using AWS Java SDK)

* Usage Methods:

***Note****: All methods require interaction with an S3 Storage bucket. For more info:* [*Amazon S3*](https://aws.amazon.com/s3/)

* 1. Making calls from the AWS Command Line interface or AWS SDK (example)
     1. Create Amazon Simple Notification Service (SNS) topic.
     2. Create Amazon SQS queue.
     3. Give Rekognition Video permission to public status of video analysis to SNS topic.
     4. Subscribe SQS queue to the SNS topic.
     5. Start analysis by called StartLabelDetection function.
     6. Get completion status from queue upon completion.
     7. Retrieve and display results by calling GetLabelDetection.
  2. Setting up a Lambda function using AWS Lambda



* Sample Label Detection implementation:

Sample project can be found in /src of this repo ([direct link](https://github.com/zcmarcus/RekognitionTest/blob/master/src/main/java/org/zcmarcus/VideoLabelDetection.java)).

***Note****: The label detection example contained in this repo is written in Java and uses Maven; for implementations in other languages see:* [*AWS Dev Build Tools*](https://docs.aws.amazon.com/rekognition/latest/dg/setting-up.html)

***Pre-requisite****: it assumed that the user already has an Amazon AWS account and at least one IAM User set up for account management. For more information, see* [*this section of the Rek**ognition “Getting Started” guide.*](https://docs.aws.amazon.com/rekognition/latest/dg/setting-up.html)

# Controversies and Potential Social Ramifications

* Controversy surrounding Amazon pitching Rekognition to law-enforcement agencies including the FBI, [ICE](https://www.washingtonpost.com/news/the-switch/wp/2018/06/22/amazon-employees-demand-company-cut-ties-with-ice/), and [police departments](https://www.oregonlive.com/washingtoncounty/2019/05/amazons-facial-recognition-technology-is-supercharging-washington-county-police.html) around the country.
* [Racial biases persist in face detection technology](https://www.youtube.com/watch?v=N-Lxw5rcfZg) (presentation by Joy Buolamwini, YouTube – Wired UK).

**Q:** How can we trust that new facial analysis techniques will not repeat mistakes of the past?

* Final items to consider

**Q:** Given the ubiquity of Amazon and AWS, are we as a society okay with these kinds of advanced technology further invading our day-to-day lives?

**Q:** What responsibilities do we as developers have when it comes to harnessing powerful tools such as this?

# Additional Related Links

### [Deep Learning (Wikipedia)](https://en.wikipedia.org/wiki/Deep_learning)

### [Amazon Simple Notification Service](https://aws.amazon.com/sns/getting-started/)

### [Amazon Simple Queue Service](https://aws.amazon.com/sqs/getting-started/)

### [Tutorial: Create an Amazon Rekognition Lambda Function](https://docs.aws.amazon.com/rekognition/latest/dg/stored-video-lambda.html)

### [Rekognition Developer Guide - Available API Operations](https://docs.aws.amazon.com/rekognition/latest/dg/API_Operations.html)