

Hands-on tutorials

Detect, Analyze, and Compare Faces with Amazon Rekognition



Detect, Analyze, and Compare Faces with Amazon Rekognition: Hands-on tutorials

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Table of Contents

Detect, Analyze, and Compare Faces with Amazon Rekognition	i
Overview	1
Implementation	2
Conclusion	16

Detect, Analyze, and Compare Faces with Amazon Rekognition

AWS experience	Beginner
Time to complete	10 minutes
Cost to complete	Free Tier eligible
Services used	Amazon Rekognition
Last updated	July 11, 2022

Overview

In this tutorial, you will learn how to use the face recognition features in Amazon Rekognition using the AWS Management Console. Amazon Rekognition is a deep learning-based image and video analysis service.

As a developer, you might face the challenge of facial recognition and comparison if you are developing an employee verification system, or need to automate video editing or provide secondary authentication for other applications. To solve this, you could develop your own machine learning model, develop an API, and manage your own infrastructure. This option is expensive, requires advanced knowledge, and is time intensive.

An easier route is to use Amazon Rekognition, which can detect faces in an image or video, find facial landmarks such as the position of eyes, and detect emotions such as happy or sad in near-real time or in batches without management of infrastructure or modeling.

In this tutorial, you will use [Amazon Rekognition](#) to analyze an image and then compare it to other images to see if the faces are the same.

This tutorial is a demo of the functionality that is available when using the AWS CLI or the Rekognition API. For production or proof of concept implementations, we recommend using these programmatic interfaces rather than the Amazon Rekognition console.

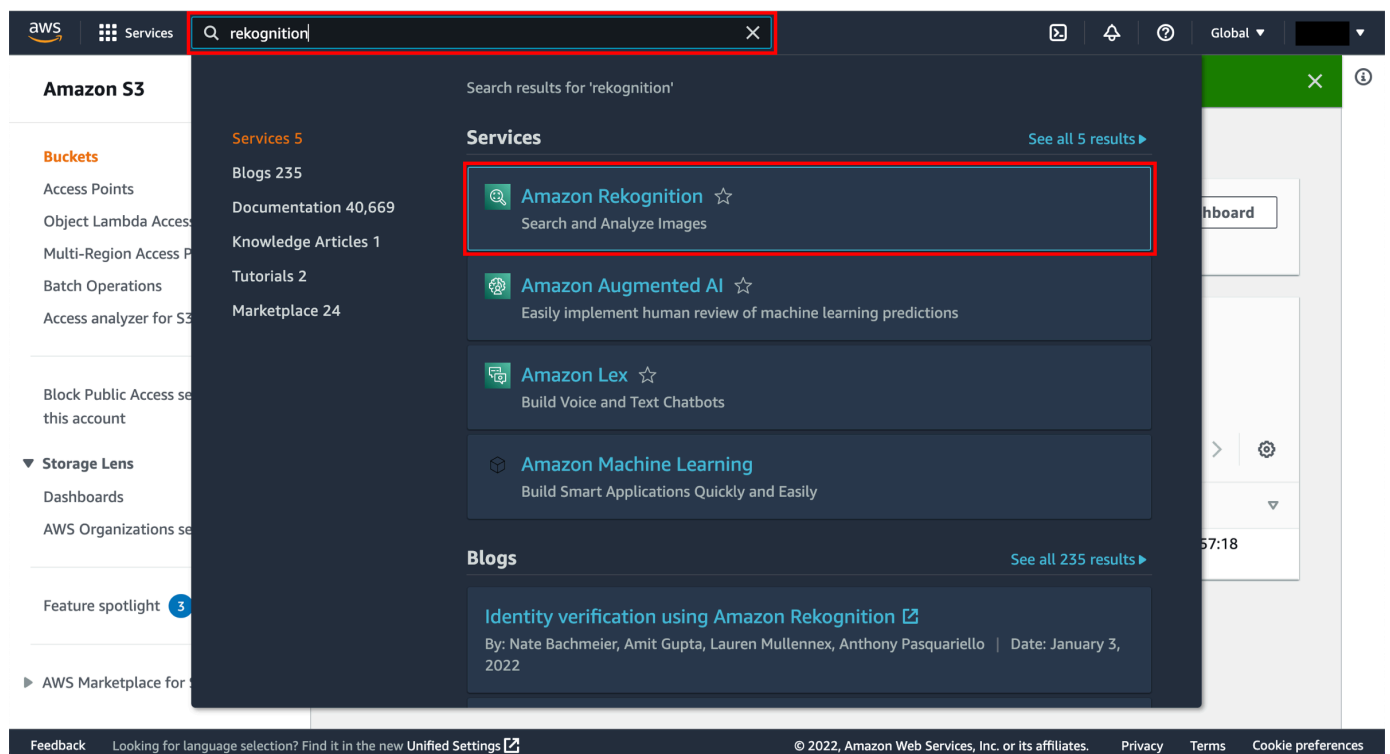
Implementation

Step 1: Analyze faces

In this step, you will use the facial analysis feature in Amazon Rekognition to see the detailed JSON response you can receive from analyzing one image.

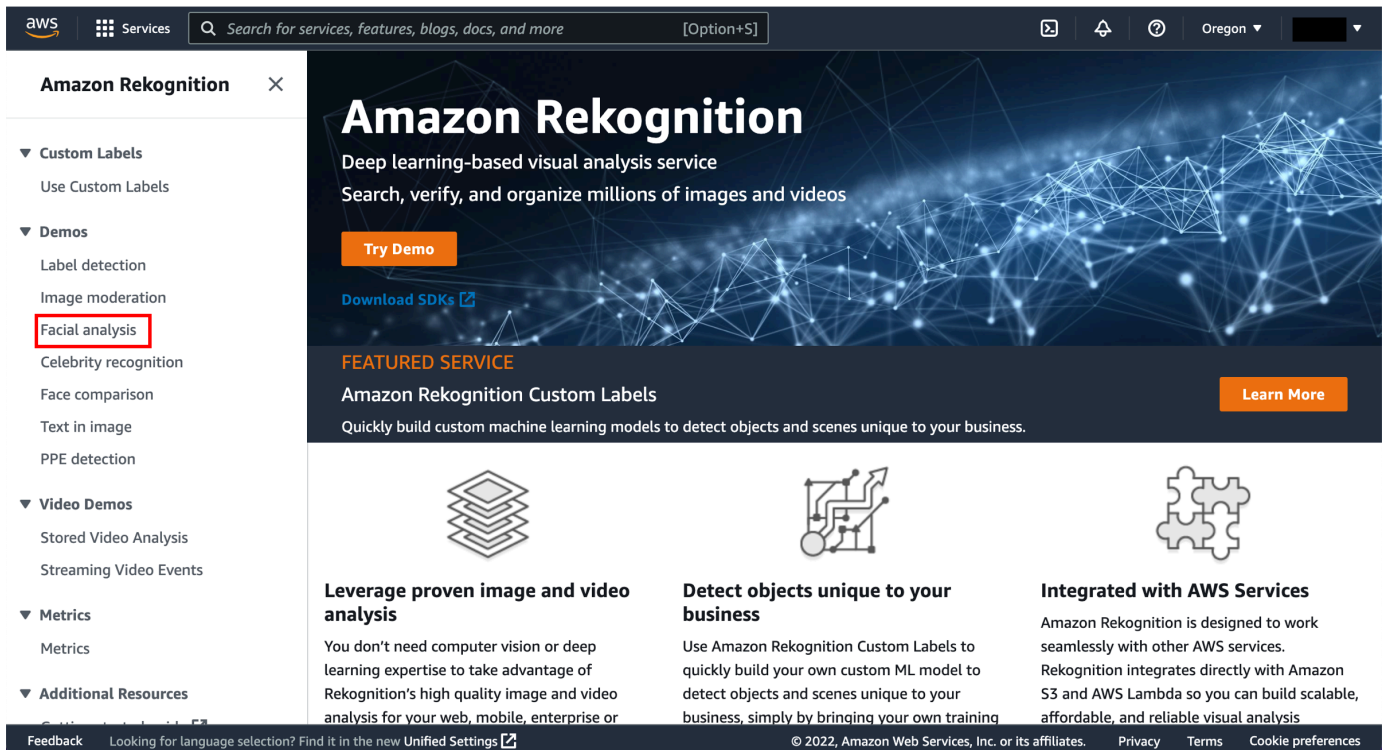
1. Open the console

Open the [AWS Management Console](#), so you can keep this step-by-step guide open. When the screen loads, enter your user name and password to get started. Then type **Rekognition** in the search bar and select **Rekognition** to open the service console.



2. Select Facial analysis

To start, select **Facial analysis** in the panel navigation on the left. This feature allows you to analyze faces in an image and receive a JSON response.



The screenshot shows the Amazon Rekognition console interface. The left-hand navigation menu is expanded, and the 'Facial analysis' option is highlighted with a red box. The main content area displays the 'Amazon Rekognition' header, a description of the service as a 'Deep learning-based visual analysis service', and a 'Try Demo' button. Below this, there is a 'FEATURED SERVICE' section for 'Amazon Rekognition Custom Labels' with a 'Learn More' button. The bottom of the page features three columns of text describing the service's capabilities: 'Leverage proven image and video analysis', 'Detect objects unique to your business', and 'Integrated with AWS Services'. The footer contains a feedback link, a language selection notice, and copyright information for 2022.

3. Save the first sample image

Open and save the first sample image for this tutorial [here](#).



4. Upload sample image

Click the orange **Upload** button and select the sample image you just saved.

Amazon Rekognition × **Facial analysis** Leave us feedback

Get a complete analysis of facial attributes, including confidence scores. [Learn more](#)

▼ 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

Results

- looks like a face 99.9 %
- appears to be female 99.9 %
- age range 25 - 35 years old
- not smiling 63.5 %
- appears to be happy 70 %
- wearing glasses 99.9 %

[Show more](#)

5. Review the quick results

Notice that under the Results dropdown, you can click through and see quick results for each face that was detected.

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Text in image
PPE detection

▼ Video Demos
Stored Video Analysis
Streaming Video Events

▼ Metrics
Metrics

▼ Additional Resources

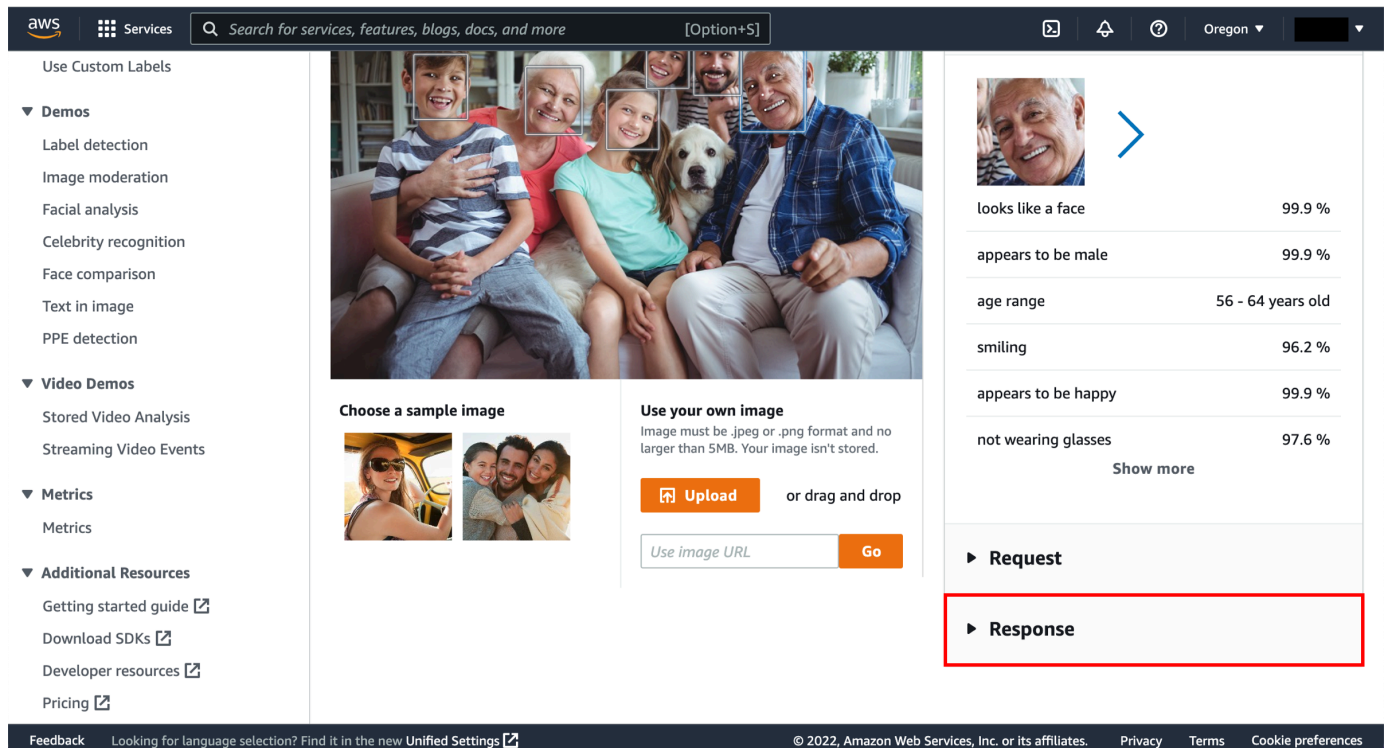
Results

- looks like a face 99.9 %
- appears to be male 99.9 %
- age range 56 - 64 years old
- smiling 96.2 %
- appears to be happy 99.9 %
- not wearing glasses 97.6 %

[Show more](#)

6. Open the Response dropdown

Click on the **Response** dropdown to see the JSON results.

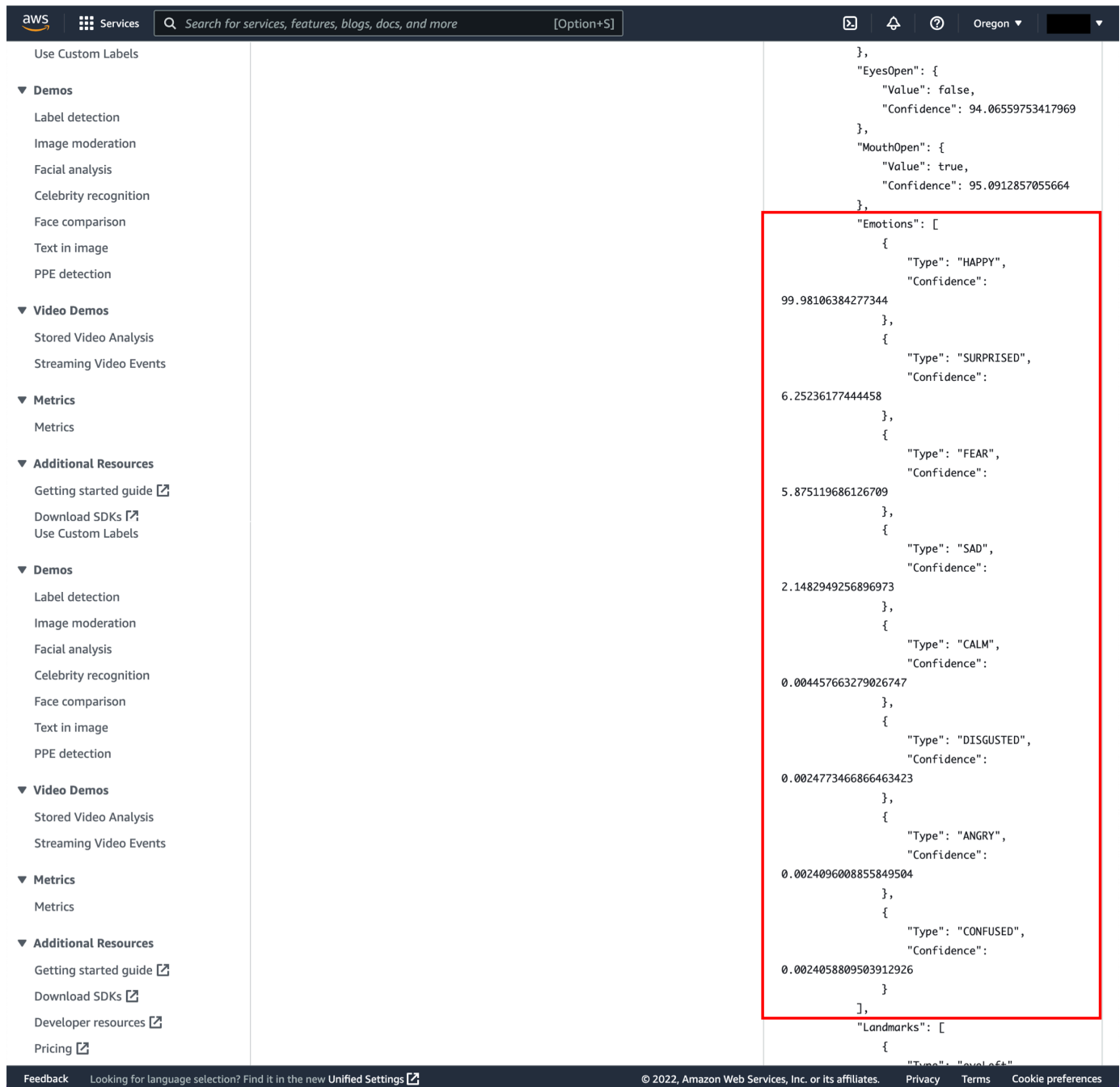


The screenshot shows the AWS Rekognition console interface. On the left is a navigation menu with sections: Demos (Label detection, Image moderation, Facial analysis, Celebrity recognition, Face comparison, Text in image, PPE detection), Video Demos (Stored Video Analysis, Streaming Video Events), Metrics (Metrics), and Additional Resources (Getting started guide, Download SDKs, Developer resources, Pricing). The main area displays a family photo with bounding boxes around faces. Below the photo are two options: 'Choose a sample image' with two small image thumbnails, and 'Use your own image' with an 'Upload' button and a text input field for 'Use image URL' with a 'Go' button. On the right, a results panel shows a close-up of a man's face with a list of detected attributes: 'looks like a face' (99.9%), 'appears to be male' (99.9%), 'age range' (56 - 64 years old), 'smiling' (96.2%), 'appears to be happy' (99.9%), and 'not wearing glasses' (97.6%). A 'Show more' link is below the list. At the bottom of the results panel, there are two dropdown menus: 'Request' and 'Response', with the 'Response' dropdown highlighted by a red border.

7. View the JSON results

Notice that under the emotions results, there are numerous detected emotions. Happy has a 99.98% confidence rating.

As a developer, detecting emotions in images and videos makes it possible to quickly catalog a digital library by emotion. Another use case for detecting emotions is to amplify ad targeting so users receive a personalized experience tailored to the current emotion.



```
    },
    "EyesOpen": {
      "Value": false,
      "Confidence": 94.06559753417969
    },
    "MouthOpen": {
      "Value": true,
      "Confidence": 95.0912857055664
    },
    "Emotions": [
      {
        "Type": "HAPPY",
        "Confidence":
99.98106384277344
      },
      {
        "Type": "SURPRISED",
        "Confidence":
6.25236177444458
      },
      {
        "Type": "FEAR",
        "Confidence":
5.875119686126709
      },
      {
        "Type": "SAD",
        "Confidence":
2.1482949256896973
      },
      {
        "Type": "CALM",
        "Confidence":
0.004457663279026747
      },
      {
        "Type": "DISGUSTED",
        "Confidence":
0.0024773466866463423
      },
      {
        "Type": "ANGRY",
        "Confidence":
0.0024096008855849504
      },
      {
        "Type": "CONFUSED",
        "Confidence":
0.0024058809503912926
      }
    ],
    "Landmarks": [
      {
        "Type": "eyeLeft"
```

Step 2: Compare faces

In this step, you will use the face comparison feature to see the detailed JSON response from comparing two different images that don't match.

1. Select Face comparison

Select **Face comparison** in the panel navigation on the left.

Amazon Rekognition ×

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Facial analysis

Get a complete analysis of facial attributes, including confidence scores. [Learn more](#)

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- 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

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

Results

looks like a face	99.9 %
appears to be male	99.9 %
age range	56 - 64 years old
smiling	96.2 %
appears to be happy	99.9 %
not wearing glasses	97.6 %

[Show more](#)

Feedback Looking for language selection? Find it in the new [Unified Settings](#)

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2. Save second sample image

Open and save the second sample image for this tutorial [here](#).



3. Upload the reference face image

Click on the orange **Upload** button for the reference face and select the image you just saved.

The screenshot shows the Amazon Rekognition console interface for the 'Face comparison' feature. The left sidebar contains navigation options like 'Custom Labels', 'Demos', 'Video Demos', 'Metrics', and 'Additional Resources'. The main content area is titled 'Face comparison' and includes a 'Reference face' section with an 'Upload' button highlighted in red, and a 'Comparison faces' section with an 'Upload' button. The 'Results' section on the right displays three comparison outcomes: a high similarity of 99.9% (marked with an equals sign) and two lower similarity results (marked with not-equals signs). The bottom of the page features a footer with 'Feedback', 'Looking for language selection? Find it in the new Unified Settings', '© 2022, Amazon Web Services, Inc. or its affiliates.', 'Privacy', 'Terms', and 'Cookie preferences'.

4. Select first reference image

Click on the orange **Upload** button for the comparison face and select our first sample image we used in step 2.

The screenshot displays the Amazon Rekognition console interface for the 'Face comparison' feature. The top navigation bar includes the AWS logo, 'Services', a search bar, and the region 'Oregon'. The left sidebar contains a navigation menu with categories like 'Custom Labels', 'Demos', 'Video Demos', 'Metrics', and 'Additional Resources'. The main content area is titled 'Face comparison' and includes a 'Leave us feedback' button. The interface is divided into two main columns: 'Reference face' and 'Comparison faces'. The 'Reference face' column shows a single image of a man. The 'Comparison faces' column shows a group of three women. Below each image is a 'Choose a sample image' section with two small image thumbnails and an 'Upload' button. There is also a 'Use your own image' section with a text input field for the image URL and a 'Go' button. The right sidebar shows the 'Results' section, which displays three rows of face comparisons. Each row shows the reference face on the left, a 'not equal' symbol (≠) in the middle, and one of the comparison faces on the right. Below the 'Results' section are 'Request' and 'Response' sections.

5. Review the Results

Notice that in **Results** dropdown you can see that our reference wasn't a match for any of the detected faces in our comparison faces image.

The screenshot displays the Amazon Rekognition console for the 'Face comparison' feature. The interface is divided into several sections:

- Navigation Sidebar:** Contains links for Custom Labels, Demos (Label detection, Image moderation, Facial analysis, Celebrity recognition, Face comparison, Text in image, PPE detection), Video Demos, Metrics, and Additional Resources.
- Reference face:** A section for uploading a single reference image, including a 'Choose a sample image' gallery and an 'Upload' button.
- Comparison faces:** A section for uploading multiple comparison images, including a 'Choose a sample image' gallery and an 'Upload' button.
- Results:** A section showing the comparison results. It displays six pairs of faces, each with a 'not equal' symbol (\neq) between them, indicating that no faces were detected as a match. This section is highlighted with a red border.
- Request:** A section for viewing the API request details.

6. Review the JSON results

Click on the **Response** dropdown to see the JSON results. Notice that the “Similarity” score for each of the detected faces never exceeds 1. The similarity score ranges from 1-100 and the threshold can be adjusted when using the API.

As a developer, comparing faces at scale can be used in applications to track persons of interest, create a face-based employee verification system, or provide a VIP experience to guests staying at a hospitality venue.



The screenshot shows the AWS IAM console interface. On the left, there is a navigation menu with categories like 'Image moderation', 'Facial analysis', 'Video Demos', 'Metrics', and 'Additional Resources'. The main content area displays a 'Request' and a 'Response' section. The 'Response' section is expanded, showing a JSON object. The 'Similarity' value, '0.5962035059928894', is highlighted with a red box. The footer of the console contains 'Feedback', 'Looking for language selection? Find it in the new Unified Settings', '© 2022, Amazon Web Services, Inc. or its affiliates.', 'Privacy', 'Terms', and 'Cookie preferences'.

```
{
  "SourceImageFace": {
    "BoundingBox": {
      "Width": 0.3000960648059845,
      "Height": 0.689637303352356,
      "Left": 0.37668338418006897,
      "Top": 0.07726003974676132
    },
    "Confidence": 99.99944305419922
  },
  "FaceMatches": [
    {
      "Similarity": 0.5962035059928894,
      "Face": {
        "BoundingBox": {
          "Width":
0.10671369731426239,
          "Height":
0.2065853774547577,
          "Left": 0.6923362612724304,
          "Top": 0.16253957152366638
        }
      }
    }
  ]
}
```

Step 3: Compare faces (again)

In this step, you will use the face comparison feature to see the detailed JSON response from comparing two different images that have a match.

1. Save the sample image

Open and save the third and final sample image for this tutorial [here](#).



2. Upload the image

Click on the orange **Upload** button for the reference face and select the image you just saved.

The screenshot shows the Amazon Rekognition console interface for the 'Face comparison' feature. On the left is a navigation sidebar with categories like Custom Labels, Demos, Video Demos, Metrics, and Additional Resources. The main area is titled 'Face comparison' and includes a 'Reference face' section (with a red box around the 'Upload' button) and a 'Comparison faces' section. The 'Results' section on the right displays a list of comparison outcomes, each showing a reference face, a comparison face, and a similarity score. The first result shows a 99% similarity score between the reference face and a photo of an older man. All other results show a 0% similarity score. The footer contains links for Feedback, language selection, and copyright information.

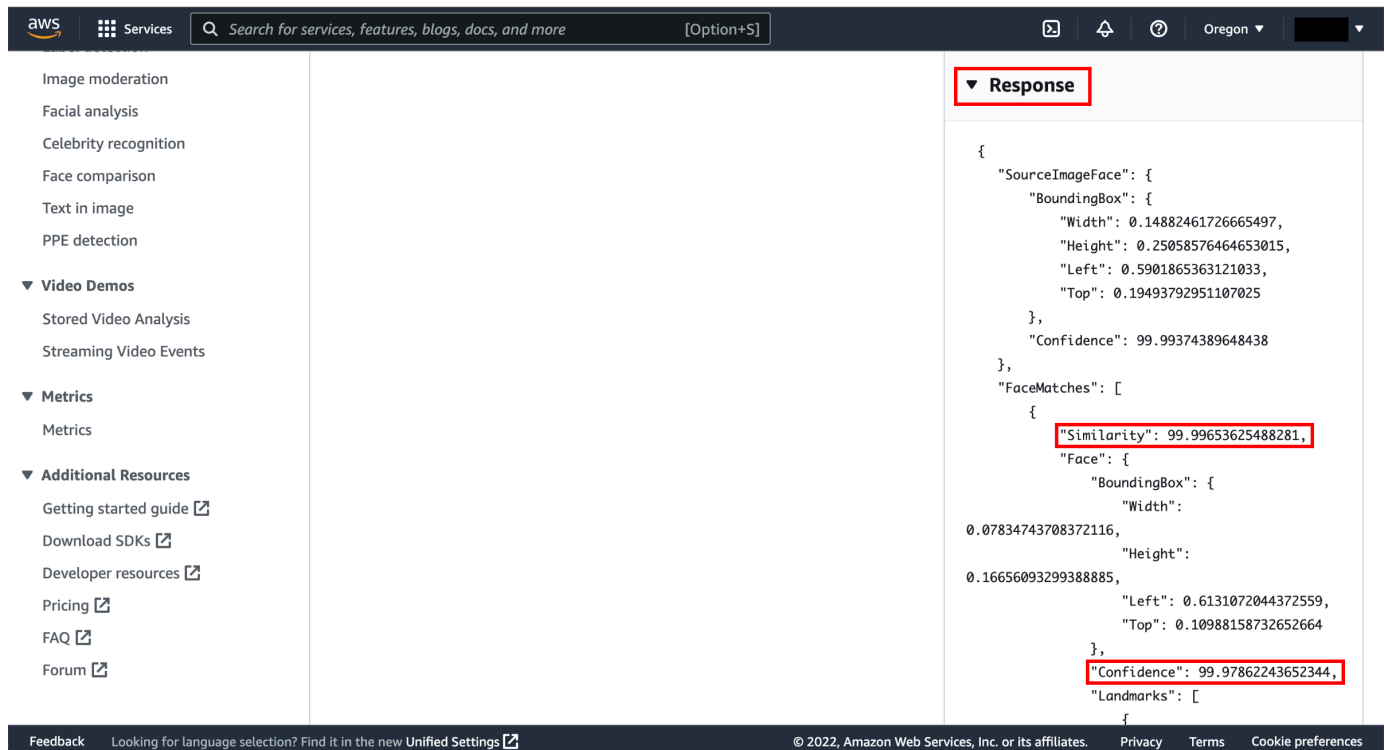
3. Review the Results

Notice that the reference face that was compared to our other photo detected a 99% similarity score and detected that all other faces were not a match.

The screenshot displays the Amazon Rekognition Face Comparison tool. On the left is a navigation menu with categories like Custom Labels, Demos, Video Demos, Metrics, and Additional Resources. The main area is titled 'Face comparison' and includes a search bar and a 'Leave us feedback' button. Below the title, there are sections for 'Reference face' and 'Comparison faces', each with a sample image and an upload area. The 'Results' section on the right shows a comparison of the reference face with several comparison faces. The first comparison shows a 99.9% similarity, while the others show a non-match symbol (≠).

4. Review the JSON results

Click on the **Response** dropdown to see the details of each comparison.



The screenshot shows the AWS Management Console interface. On the left, there is a navigation menu with categories like Image moderation, Facial analysis, and Video Demos. The main content area displays the response of an API call, which is a JSON object. The response is expanded to show the 'Response' section. The JSON structure is as follows:

```
{
  "SourceImageFace": {
    "BoundingBox": {
      "Width": 0.14882461726665497,
      "Height": 0.25058576464653015,
      "Left": 0.5901865363121033,
      "Top": 0.19493792951107025
    },
    "Confidence": 99.99374389648438
  },
  "FaceMatches": [
    {
      "Similarity": 99.99653625488281,
      "Face": {
        "BoundingBox": {
          "Width":
0.07834743708372116,
          "Height":
0.16656093299388885,
          "Left": 0.6131072044372559,
          "Top": 0.10988158732652664
        },
        "Confidence": 99.97862243652344,
        "Landmarks": [
          {
            "Type": "EYE",
            "x": 0.6131072044372559,
            "y": 0.10988158732652664
          },
          {
            "Type": "EYE",
            "x": 0.6131072044372559,
            "y": 0.10988158732652664
          },
          {
            "Type": "MOUTH",
            "x": 0.6131072044372559,
            "y": 0.10988158732652664
          },
          {
            "Type": "MOUTH",
            "x": 0.6131072044372559,
            "y": 0.10988158732652664
          },
          {
            "Type": "NOSE",
            "x": 0.6131072044372559,
            "y": 0.10988158732652664
          },
          {
            "Type": "NOSE",
            "x": 0.6131072044372559,
            "y": 0.10988158732652664
          }
        ]
      }
    }
  ]
}
```

The 'Similarity' value (99.99653625488281) and the 'Confidence' value (99.97862243652344) for the first match are highlighted with red boxes. The footer of the console shows '© 2022, Amazon Web Services, Inc. or its affiliates.' and links for 'Privacy', 'Terms', and 'Cookie preferences'.

Conclusion

You have learned how to use the console to analyze and compare faces. You can also perform this feature using the API so you can operate at scale. Use Amazon Rekognition when you need to perform facial analysis at scale without worrying about infrastructure or training a model for identifying persons of interest, cataloging a digital library, creating a face-based employee verification system, or performing sentiment analysis.