Face Recognition

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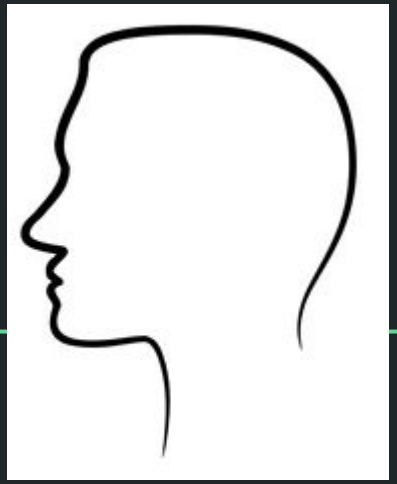


Project Description

Project 4: Face Recognition

In this project you will write a program that uses a face detection method (e.g., Viola-Jones) and one of the image feature descriptors (e.g., LBP) to recognize your face. Your solution should correctly recognize you when tested on a small set of people, for instance your classmates.

Tools and Environment

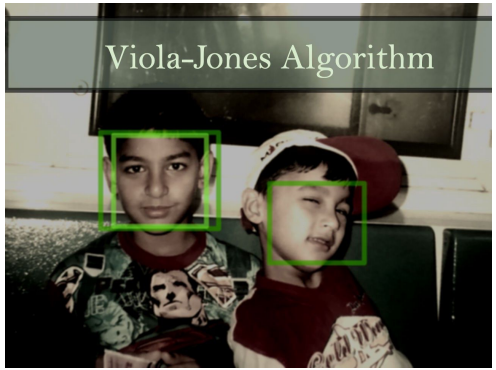
Environments and Algorithms Used

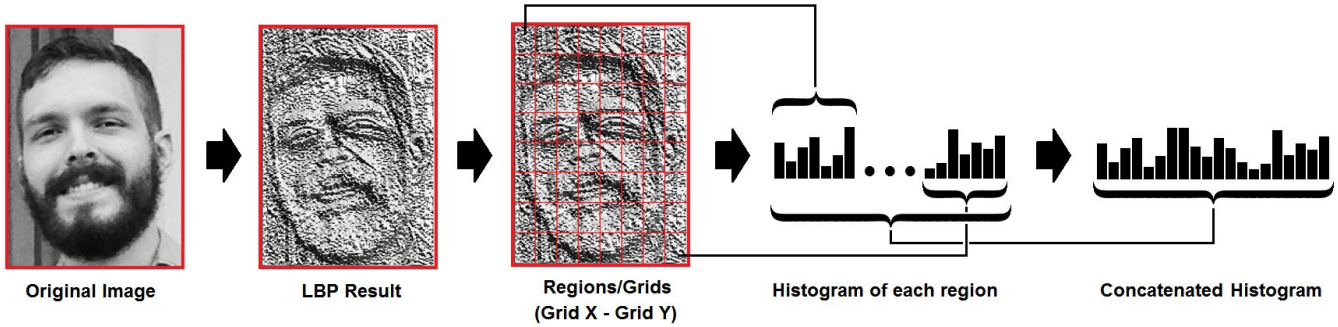
Environment: Python with OpenCV package

Algorithms/Feature Extraction:

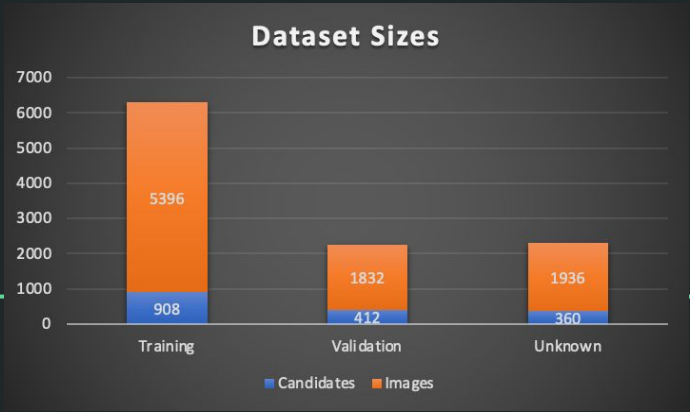
Viola-Jones: Using this to detect faces and format them correctly for LBP

LBP: Using LPPHFaceRecognizer to extract features and recognize face





Testing and Results



Training and Validation- Success

Over 75% accuracy on Validation and Unknown data

```
Name: Roger_Federer --> Result: Roger_Federer, 15.81%
Name: Roger_Federer --> Result: Roger_Federer, 35.19%
Name: Roger_Federer --> Result: Roger_Federer, 34.93%
Name: Roger_Federer --> Result: Roger_Federer, 50.63%
Name: Roger_Federer --> Result: Roger_Federer, 56.23%
Name: Roger_Federer --> Result: Roger_Federer, 46.77%
Name: Roger_Federer --> Result: Roger_Federer, 32.69%
Name: Roger_Federer --> Result: Roger_Federer, 40.66%
Error with 3_unknown/Roger_Federer/Roger_Federer_0005.jpg
Name: Roger_Federer --> Result: Roger_Federer, 15.16%
Name: Roger_Federer --> Result: Roger_Federer, 36.87%
Name: Tim_Duncan --> Result: Tim_Duncan, 36.02%
Name: Tim_Duncan --> Result: Tim_Duncan, 34.05%
Name: Tim_Duncan --> Result: Tim_Duncan, 35.70%
Name: Tim_Duncan --> Result: Tim_Duncan, 35.04%

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Results for directory 3_unknown/
   Total images = 1936
   # Correct predictions = 1457
   # Errors = 101
   Rate of correct identification = 0.7525826446280992
   Rate of errors = 0.052169421487603305
```

Training and Validation- Fail :(

Some of the attempts failed to recognize the correct person

This varied by image, for example, on Lebron James: Laila_Ali, 18.73%

The Ultimate Test

Results for Adam

When testing Adam against the model, we were curious to see who the closest match was before adding him into the model

Our match to Scott Wolf with a confidence rate of -10.21% (Info on Scott here)

This is reasonable because Adam was not in the dataset

Results for Real-time Addition to Dataset

We also were able to implement a program that takes in the user's face from the computer webcam, creates a model, and matches the face to the user in the model

Here, we were able to add Tim to the dataset and correctly identify him with a confidence level of 75.24%