Final Assignment: Identity Verification

You are working for a company that wants to use Facial Biometrics (Face Recognition) to ensure that their employees are returning to work! In your case, we are looking at who came to class and whether we can reliably verify identities by comparing faces. In particular, the company is interested in comparing the performance, pros, and cons of the opensource package “facial\_recognition” against the Amazon ReKognition API service. To do this they have cooked up two use cases for you to analyze. First how well do the two packages do on facial recognition simply comparing two faces to one another, and second how well can we recognize known faces in an image.

We have two use cases and a write up.

## Use Case # 1 – Identity verification.

You are given an excel file (MatchSourceTarget.xlsx) containing a source images (MSBA headshots), a target image (an aged headshot) and an indicator if the faces are expected to match. Your job is to assess the accuracy, precision and recall of the face\_recognition package versus Amazon Rekognition for identity verification – if you came to the lecture on the 29th it’s basically what we did in that class. Specifically, you will need to write two notebooks to compare faces, generate similarity, determine a match threshold for each (face\_recognition and Amazon Rekognition) then compare the performance of both systems.

Deliverables:

* Two Notebooks (we need to know you that wrote the code)
* Short report comparing both methods for identity verification, minimally it should include:
  + Key findings
  + Confusion matrix
  + Tables of accuracy, precision, and recall
  + Example of an expected match (yourself, for example with similarity from face\_recognition and CompareFaces)
  + Example(s) of an expected “non-match”

## Use Case # 2 – Attendance: Who came to Class.

You are given 3 images of your section, and a sample of headshots from MSBA students (except the two that didn’t get headshots). Your task is to match the faces in the images to the headshots and produce labeled images (faces found, similarity), a table of students found with their similarity score, and a selection of faces that were not found in your collection. You’ll need to do this twice, once with face\_recognition – follow the recipe to make a database and once with Amazon Rekogntiion – follow the recipe for a collection.

### Deliverables:

* Two Notebooks (we need to know you wrote the code)
* 3 labeled images for face\_recognition
* 3 labeled images for Amazon Rekogntion
* Short report detailing why you chose the thresholds you did, which method is likely better, how many faces were found that were un-matched to students, and any other key findings.

## Final Write-up: The executive summary

You just did a major evaluation of face recognition and Amazon Rekognition technologies, you will now write an executive summary it should include a brief summary of what you did (your methodology), key findings for each use case, and a recommendation with supporting justification on which method to the company should choose and why. Here we are expecting you to think more deeply about the problem, think about accuracy, precision, and recall but also think about complexity, cost, and maintenance; suppose you could host face\_recognition on the cloud or that the accuracy of face\_recognition is on par with Amazon Rekogntion, would either of these change your assessment?

My recommendations:

1. Get familiar with the face\_recognition package, search the internet for examples
2. Get familiar with Amazon Rekognition, there are hundreds of examples of the APIs.
3. Create functions to perform matching
4. Automate your code with a for loop
5. Keep it simple!

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Yes, you can do this just using the notebooks and write u and doing it one by one but that’s not going to meet expectations! You should try and use function and loops to do this!

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| Criteria | Exemplary | Meets Expectations | Below Expectations |  |
| Use Case 1 | You’ve gone above and beyond, notebooks are top notch, writeup is brief but detailed, several examples included, clearly show depth of understanding | You’ve met expectations, notebooks are simply copies of what we’ve done in class, writeup is brief but detailed, examples included, you show understanding of the problem | You’ve not quite met expectations, |
| Use Case 2 | You’ve gone above and beyond, notebooks are top notch, writeup is brief but detailed, several examples included, clearly show depth of understanding | You’ve met expectations, notebooks are simply copies of what we’ve done in class, writeup is brief but detailed, examples included, you show understanding of the problem | 15 Histogram does not accurately display similarity scores but is well-formatted |
| Executive Summary | You’ve gone above and beyond, executive summary is brief but detailed, insightful key findings, your depth of recommendation shows strong understanding of the tradeoffs. | You’ve met expectations for surface level understanding, executive summary is brief but detailed, insightful key findings, depth of recommendation is what we’d expect. | 15 Cross tab does not accurately display predicted matches but is well-formatted |