AWS Image Recognition Pipeline - Setup Instructions

This document provides detailed instructions to set up the AWS Image Recognition Pipeline using EC2, S3, SQS, and Rekognition.   
The pipeline involves downloading images, detecting objects (cars), sending image keys to SQS, and processing those images   
on another EC2 instance for text recognition using AWS Rekognition.

# Prerequisites

1. AWS Account: Ensure you have an active AWS account.  
2. AWS CLI Setup: Make sure you have AWS CLI installed and configured on your local machine.  
3. IAM Permissions: Ensure your AWS user has sufficient permissions to access EC2, S3, SQS, and Rekognition services.

# Step 1: Launch EC2 Instances

1. Launch EC2 Instances (EC2-A and EC2-B):  
 - Open the EC2 Dashboard in AWS Console.  
 - Launch two Amazon Linux 2 instances (free-tier eligible).  
 - Ensure the security group allows inbound traffic on SSH (port 22) and outbound traffic.  
 - Download the .pem key pair for SSH access to the instances.  
  
2. Access EC2 Instances via SSH:  
 Use the following command to connect to each instance. Replace <path-to-your-key> with the path to your .pem key file:  
   
 ssh -i "<path-to-your-key>/cckey.pem" ec2-user@<EC2-instance-public-IP>

# Step 2: Install AWS CLI and Dependencies on Both Instances

1. Update the system:  
 sudo yum update -y  
  
2. Install AWS CLI:  
 sudo yum install aws-cli -y  
  
3. Install Python and pip (only if not already installed):  
 sudo yum install python3-pip -y  
 pip3 install boto3 requests Pillow  
  
4. Install Java (only required if you're using Java in your application):  
 sudo yum install java-devel -y  
 java -version

# Step 3: Configure AWS CLI

1. Configure AWS CLI credentials:  
 - Create the .aws folder and credentials file:  
   
 mkdir ~/.aws  
 touch ~/.aws/credentials  
 nano ~/.aws/credentials  
   
 - In the credentials file, add your AWS access key, secret key, and session token (if using an Educate account):  
   
 [default]  
 aws\_access\_key\_id = YOUR\_ACCESS\_KEY  
 aws\_secret\_access\_key = YOUR\_SECRET\_KEY  
 aws\_session\_token = YOUR\_SESSION\_TOKEN (for Educate users)  
  
2. Configure AWS CLI:  
 Run aws configure and input your credentials and region. For example:  
   
 aws configure

# Step 4: Set Up S3 Bucket

1. Create an S3 Bucket:  
 - Go to the S3 service in the AWS Console and create a bucket named njitcs643 (or any name you prefer).  
 - Upload images into the bucket.   
  
2. Download Images to EC2 Instances:  
 On EC2-A, use wget to download images from the provided URL:  
  
 wget https://njit-cs-643.s3.us-east-1.amazonaws.com/1.jpg  
 wget https://njit-cs-643.s3.us-east-1.amazonaws.com/2.jpg  
 # Repeat for all images  
  
3. Upload Images to S3 Bucket:  
 From EC2-A, upload images to your S3 bucket:  
  
 aws s3 cp 1.jpg s3://njitcs643/  
 aws s3 cp 2.jpg s3://njitcs643/  
 # Repeat for all images  
  
4. Verify Image Upload:  
 Use the following command to confirm the images are uploaded:  
  
 aws s3 ls s3://njitcs643/

# Step 5: Set Up SQS Queue

1. Create SQS Queue:  
 On EC2-A, create an SQS queue:  
  
 aws sqs create-queue --queue-name recogqueue  
  
2. Get the Queue URL:  
 Copy the Queue URL output by the command above. You will use this in your scripts later.

# Step 6: Run Object Detection on EC2-A

1. Download and Update object\_detection.py:  
 - Create the object\_detection.py script on EC2-A:  
   
 nano object\_detection.py  
   
 - Paste the code provided in the project setup instructions.  
  
2. Run the Object Detection Script:  
 python3 object\_detection.py

# Step 7: Run SQS Listener on EC2-B

1. Download and Update sqs\_listener.py:  
 - Create the sqs\_listener.py script on EC2-B:  
   
 nano sqs\_listener.py  
   
 - Paste the code provided in the project setup instructions.  
  
2. Run the SQS Listener Script:  
 python3 sqs\_listener.py

# Step 8: Monitor and Verify Results

- Once the scripts are running, monitor the output for detected objects and text.  
- After completion, the results will be printed, showing the images where cars were detected and any detected text.

# Step 9: Terminate EC2 Instances

- After finishing the work, terminate the EC2 instances to avoid additional charges:  
 - Go to the EC2 dashboard and select both instances.  
 - Click "Terminate".