Module 22
Machine Learning – Part 2 (AWS Rekognition)

Overview

AWS Rekognition is an image and video analysis service based on a Machine Learning (ML) algorithm known as Artificial Neural Network (ANN).

NOTE: For those who will take Machine Learning (CS460) with me in the Fall quarter, we will cover ANNs in detail and practice coding the algorithm from scratch. Here, I will not talk about what ANNs are, how they look like, and how they function since it is beyond the scope of the course. We will just use the AWS Rekognition API as a black box that does things to us.

AWS Rekognition is one of the most interesting AWS ML services that allows clients to do sophisticated image and video analysis without the need to build and train their own ANN. This means that application developers can provide such capabilities in their applications without the need to invest time and effort in training and building ML models. Without such out-of-the-box service, achieving the same would require a lot of developers with a wide array of expertise.

Image and video analysis might sound like something that is rarely needed and only concern a small fraction of software applications. However, this is not the case. This WiKi lists some types of applications that use ANNs. It is not an exhaustive list, but it should give you an idea how ANNs find their way in a wide array of applications and ideas.

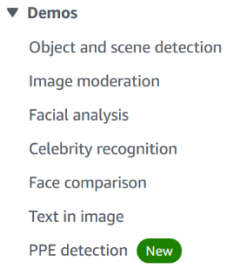
Before you use the service, first read What AWS Rekognition is. The link also shows some of the applications that need such a service.

Steps to do in the AWS Console

Before you use the AWS Rekognition API, go through the tutorial below to observe its capabilities and potential uses.

1. Login to the AWS console and go to the **Amazon Rekognition** service.

2. Located in the left navigation bar are various demos you can look at:



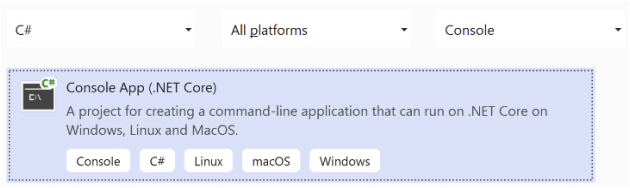
Go through the many demos listed under “Demos”. Click on each and see the results you get. This should give you an idea of the available capabilities and how you can use them in your own applications.

You will now use the Amazon Rekognition API to detect text in images:

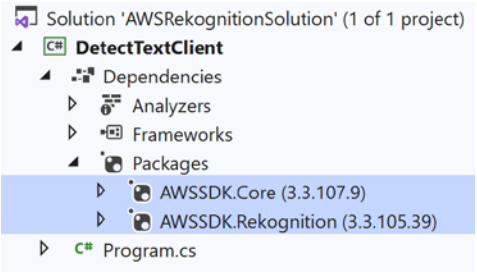
Detect Text in an Image Project

1. Create a Visual Studio solution and name it `AWSRekognitionSolution`.
   (You will use this same solution to create multiple projects related to Rekognition in this and future modules).

2. Under the above solution create a project of type **Console App (.NET Core)** and name it `DetectTextClient`.



3. Use the **Manage NuGet Packages…** menu to add `AWSSDK.Core.dll` and `AWSSDK.Rekognition.dll` to your project. Your project structure should now look like this:



4. Complete the program to detect text in 2 images included with this module (BioConvention.png and PetroleumConference.png).

Your program should detect texts in the images and print them to the console.

HINTS:

- Some using statements that you may need:

```
using System;
using System.IO;
using Amazon;
using Amazon.Runtime;
using Amazon.Runtime.CredentialManagement;
using Amazon.Rekognition;
using Amazon.Rekognition.Model;
```

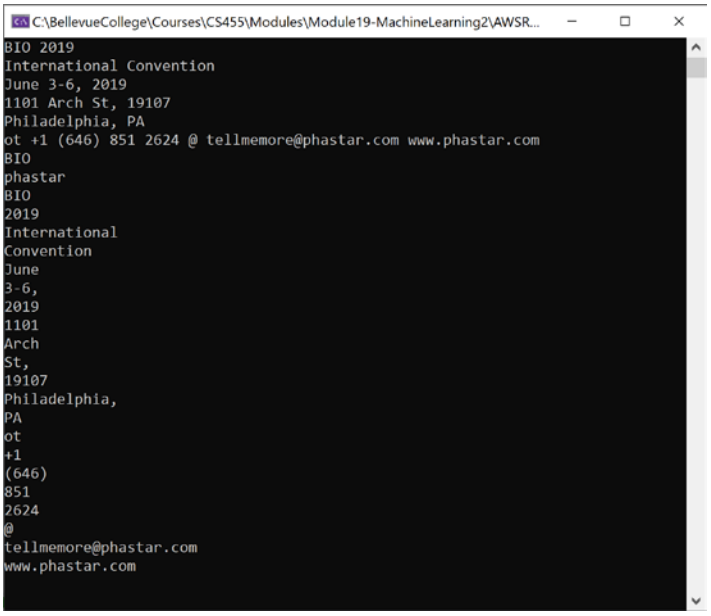
- Some classes you need to use are:

```
AmazonRekognitionClient
DetectTextRequest
DetectTextResponse
```

- The `DetextTextRequest` object has an `Image` field of type `Amazon.Rekognition.Model.Image` that you need to set. You can create that image object like this (where `photo1` is a string that represents the path of your image):

```
Image image = new Image();
try
{
    using (FileStream fs = new FileStream(photo1, FileMode.Open, FileAccess.Read))
    {
        byte[] data = new byte[fs.Length];
        fs.Read(data, 0, (int)fs.Length);
        image.Bytes = new MemoryStream(data);
        fs.Close();
    }
}
catch (Exception)
{
    Console.WriteLine("Failed to load image file");
    return;
}
```

Below is an example how the output of the program looks like when tested with image `BioConvention.png`.



5. Test your program with files other than the 2 I included (search for “flyers” in Google or Bing images and pick a few that you like).

You will use this service in Project3. Make sure you are comfortable using it.

What to Submit

There is nothing to submit for this module.