aws AI

Enriching your App with Image Recognition and AWS AI Services

Dragos Madarasan, Solutions Architect
Amazon Web Services

@dragospm

dragos-madarasan

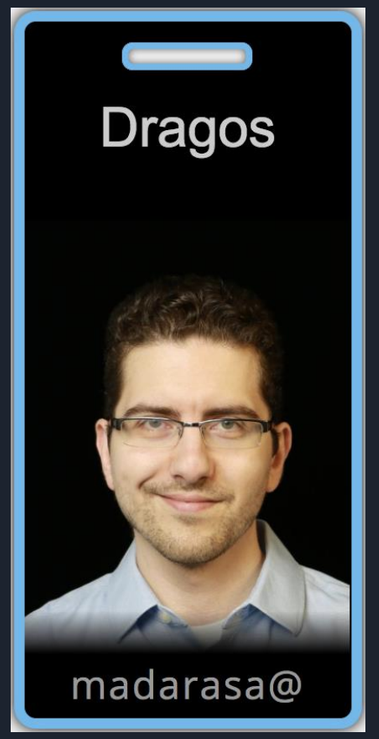
Agenda

- Introduction to AWS AI Services
- Amazon Rekognition and the different APIs
- Use Cases
- Demo

aws AI

Who am I?

- Solutions Architect @ AWS, covering Romania and Hungary
- Work with and support clients, partners, NGOs, Public Sector
- Based in Munich, Germany, often in Romania
- Previously Support Engineer and ProServe Consultant @ AWS



aws AI

Image Processing

- Classification, Detection, segmentation
- Face Detection
- Face Verification
- Face Recognition
- Text Detection

aws AI

Our deep experience with AI/ML differentiates our approach

1995

Amazon has invested in AI/ML since our inception, and we share our knowledge and capabilities with our customers

2018

Product recommendation engine

Robot-enabled fulfillment centers

New product categories

ML-driven supply chain and capacity planning

Natural language processing-supported contact centers

Checkout-free shopping using deep learning

aws AI

Our mission at AWS

Put machine learning in the hands
of every developer

aws AI

The Amazon ML stack: Broadest & deepest set of capabilities

AI SERVICES

Vision


REKOGNITION IMAGE


REKOGNITION VIDEO


TEXTRACT

Speech


POLLY


TRANSCRIBE

Language


TRANSLATE


COMPREHEND & COMPREHEND MEDICAL

Chatbots


LEX

Forecasting


FORECAST

Recommendations


PERSONALIZE

ML SERVICES


AMAZON SAGEMAKER

BUILD

Pre-built algorithms & notebooks

Data labeling (GROUND TRUTH)

Algorithms & models (AWS MARKETPLACE FOR MACHINE LEARNING)

TRAIN

One-click model training & tuning

Optimization (NEO)

Reinforcement learning

DEPLOY

One-click deployment & hosting

ML FRAMEWORKS & INFRASTRUCTURE

Frameworks

TensorFlow

mxnet

PYTORCH

Interfaces

GLUON

Keras

Infrastructure


EC2 P3 & P3dn


EC2 C5


FPGAs


GREENGRASS


ELASTIC INFERENCE

aws AI

Amazon SageMaker

Machine learning for every developer and data scientist.

aws AI

Amazon SageMaker: Build, train, and deploy ML

Pre-built notebooks for common problems	Built-in, high performance algorithms	One-click training	Optimization	One-click deployment	Fully managed with auto-scaling
Collect and prepare training data	Choose and optimize your ML algorithm	Set up and manage environments for training	Train and tune model (trial and error)	Deploy model in production	Scale and manage the production environment


Put AI to work for your business

AI SERVICES

Vision

REKOGNITION IMAGE

REKOGNITION VIDEO

TEXTRACT

Speech

POLLY

TRANSCRIBE

Language

TRANSLATE

COMPREHEND & COMPREHEND MEDICAL

Chatbots

LEX

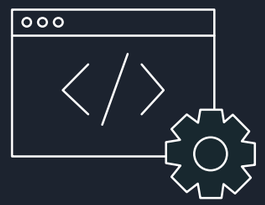
Forecasting

FORECAST

Recommendations

PERSONALIZE

Pre-trained AI services that require no ML skills or training



Easily add intelligence to your existing apps and workflows

Quality and accuracy from continuously-learning APIs

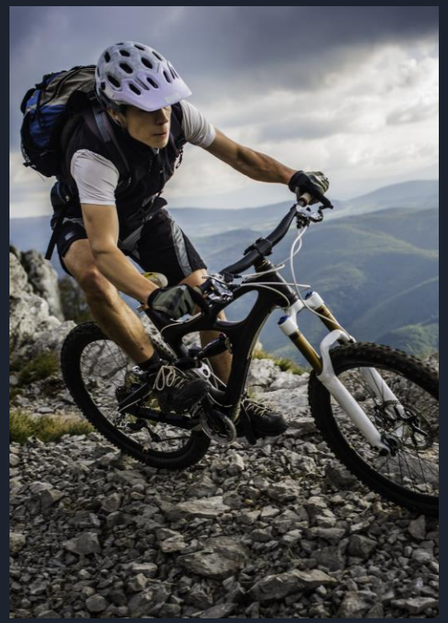
aws AI

Amazon Rekognition

Easily add intelligent image and video analysis to your applications.

aws AI

Amazon Rekognition:
Deep Learning-Based Image and Video Analysis



aws AI

Amazon Rekognition Benefits

State of the art capabilities

Continuous improvement

Rapid integration

Low cost

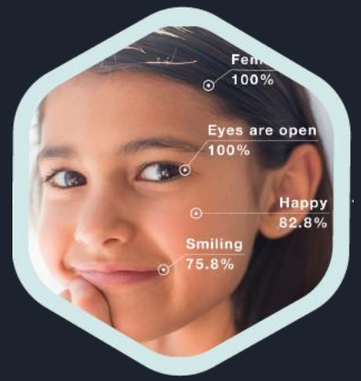
Serverless

Your data is your own

aws AI

Amazon Rekognition Image

Object and scene detection



Facial analysis

Face recognition

Unsafe image detection

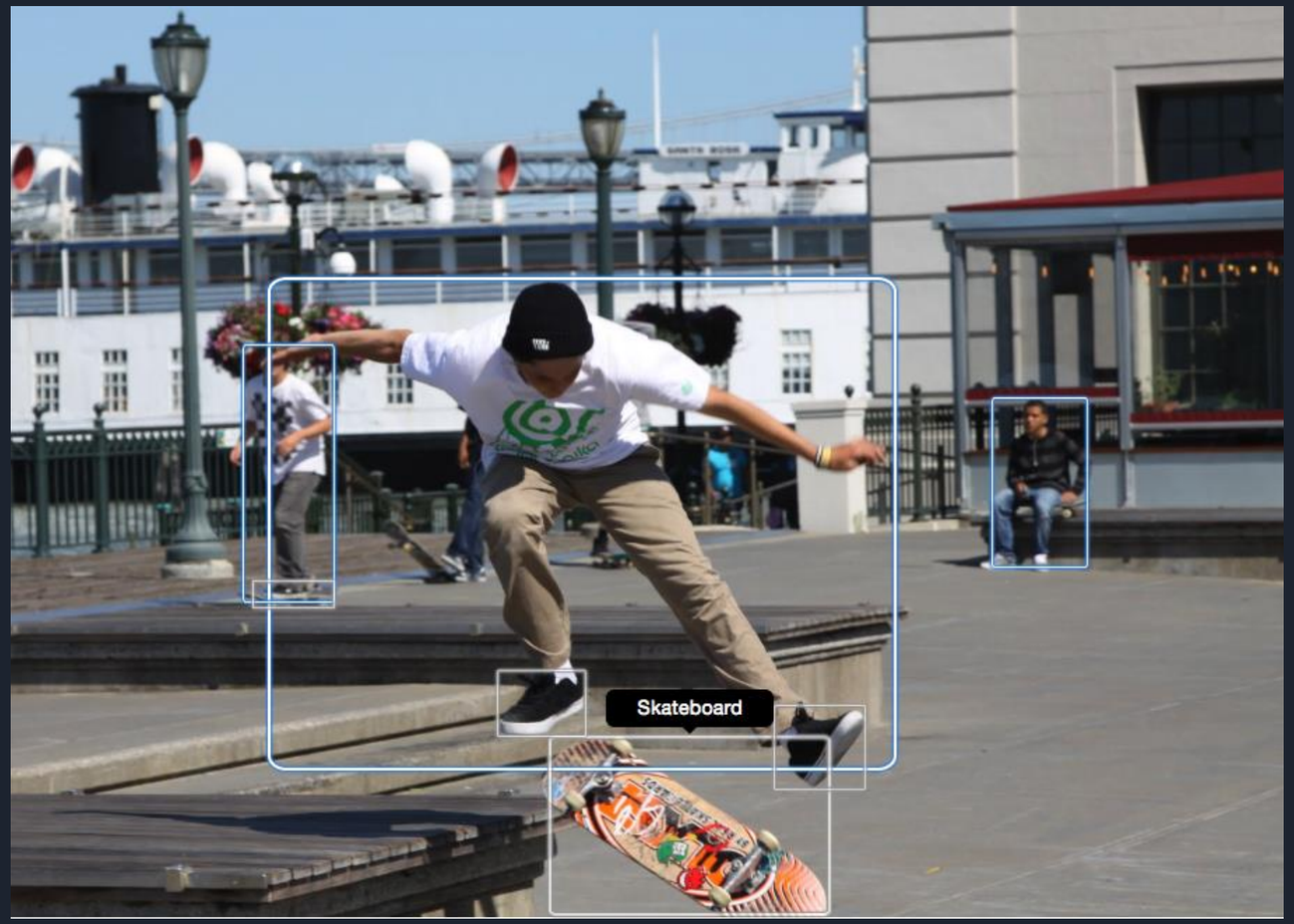
Celebrity recognition

Text in image

Face comparison

aws AI

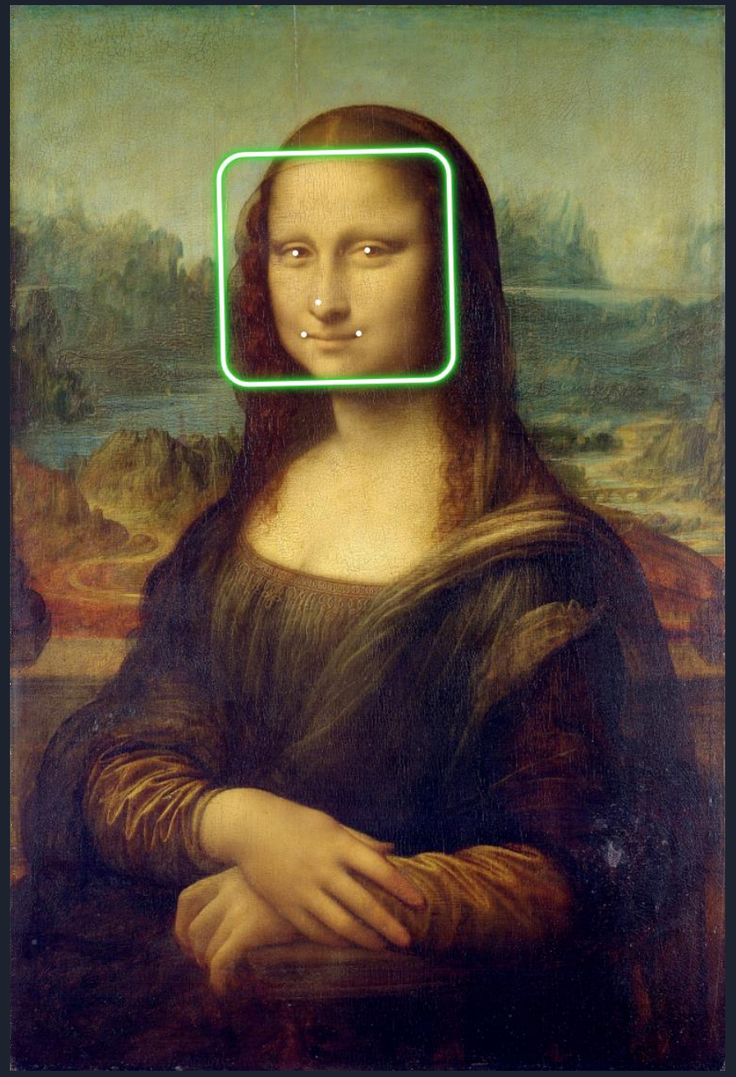
Object & Scene Detection



Human	99.8 %
Person	99.8 %
Apparel	99.5 %
Clothing	99.5 %
Shoe	99.5 %
Footwear	99.5 %
Skateboard	98.9 %
Sports	98.9 %
Sport	98.9 %
Meal	57.8 %
Food	57.8 %
Wood	56.9 %
Cap	55.1 %
Hat	55.1 %

aws AI

Facial Analysis

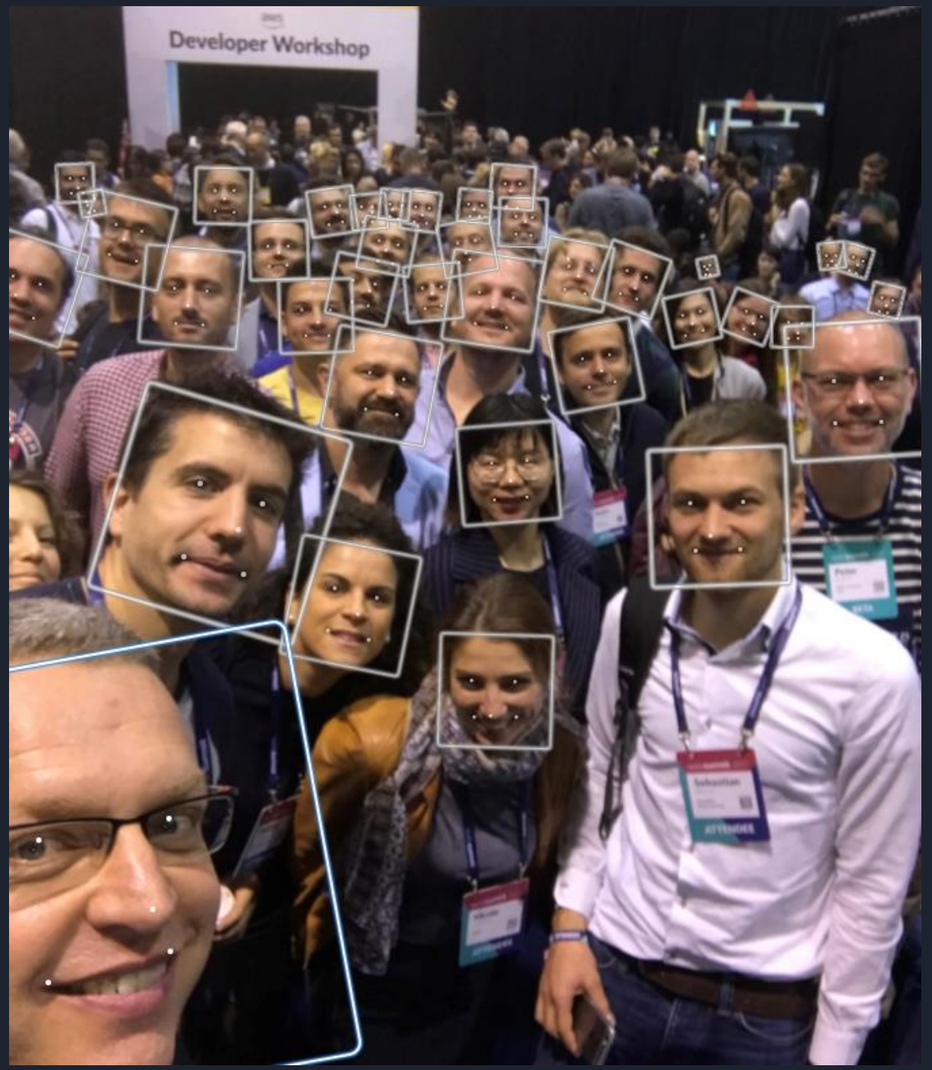


Results

looks like a face	99.9%
appears to be female	100%
age range	26 - 43 years old
not smiling	97.8%
appears to be happy	76.7%
not wearing glasses	95.8%
not wearing sunglasses	99.6%
eyes are open	99.7%
mouth is closed	99.9%
does not have a mustache	99.6%
does not have a beard	99%

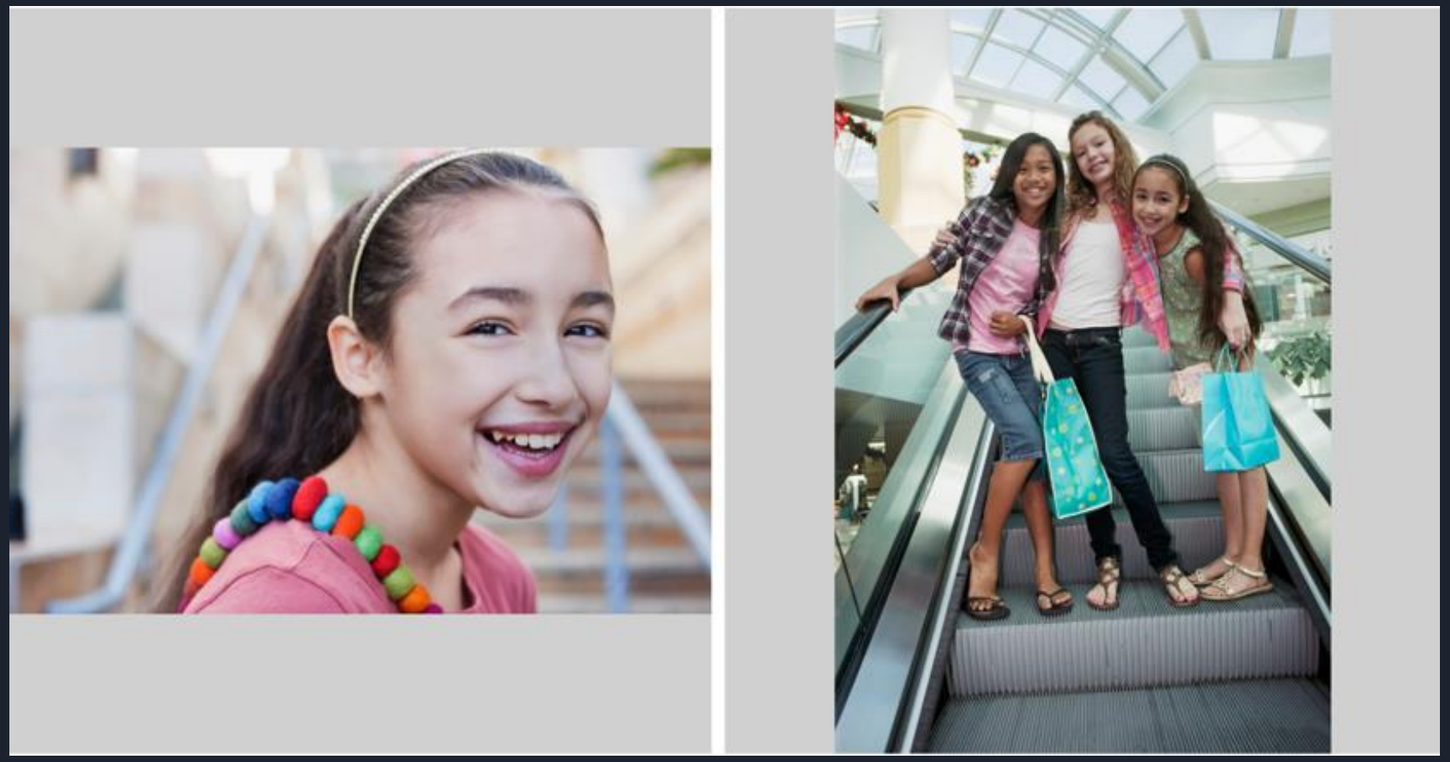
aws AI

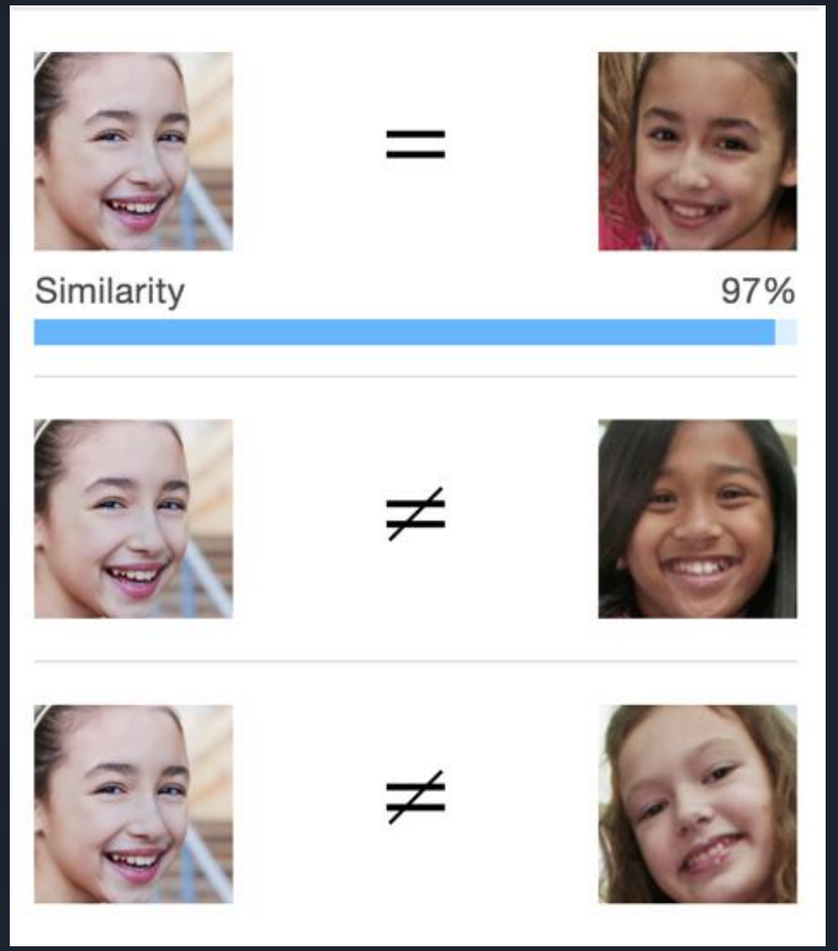
Crowd Detection – up to 100 faces



aws AI

Facial Search





aws AI

Image Moderation

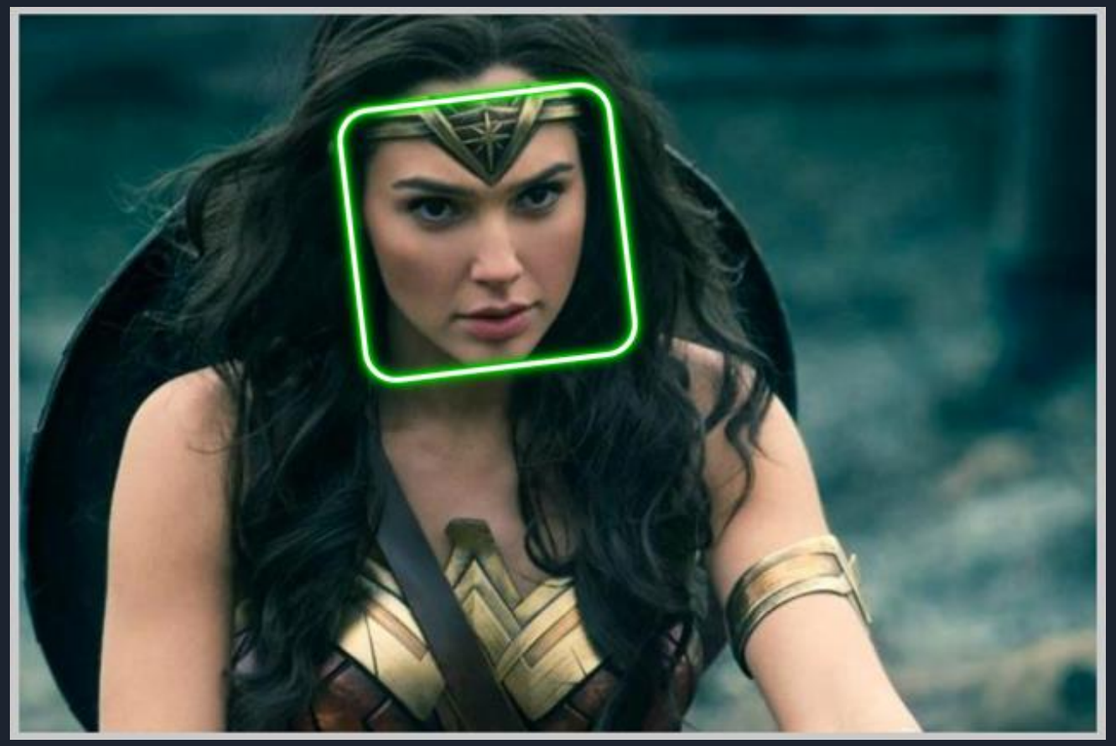
Results	
Suggestive	83.5%
Female Swimwear Or Underwear	83.5%

Explicit Nudity
- Nudity
- Graphic Male Nudity
- Graphic Female Nudity
- Sexual Activity
- Partial Nudity

Suggestive
- Female Swimwear or Underwear
- Male Swimwear or Underwear
- Revealing Clothes

aws AI

Celebrity Recognition



Results

Gal Gadot
Learn More

Match confidence 100%

aws AI

Text in Image

Results US English only

| 5T6E652 |

Request

Response


```
{
  "TextDetections": [
    {
      "Confidence": 96.38984680175781,
      "DetectedText": "5T6E652",
      "Geometry": {
        "BoundingBox": {
          "Height": 0.05606506019830704,
          "Left": 0.38905566930770874,
          "Top": 0.7383729219436646,
          "Width": 0.10844030976295471
        },
        "Polygon": [
          {
            "X": 0.38905566930770874,
            "Y": 0.7383729219436646
          },
          {
            "X": 0.49749597907066345,
            "Y": 0.7726403474807739
          },
          {
            "X": 0.4896218776702881,
            "Y": 0.8287054300308228
          },
          {
```


aws AI

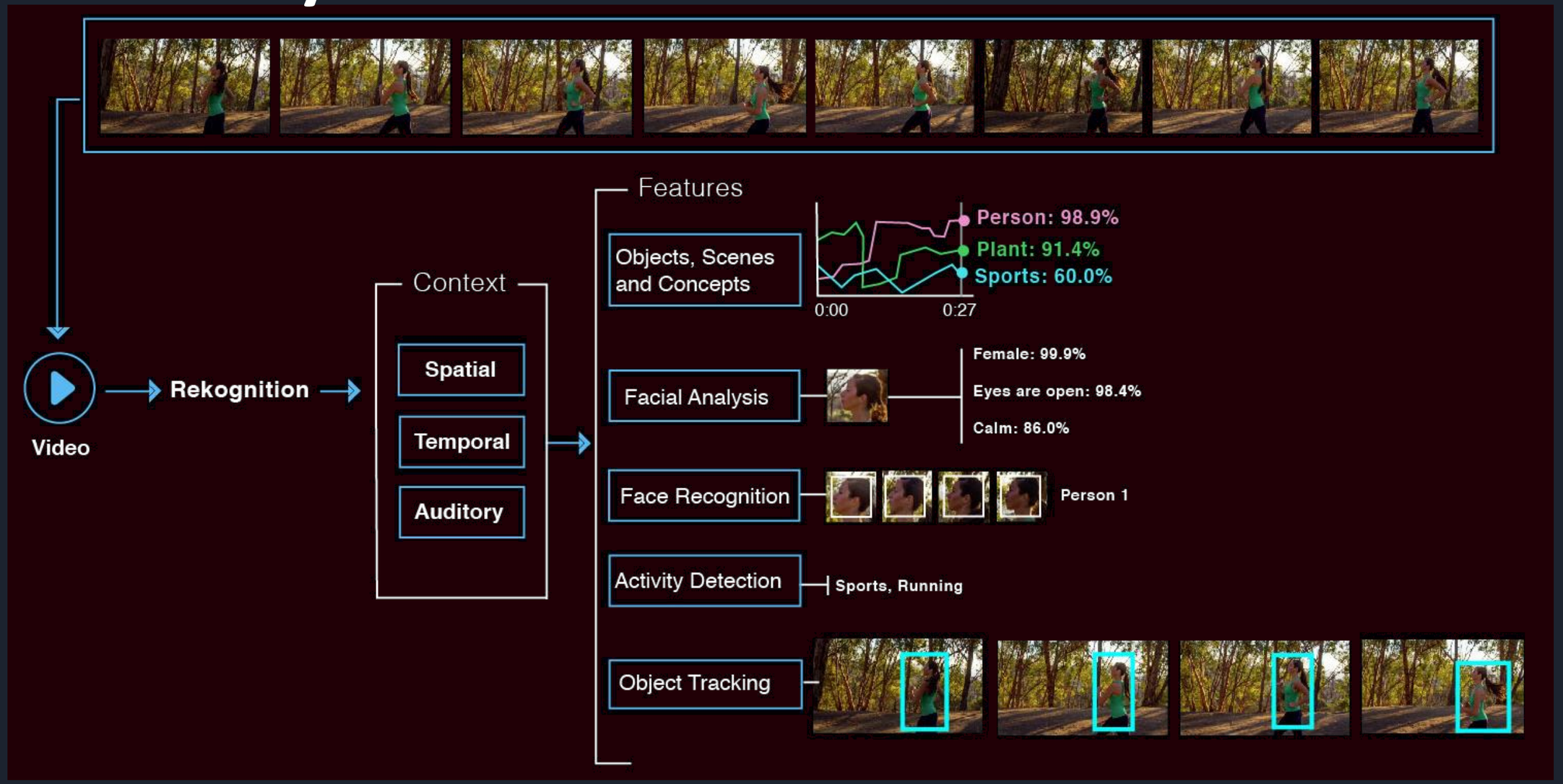
DEMO

Amazon Rekognition Video

Deep Learning-based video analysis service

aws AI

Video Analysis



aws AI


LIVE STREAMING
Front Door Camera 1

Rekognition API Example

```
boazz: ~/ aws rekognition detect-labels
     --image '{"S3Object":{"Bucket":"demos.ziniman.com","Name":"photos/reko.jpg"}}'

{
    "Labels": [
        {
            "Confidence": 99.140487670089844,
            "Name": "Human"
        },
        {
            "Confidence": 99.1404800415039,
            "Name": "People"
        },
        {
            "Confidence": 99.140487670089844,
            "Name": "Person"
        }……
```


aws AI

Rekognition API Example

```
boazz: ~/ aws rekognition detect-faces
     --image '{"S3Object":{"Bucket":"demos.ziniman.com","Name":"photos/reko.jpg"}}'
     --attributes "ALL”
```


```
{
    "FaceDetails": [
        {
            ....
            "Gender": {
                "Confidence": 99.9211654663086,
                "Value": "Male"
            },
            "AgeRange": {
                "High": 52,
                "Low": 35
            },
     ....
```


aws AI

Rekognition Lambda Python Example

```python
import boto3
import json
import os
import urllib

region_name=os.environ['AWS_REGION']

rekognition = boto3.client("rekognition", region_name)


def run_reko(event, context):

    file_object = event['Records'][0]['s3']['object']
    file_key = urllib.unquote_plus(file_object['key'].encode("utf8"))
    bucket = event['Records'][0]['s3']['bucket']['name']

    response = rekognition.detect_labels(
        Image={
            "S3Object": {
                "Bucket": bucket,
                "Name": file_key,
            }
        },
        MaxLabels=5,
        MinConfidence=70,
    )

    print ('Reko Labels: ' + json.dumps(response))
```


aws AI

Where to Start?

- https://aws.amazon.com/rekognition/
- https://aws.amazon.com/blogs/machine-learning/
- https://aws.amazon.com/blogs/machine-learning/classify-your-own-images-using-amazon-sagemaker/
- https://github.com/ziniman/aws-rekognition-demo
- https://github.com/ziniman/aws-serverless-website-photo-tagging

aws AI

Thank You!

Dragos Madarasan, Solutions Architect
Amazon Web Services


@dragospm


dragos-madarasan

aws AI