



19 August 2021

Image and Video Analysis using Amazon Rekognition

Rohini Gaonkar

Sr. Developer Advocate
Amazon Web Services



Agenda

- Why you need Amazon Rekognition
- Demo in AWS Management Console
- Understand Rekognition APIs
- Demo Custom Labelling
- Learning Resources – sample code, documentation and all

COMMUNICATION

A B C

COMMUNICATION

A B C



Common applications

THAT REQUIRE AUTOMATED IMAGE & VIDEO ANALYSIS AT SCALE

WORKPLACE SECURITY & SAFETY

- Automate PPE detection
- Improve customer & employee safety
- Improve safety best practices

IDENTITY VERIFICATION

- Verify students before and during tests
- Confirm customer initiated financial transactions
- Identify workers before providing services

MEDIA ANALYSIS

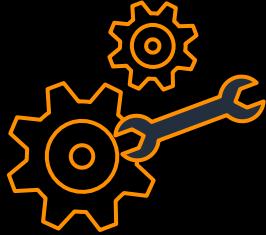
- Tag images and photos for search and discovery
- Segment videos to set binge markers
- Flag inappropriate content

INDUSTRIAL AUTOMATION

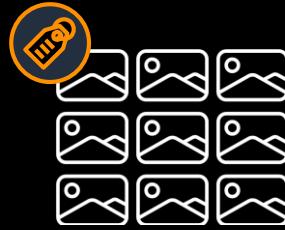
- Identify parts & components
- Detect anomalies in real-time
- Scale supply chain inventory management

Manual image analysis

CUSTOMIZATION REQUIRES EXPERTISE & RESOURCES



Deep Machine
Learning expertise
(hard to find)



Tens of thousands of
labeled images
(expensive and time
consuming)



Several weeks
to months to
complete



Scaling to peak
needs can be
expensive



Error-prone and
subjective leading to
inconsistencies

Amazon Rekognition



Deep learning-based image and video analysis service



Image



**Stored
Video**



**Streaming
Video**

Why Amazon Rekognition



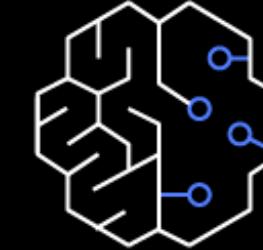
Build faster

Ready to integrate SDKs & APIs
High quality results
No ML Expertise required



Simplify operations

No ML models to build or manage
No data teams required
Get continuous improvements



Customize easily

Amazon Rekognition Custom Labels
Detect business-specific labels
Run trained models in your account

Innovate at the speed your business needs



<https://aws.amazon.com/rekognition/>

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Amazon Rekognition common applications

THAT REQUIRE AUTOMATED IMAGE & VIDEO ANALYSIS AT SCALE



WORKPLACE SECURITY & SAFETY

Automate PPE detection
Improve customer & employee safety
Improve safety best practices



IDENTITY VERIFICATION

Verify students before and during tests
Confirm customer initiated financial transactions
Identify workers before providing services



MEDIA ANALYSIS

Tag images and photos for search and discovery
Segment videos to set binge markers
Flag inappropriate content



INDUSTRIAL AUTOMATION

Identify parts & components
Detect anomalies in real-time
Scale supply chain inventory management

Preparing images at scale

The Mainichi Newspapers uses Amazon Rekognition to automatically analyze, trim, and resize photos for use in their publications.

The Mainichi

Japan's National Daily Since 1922

Amazon Rekognition image and video

EXTRACT RICH METADATA FROM VISUAL CONTENT



OBJECT, SCENE, AND ACTIVITY



CUSTOM LABELS



CONTENT MODERATION



TEXT



PPE DETECTION



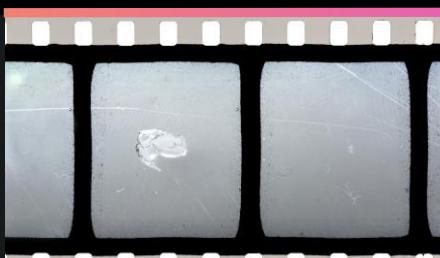
FACE DETECTION AND ANALYSIS



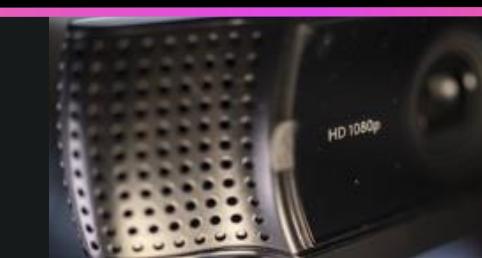
FACE COMPARE & SEARCH



CELEBRITY RECOGNITION



VIDEO SEGMENTS



LIVE STREAM VIDEO



PATHING



Demo

SEE IT IN ACTION IN
AWS MANAGEMENT CONSOLE



Rekognition APIs

LET'S CODE



Amazon Rekognition image and video

EXTRACT RICH METADATA FROM VISUAL CONTENT



OBJECT, SCENE, AND ACTIVITY

[DetectLabels](#)



CUSTOM LABELS



CONTENT MODERATION

[DetectModerationLabels](#)



TEXT

[DetectText](#)



PPE DETECTION

[DetectProtectiveEquipment](#)



FACE DETECTION AND ANALYSIS

[DetectFaces](#)



FACE COMPARE & SEARCH

[CompareFaces](#)



CELEBRITY RECOGNITION

[RecognizeCelebrities](#)

[GetCelebrityInfo](#)



VIDEO SEGMENTS



LIVE STREAM VIDEO

[CreateStreamProcessor](#)



PATHING

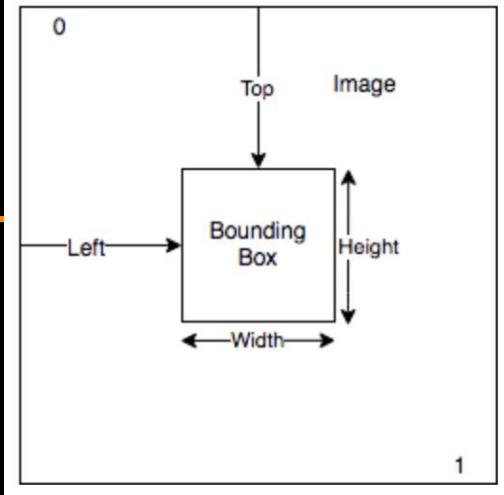
[DetectText](#)



Amazon Rekognition (detect_faces)



```
import boto3  
  
bucket    = 'myBucket'  
photo      = 'myImage.jpg'  
  
session   = boto3.Session()  
client    = session.client('rekognition')  
  
response = client.detect_faces(Image={'S3Object': {'Bucket': bucket, 'Name': photo}}, Attributes=['ALL'])
```



Bounding Box

```
{  
  'AgeRange': {'High': 16, 'Low': 6},  
  'Beard': {'Confidence': 99.66973114013672, 'value': False},  
  'BoundingBox': { 'Height': 0.20399603247642517,  
                  'Left': 0.41700470447540283,  
                  'Top': 0.07346603274345398,  
                  'Width': 0.11279052495956421},  
  .  
  .  
  .  
  'Confidence': 99.99211883544922,  
  'Gender': {'Confidence': 99.83600616455078, 'value':  
            'Female'},  
  'Smile': {'Confidence': 99.76499938964844, 'value': True}  
}
```

Amazon Rekognition (recognize_celebrities)



```
import boto3

bucket    = 'myBucket'
photo     = 'myImage.jpg'

session   = boto3.Session()
client    = session.client('rekognition')

response = client.recognize_celebrities(Image={'S3Object': {'Bucket': bucket, 'Name': photo}})
```

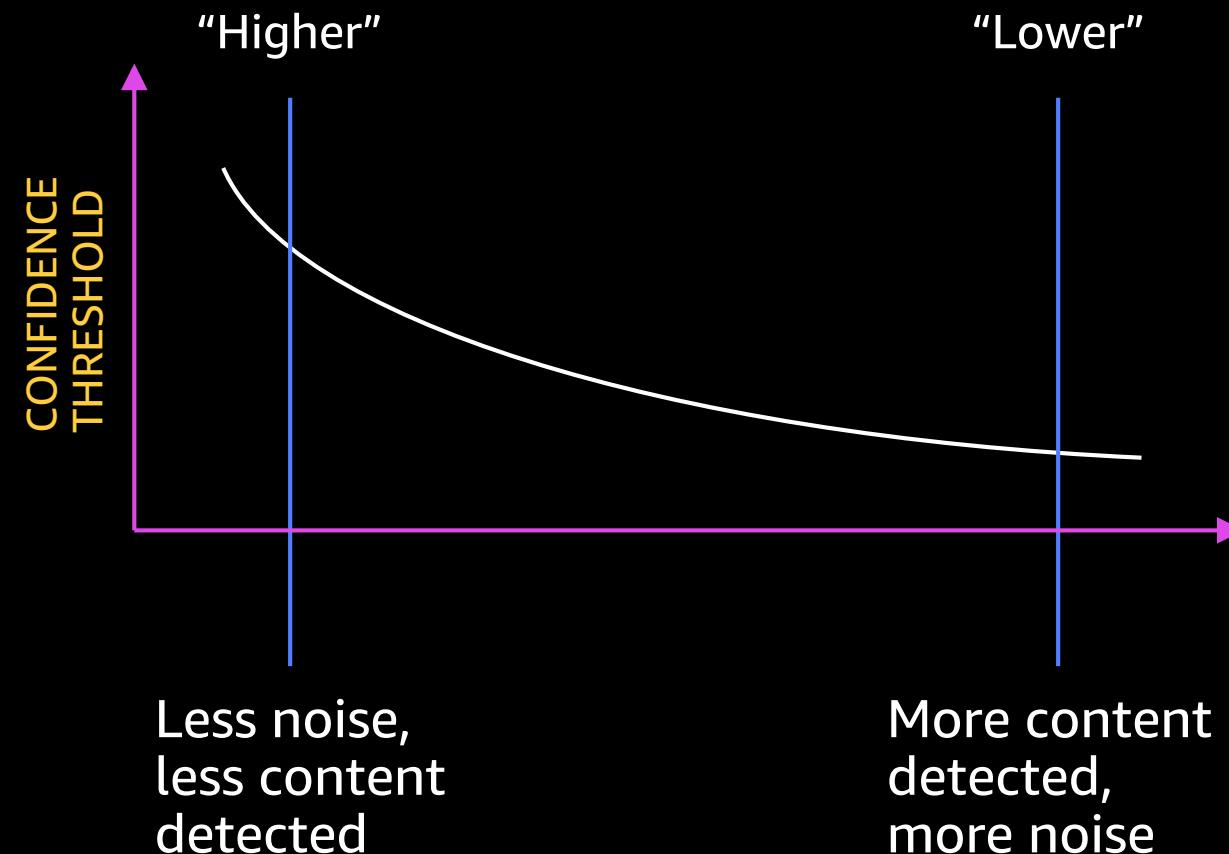


```
{'CelebrityFaces': [
  {'Face': {'BoundingBox': {'Height': 0.565079391002655,
                           'Left': 0.1358333790302277,
                           'Top': 0.24285714328289032,
                           'Width': 0.296666619641876},
            'Confidence': 99.96903991699219,
            'Id': '6bN4xP',
            'MatchConfidence': 100.0,
            'Name': 'Roger Federer',
            'Urls': ['www.imdb.com/name/nm1716574']}]
},

'UnrecognizedFaces': []}
```

Confidence scores

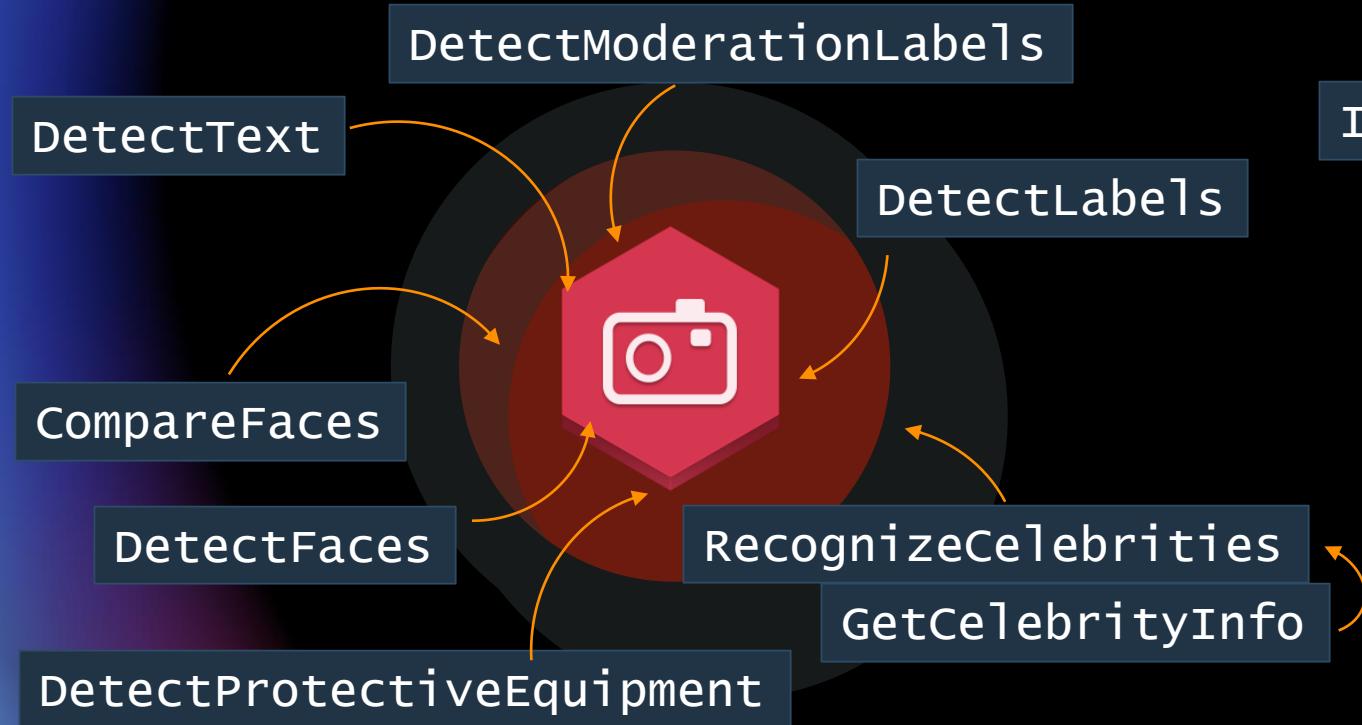
Confidence scores let you choose the best tradeoff for your use case between precision and recall



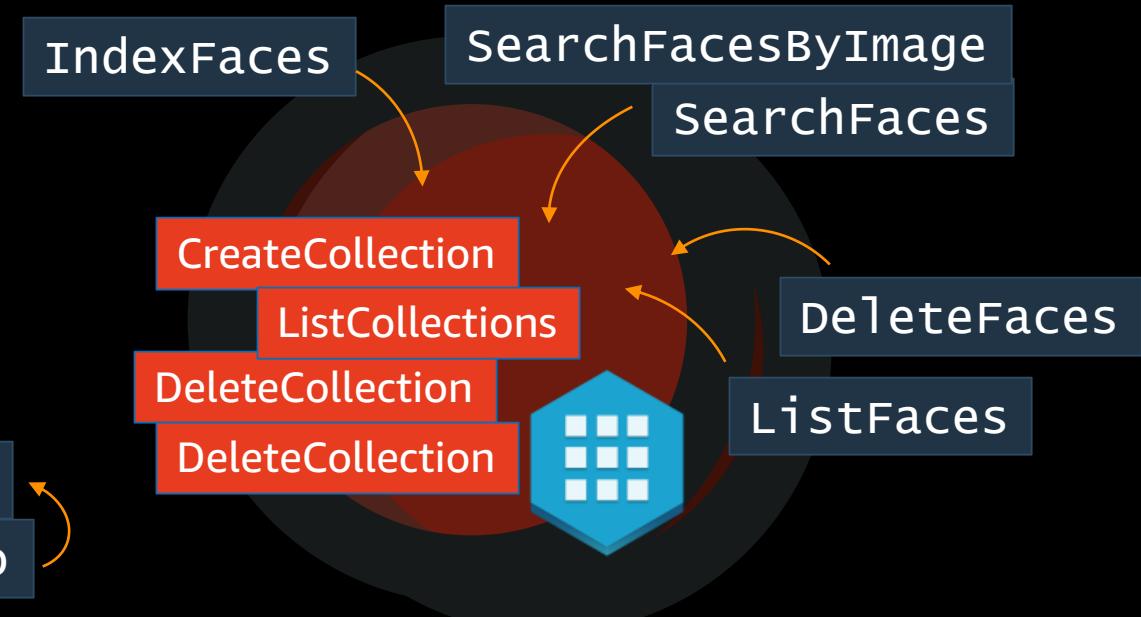
API operations Images



Non-Storage API Operations



Storage-Based API Operations

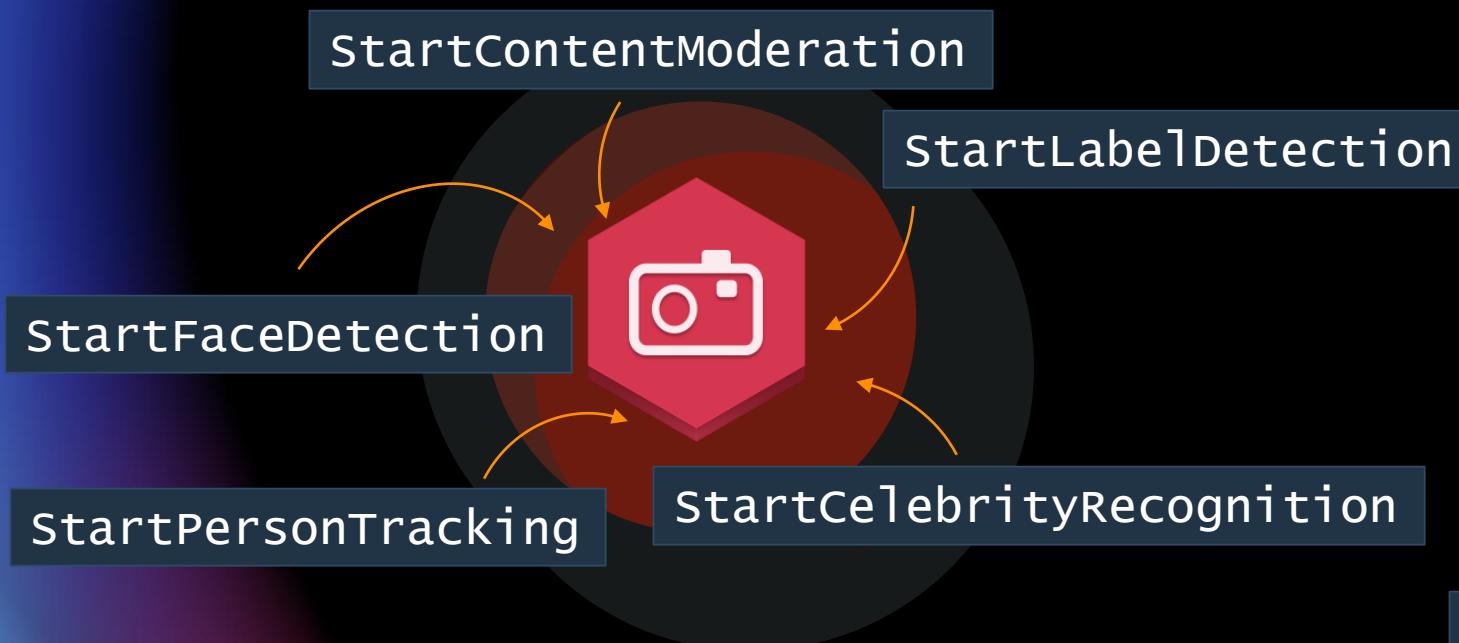


Amazon Rekognition's computer vision API operations can be grouped into non-storage API operations, and storage-based API operations

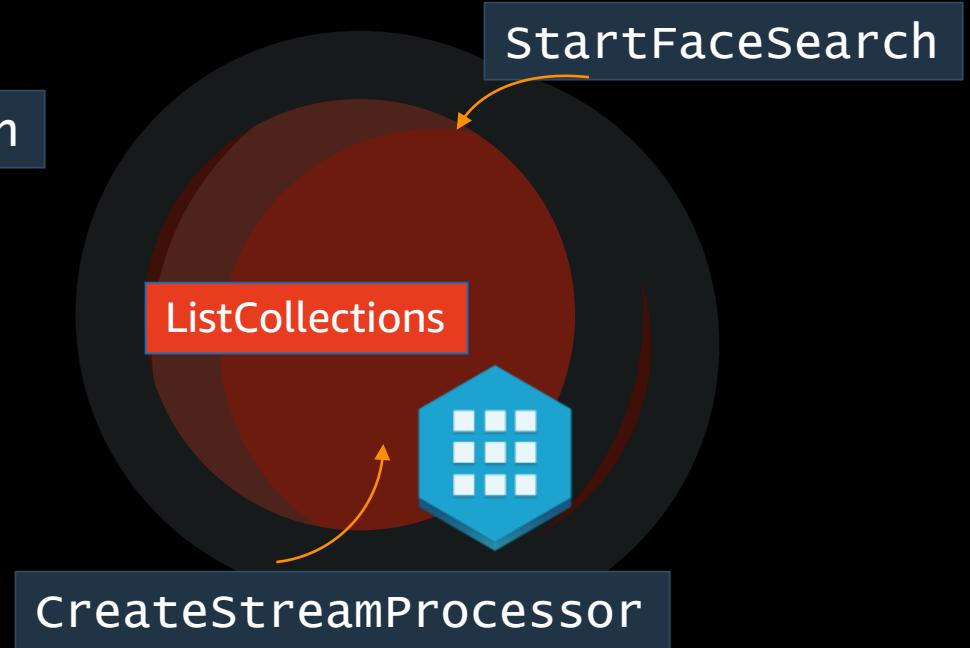
API operations Videos



Non-Storage API Operations



Storage-Based API Operations



Amazon Rekognition's computer vision API operations can be grouped into non-storage API operations, and storage-based API operations

Amazon Rekognition PPE detection

LET'S DIVE DEEPER



Amazon Rekognition PPE detection

ANALYZE IMAGES TO DETECT IF PERSONS ARE WEARING FACE COVERS, HEAD COVERS, HAND COVERS

Helmet 97%

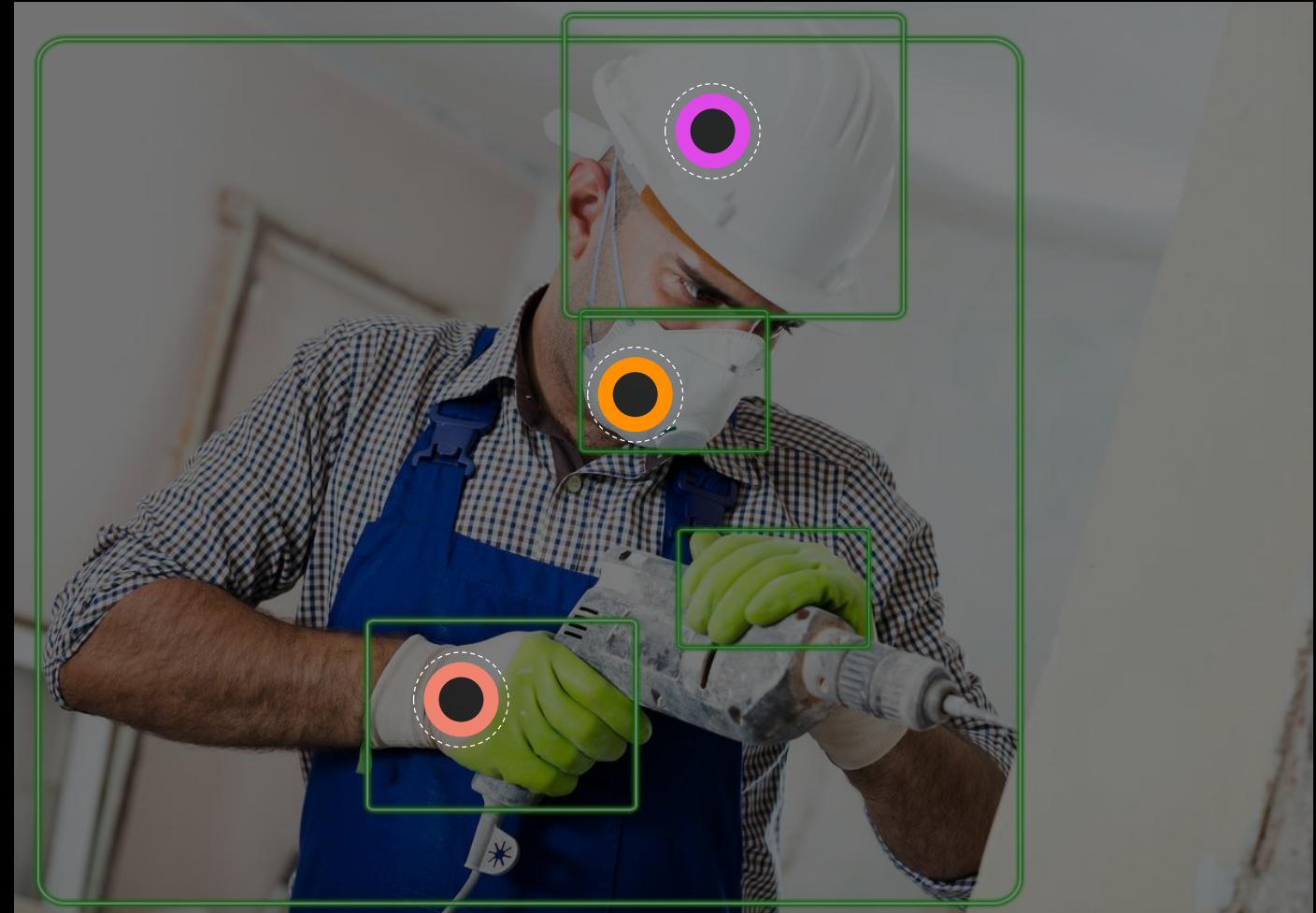
Helmet on head: true 96%

Face mask 98.8%

Face mask on face: true 83.5%

Glove 98.8%

Gloves on hand: true 94.8%





PPE detection

"Amazon Rekognition PPE detection solved one of our big challenges in this difficult time where we strive to deliver food safely to our customers. By using this technology in our delivery mobile application, we can now automatically check that our food delivery employees are wearing a face mask as they pick up orders from the kitchen and deliver them."

Amit Gupta
CTO, Rebel Foods

Amazon Rekognition (detect_protective_equipment)



```
import boto3

bucket    = 'myBucket'
photo     = 'myImage.jpg'

session   = boto3.Session()
client    = session.client('rekognition')

response = client.detect_protective_equipment(Image={'S3Object': {'Bucket': bucket, 'Name': photo}})
```

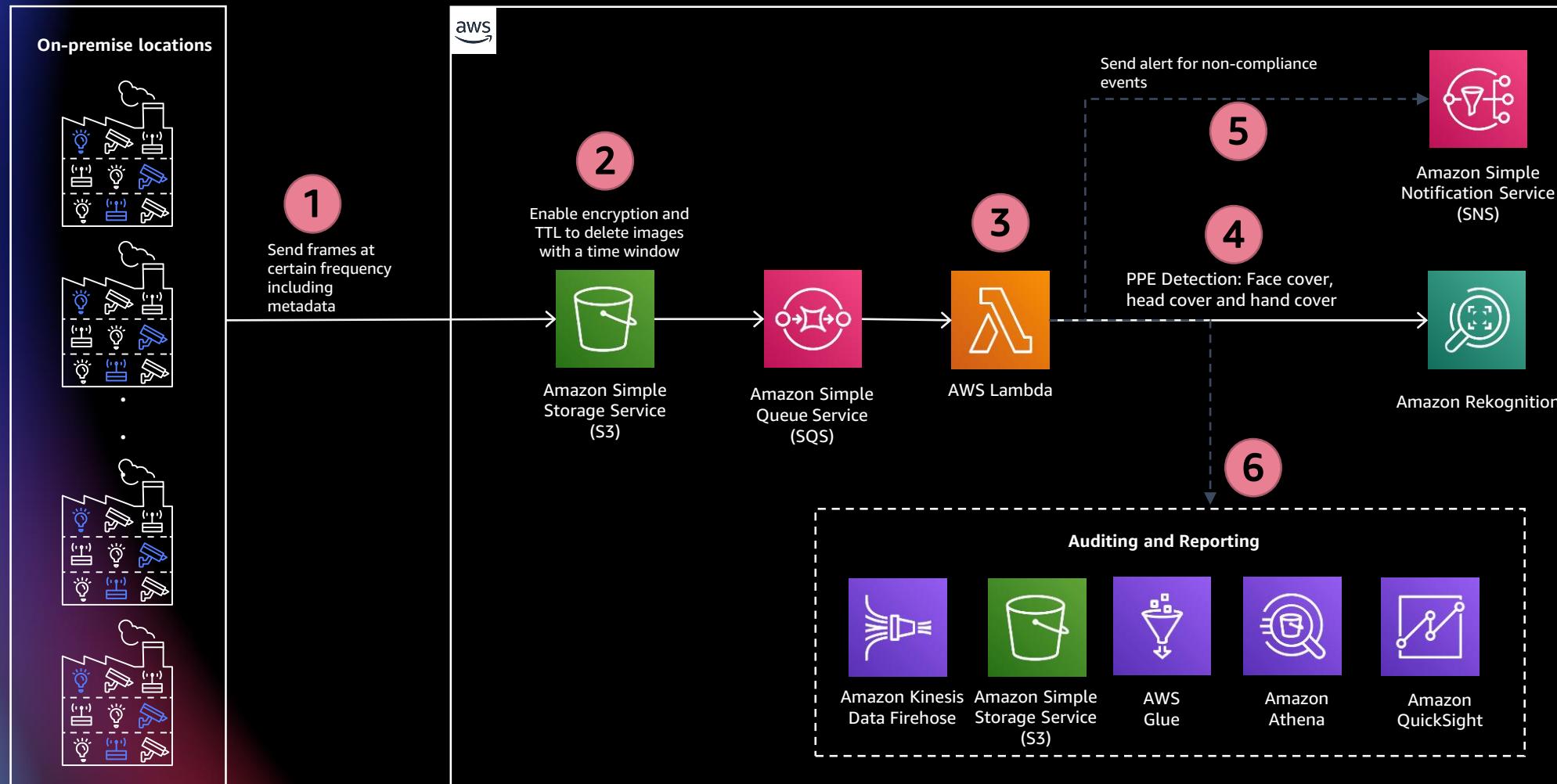


```
{ 'Persons':
  [ { 'BodyParts':
      [ { 'Name': 'FACE',
          'EquipmentDetections': [ {
              'BoundingBox': {},
              'Confidence': 99.00,
              'Type': 'FACE_COVER',
              'CoversBodyPart': {
                  'Confidence': 99.76295,
                  'Value': True }
            }, ] }, ],
        'BoundingBox': {},
        'Confidence': 99.00,
      }, ] }
```



Deploying PPE detection in your organization

REFERENCE ARCHITECTURE



Our most common customer request

Customization

"Can we make it specific for what I need for my business?"



Amazon Rekognition
Labels

Customer need

Machine part

Turbocharger



Machine part

Torque converter



Machine part

Crankshaft

Amazon Rekognition Custom Labels



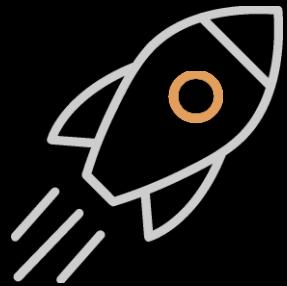
Customized image analysis to easily detect objects and scenes you define as most relevant to your domain



Guided experience
to create labeled
images



Train and evaluate
with no coding and
no ML experience



Easy-to-use fully
managed API

Examples of Custom Labels



Products



Icons, logos, and symbols



Comic and animation



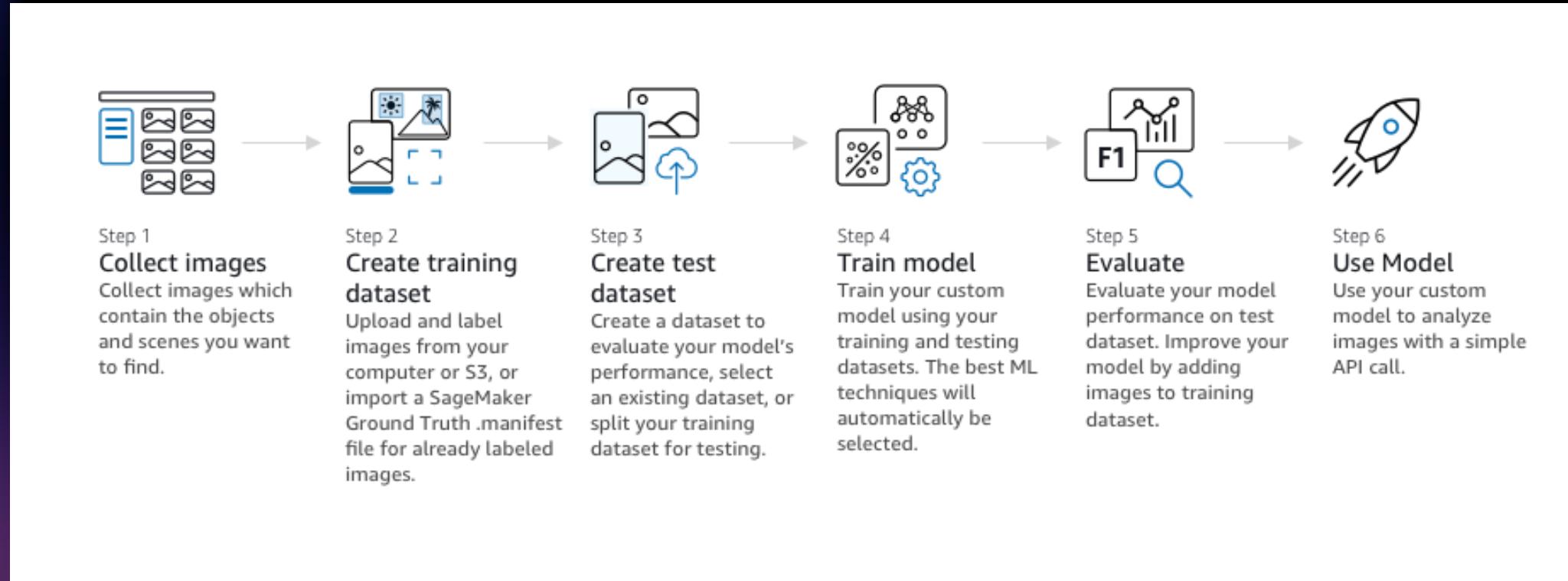
Biological

Demo

CUSTOM LABELS FOR PPE



Amazon Rekognition Custom Labels workflow



Code Samples

- PPE code samples and demo solution:

<https://github.com/aws-samples/amazon-rekognition-ppe>

- Custom PPE Detection Demo Using Custom Labels

<https://github.com/aws-samples/amazon-rekognition-custom-ppe-detection-with-custom-labels>

- Custom Brand Detection using Amazon SageMaker Ground Truth

<https://github.com/aws-samples/amazon-rekognition-custom-brand-detection>

- Large Scale Processing

<https://github.com/aws-samples/amazon-rekognition-large-scale-processing>

Resources

- Detailed Blog:

<https://aws.amazon.com/blogs/machine-learning/automatically-detecting-personal-protective-equipment-on-persons-in-images-using-amazon-rekognition/>

- Developer guide:

<https://docs.aws.amazon.com/rekognition/latest/dg/ppe-detection.html>

- Custom Labels Developer guide:

<https://docs.aws.amazon.com/rekognition/latest/customlabels-dg/what-is.html>

Visit the AWS Data Resource Hub

Dive deeper with these resources, get inspired and learn how you can use data to make better decisions and innovate faster.

- Building a winning data strategy
- The new leadership mindset for data & analytics
- Harness data to reinvent your organization
- Put your data to work with a modern analytics approach
- Breaking free from on-premises database constraints
- Cloud storage adoption: From cost optimization to agility & innovation
- A strategic playbook for data, analytics, and machine learning
- ... and more!



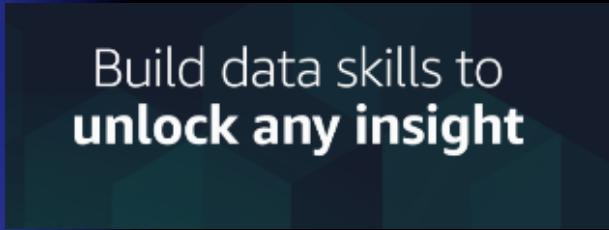
<https://tinyurl.com/aws-data-resource>

Visit resource hub

AWS Training and Certification

Empower your teams with comprehensive training

By building skills with AWS Training and Certification, businesses and individuals can see the bigger picture understanding the reasoning behind every data point. As training progresses and teams become data-fluent, previously hidden insights come into view.



Build data skills to
unlock any insight

Leverage free digital training

Learn how to harness the world's most valuable resource: data. Access digital and virtual instructor-led courses on data analytics and databases built by the experts at AWS and start your learning journey to become data-driven.

[Take a digital course »](#)



Get certified

Earn industry-recognized credibility and set tangible goals for success with industry-recognized certifications, like *AWS Certified Data Analytics – Specialty*.

[Learn more »](#)



Ramp-up your skills

Deep dive into new topics and focus on knowledge gaps at your own pace with the *AWS Ramp-Up Guide: Database* and *AWS Ramp-Up Guide: Data Analytics*. With a wide range of whitepapers, blog posts, videos, webinars and peer resources available for data professionals to leverage for independent learning.

[Download ramp-up guides »](#)

Thank you for attending AWS Innovate – Data Edition

We hope you found it interesting! A kind reminder to **complete the survey**. Let us know what you thought of today's event and how we can improve the event experience for you in the future.



aws-apj-marketing@amazon.com



twitter.com/AWSCloud



facebook.com/AmazonWebServices



youtube.com/user/AmazonWebServices



slideshare.net/AmazonWebServices



twitch.tv/aws

Thank you!