Face Recognition with Amazon Rekognition

An Internship report submitted in partial fulfillment of the requirements for the

Award of Degree of

BACHELOR OF TECHNOLOGY

in

INFORMATION TECHNOLOGY

by

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Department of INFORMATION TECHNOLOGY

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2023-24

CERTIFICATE

This is to certify that the Internship report entitled "**Face Recognition with Face Rekognition"** being submitted by "**Venkata Krishna Lingala" "Y21AIT517**"is work done by him/ her and submitted during 2022– 2023 academic year, in partial fulfillment of the requirements for the award of the degree of **BACHELOR OF TECHNOLOGY in INFORMATION TECHNOLOGY,** at "**Internshala"** from **05-May-2023 to 16-June-2023.**

Department Internship Coordinator   Head of the Department

DECLARATION

I hereby declare that the dissertation entitled **Face Recognition with Amazon Rekognition** submitted for the B.Tech Degree is my work and the dissertation has not formed the basis for the award of any degree, associates, fellowship, or any other similar titles.

Place: Bapatla   **Venkata Krishna Lingala**

Date: **Y21AIT517**

INTERNSHIP CERTIFICATE ISSUED BY THE COMPANY

INTERNSHALA TRAININGS

Certificate of Training

Venkata Krishna Lingala

from Bapatla Engineering College has successfully completed a 6-week online training on **Cloud computing with AWS**. The training consisted of Introduction to Cloud Computing, Getting Started with AWS, AWS Identity & Access Management, Simple Storage Service (S3), Virtual Private Cloud (VPC), Elastic Compute Cloud (EC2), High-Level Architecture, Database, AWS Advanced Services, AWS Security & Management Services, AWS Billing and Pricing, and Training Conclusion and Final Project modules.
In the final assessment, Venkata Krishna scored 70% marks.
We wish Venkata Krishna all the best for future endeavours.

Sarvesh Agarwal
FOUNDER & CEO, INTERNSHALA

Date of certification: 2023-05-24   Certificate no. : 5qhy6e60tsp

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ABSTRACT

During my internship at Internshala, I worked on a project with Amazon Web Services (AWS). I assisted with Identity Access Management (IAM), Elastic Compute Cloud (EC2), Simple Storage System (S3), Virtual Private Cloud (VPC), Relational Database System (RDS), CloudFormation, Application Services, Route53. Overall, my internship was a valuable learning experience that allowed me to develop new skills and gain practical experience in the field of Cloud Computing.

During my internship, I worked on a project called Face Recognition with Amazon face rekognition. For this, I used four services from AWS i.e. Amazon S3, Lambda, Dynamo DB, and Amazon Rekognition.

The main motive of this project is to recognize the people from their images. To do this we need to train the rekognition with the images and some metadata. Metadata means the Full name of the person present in the photo. All the photos are stored in a collection and which are used when finding the person. To find or recognize a person we have a Python code that will take an image as input and give the "name of the person" as the output if he/she is present in the database. If there is no such person present in the database then it will show the "person not found".

Keywords:

1.AWS SERVICES:

- Identity Access Management (IAM)
- Elastic Compute Cloud (EC2)
- Simple Storage System(S3)
- Relational Data Base (RDS)
- Virtual Private Cloud (VPC)

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1. Introduction

I was excited to have this opportunity to intern at Internshala. My primary responsibilities were to develop a project and learn as much as I could about the Cloud. I assisted with Identity Access Management (IAM), Elastic Compute Cloud (EC2), Simple Storage System (S3), Virtual Private Cloud (VPC), Relational Database System (RDS), CloudFormation, Application Services, Route53. Overall, my internship was a valuable learning experience that allowed me to develop new skills and gain practical experience in the field of Cloud Computing.

Cloud computing is on-demand access, via the internet, to computing resources—applications, servers (physical servers and virtual servers), data storage, development tools, networking capabilities, and more—hosted at a remote data center managed by a cloud services provider (or CSP). Mainly Cloud Computing is used for Organizations of every type, and size. Industries are using the cloud for a wide variety of use cases, such as data backup, disaster recovery, email, virtual desktops, software development and testing, big data analytics, and customer-facing web applications.

Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP) are the big three cloud service providers today.

During my internship, I worked on a project called Face Recognition with Amazon face rekognition. For this, I used four services from AWS i.e. Amazon S3, Lambda, Dynamo DB, and Amazon Rekognition.

The main motive of this project is to recognize the people from their images. To do this we will use Amazon Rekognition.

2.Requirement Analysis

The requirements for this project are:

1. **An AWS free tire Account**

   The AWS Free Tier provides customers the ability to explore and try out AWS services free of charge up to specified limits for each service. The Free Tier is comprised of three different types of offerings, a 12-month Free Tier, an Always Free offer, and short-term trials.

2. **Visual Studio Code**

   Visual Studio Code is a streamlined code editor with support for development operations like debugging, task running, and version control. It aims to provide just the tools a developer needs for a quick code-build-debug cycle and leaves more complex workflows to fuller featured IDEs, such as Visual Studio IDE.

3. **Python SDK**

   SDK means System Development Kit. It helps in the programming of mobile applications bringing a group of tools in one place. Python SDK enables the user to write codes that manage OCI resources. The primary purpose of the Python SDK is to provide an easy Python environment to use.

4. **Photos of the persons whom you want to train and recognize**

   These photos are used to train our machine. And to help us to test whether our project is working fine or not.

3.Software Design
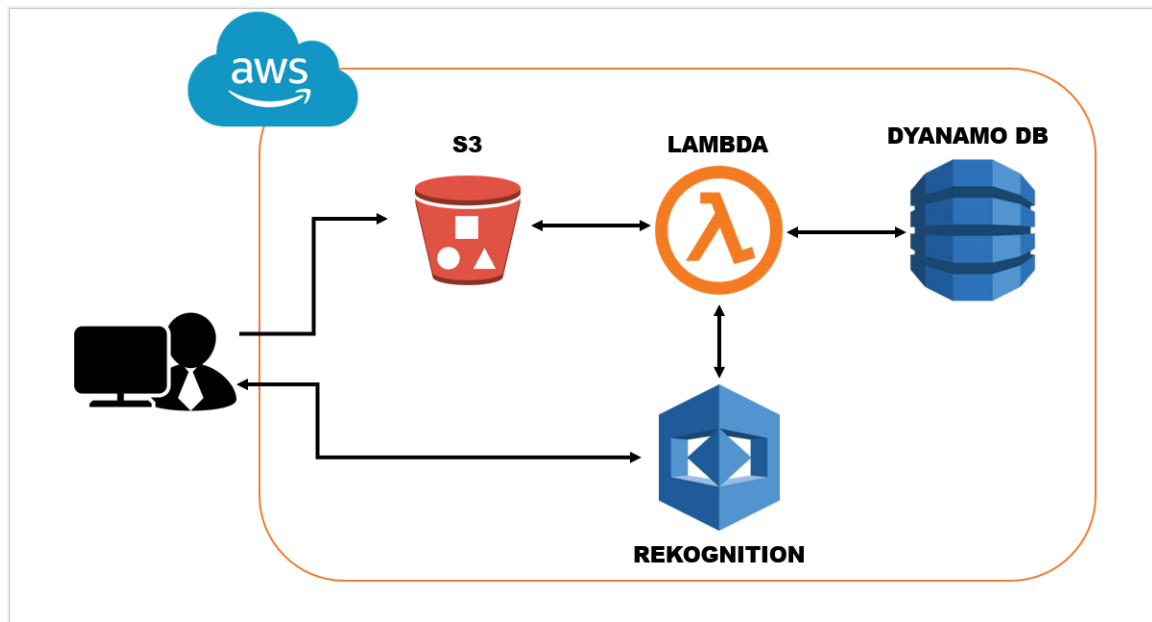
4. **Technology/Methodology**

1. **S3**

Amazon Simple Storage Service (Amazon S3) is an object storage service that offers industry-leading scalability, data availability, security, and performance. You can use Amazon S3 to store and retrieve any amount of data at any time, from anywhere.

2. **Amazon Lambda**

AWS Lambda is a serverless compute service that runs your code in response to events and automatically manages the underlying compute resources for you. These events may include changes in state or an update, such as a user placing an item in a shopping cart on an e-commerce website.

3. **Dynamo DB**

Amazon DynamoDB is a fully managed, serverless, key-value NoSQL database designed to run high-performance applications at any scale. DynamoDB offers built-in security, continuous backups, automated multi-region replication, in-memory caching, and data import and export tools.

4. **Amazon Rekognition**

Amazon Rekognition makes it easy to add image and video analysis to your applications. You just have to provide an image or video to the Amazon Rekognition API, and the service can: Identify labels (objects, concepts, people, scenes, and activities) and text.

5. **Coding**

- **Code to insert images to s3 Bucket:**

```python
import boto3

s3 = boto3.resource('s3')

images = [('image1.jpg', 'Sundar Pichai'),
          ('image2.jpg', 'Bill Gates'),
          ('image3.jpg', 'Elon musk')]
for image in images:
    file = open(image[0], 'rb')
    object = s3.Object('famous-persons-images', 'index/' + image[0])
    ret = object.put(Body=file,
                     Metadata={'FullName': image[1]})
```

Input:

Output:

-

Objects (3)

Objects are the fundamental entities stored in Amazon S3. You can use Amazon S3 inventory ☐ to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. Learn more ☐

Name	Type	Last modified	Size	Storage class
☐ image1.jpg	jpg	October 24, 2023, 14:45:17 (UTC+05:30)	207.4 KB	Standard
☐ image2.jpg	jpg	October 24, 2023, 14:45:18 (UTC+05:30)	638.6 KB	Standard
☐ image3.jpg	jpg	October 24, 2023, 14:45:21 (UTC+05:30)	735.8 KB	Standard

- **Lambda Handler to populate the index of DynamoDB:**

```python
def lambda_handler(event, context):

    bucket = event['Records'][0]['s3']['bucket']['name']
    print("Records: ", event['Records'])
    key = event['Records'][0]['s3']['object']['key']
    print("Key: ", key)

    try:
        response = index_faces(bucket, key)

        if response['ResponseMetadata']['HTTPStatusCode'] == 200:
            faceId = response['FaceRecords'][0]['Face']['FaceId']
            ret = s3.head_object(Bucket=bucket, Key=key)
            personFullName = ret['Metadata']['fullname']

            update_index('facerecognition', faceId, personFullName)

        print(response)

        return response
    except Exception as e:
        print(e)
        print("Error processing object {} from bucket {}. ".format(key, bucket))
        raise e
```

Output:

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Code to Recognize :

```python
import boto3
import io
from PIL import Image

rekognition = boto3.client('rekognition', region_name='ap-south-1')
dynamodb = boto3.client('dynamodb', region_name='ap-south-1')
image_path = input("Enter path of the image to check: ")
image = Image.open(image_path)
stream = io.BytesIO()
image.save(stream, format="JPEG")
image_binary = stream.getvalue()
response = rekognition.search_faces_by_image(
    CollectionId='facerecognition_collection',
    Image={'Bytes': image_binary})
found = False
for match in response['FaceMatches']:
    print(match['Face']['FaceId'], match['Face']['Confidence'])

    face = dynamodb.get_item(
        TableName='facerecognition',
        Key={'RekognitionId': {'S': match['Face']['FaceId']}}
    )

    if 'Item' in face:
        print("Found Person: ", face['Item']['FullName']['S'])
        found = True

if not found:
    print("Person cannot be recognized")
```

```python
def index_faces(bucket, key):

    response = rekognition.index_faces(
        Image={"S3Object":
                {"Bucket": bucket,
                 "Name": key}},
        CollectionId="facerecognition_collection")
    return response


def update_index(tableName, faceId, fullName):
    response = dynamodb.put_item(
        TableName=tableName,
        Item={
            'RekognitionId': {'S': faceId},
            'FullName': {'S': fullName}
        }
    )
```

Output: If a person found

```
PS D:\Face_reco\test> python testing.py
Enter path of the image to check: elon.jpg

95b49fa2-f383-47a3-a919-61572632d2d6 99.99810028076172


Found Person:   Elon musk

a3e703ce-c358-489f-9460-23da26e89747 99.99810028076172
```

Output: If a person did not found

```
PS D:\Face_reco\test> python testing.py
Enter path of the image to check: jeff.jpg
Person cannot be recognized
```

6.Conclusion

Overall, my internship at Internshala was a valuable learning experience. I was able to develop new skills and gain practical experience in the field of Cloud Computing with AWS. I am grateful for the opportunity to have interned at such a successful and dynamic company.