Topic: Demonstration of Azure Face API to collect face attributes from face images

Problem: To collect data intelligence from people's faces , their expressions and kind of attendance for a specific public gathering/event with use of Azure Cognitive Services - Face API, Azure Storage and Visualization with Pandas.

Data Set: JPG Image database from Georgia Tech Face DB -
http://www.anefian.com/research/face_reco.htm
Database has multiple color images (127 MB in size) of different people in variety of lighting conditions. The data is publicly available for research purpose. I used a manageable subset for purpose of this demo and used them as input to my program as a whole directory location.

Hardware: Intel i5-6300U CPU 2.4Ghz, 16 GB RAM, 64 bit Windows 7 OS

Software:

Technology / Tools	Description
Azure Cognitive Services – Face API	Azure's Face API services
Azure Storage - Table	Azure's Storage services - Table
Python 2.7 & 3.6	Python 2.7 & 3.6 (Used 2.7 for Visualization due to 3.6 installation issues)
Microsoft Azure Storage Explorer	To manage Azure Table data

Overview of steps:
1. Subscribe to Face API
2. Download Image Database for testing Face API
3. Install Python 3.6 on your machine (I have used Anaconda distribution)
4. Setup Azure Storage Account to be used for storing all image attributes
5. Learn Face API.
6. Code development to use Face API and collect face attributes in Azure Storage
7. Data Visualization & inference

Result Analysis :

In test demo I ran, program picked up all images from input directory to process them as Batch. Azure Face API was called per image to detect face attributes. Though Face API collect a bunch of attributes, I have limited results to Age, Gender, Glasses and Smile attribute for purpose of Demo. Once results are retrieved, attribute values are stored in Azure Storage Table. I created a Data Visualization code using Pandas and gave extract from stored face attributes from Azure table to find average age of all faces and average smiling face attribute of this test group to display as graph. If we consider this input source as set of people attending a public event, we can see average age of attending group and whether they were smiling or not in event. Including other attributes, such results can provide public reception of any social events.

Lessons Learnt :
- There are multiple image data sources available to test with but lot of images are in non JPG format mostly RAW format. I could not get Python packages working with non JPG format images. I also saw that Azure Face API only works with JPG, BMP, PNG and GIF files.
- Azure Face API (Free pricing Tier) can only run 20 calls per minute. So when I was running for big batch, I was getting errors. I reduced down my input to < 20 for Demo. We can use time delay function to overcome this limit to some extent.

Pros :
1. Azure Face API accurately delivers face attributes and specially age
2. Face API can detect very small faces in images correctly. In one of my test image, it captured a face in picture on shirt person wearing in image
3. Free pricing Tier is available for use

Cons:
1. Azure Face API does not work with RAW image formats produced by cameras. It only works with JPG, BMP, GIF and PNG
2. Free tier has limitation to run 20 calls in a minute

YouTube URLs :
Short: https://www.youtube.com/watch?v=l_3xt2chxns
Long: https://www.youtube.com/watch?v=7dBOHjJYPj4

Github :
https://github.com/siliconstrength/DeepAzureFinalProject

References:
https://azure.microsoft.com/en-us/services/cognitive-services/face/
http://www.anefian.com/research/face_reco.htm
https://docs.microsoft.com/en-us/azure/cognitive-services/face/overview