

# Face recognition System

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# Project Overview

Face Recognition is used for everything from automatically tagging pictures in social media to unlocking our phones. Recent advancements in deep learning have made the accuracy of face recognition better. This project covers face recognition development environment, and training machine learning models to analyze images and identify them next time it sees them.

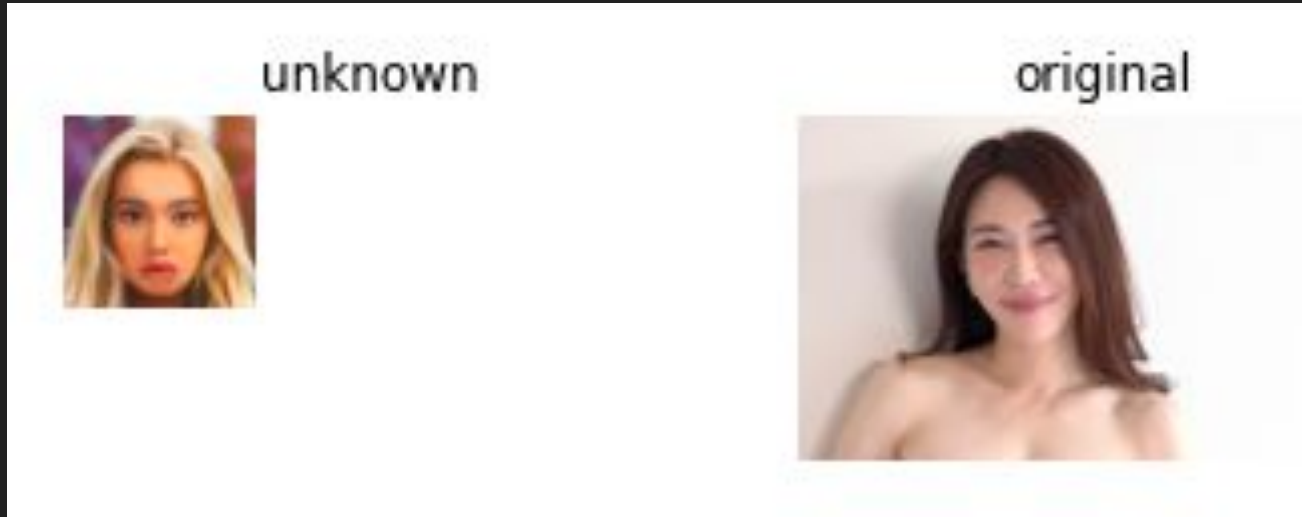
# Project Statement

Build a face recognition system that can identify facial landmarks automatically, represent a face as a set of measurements, and recognize faces using their face encodings.

# Results: Tuning the Model

The model was tried on an image it never seen before.

Since it hasn't seen the unknown image before, it couldn't recognized it. However it does match it with another girl's image.



# Results: Testing

Model accuracy was 100% for images it was trained on

unknown



original



It was able to recognize the black male in the original image

# Results: Digital Makeup

Facial landmarks, imagedraw were used to apply digital makeup correctly on these images.

Mouth and Eye Digital Makeup on the females



Each eyebrow makeup is a line with 3 as the width and RGBA color.

Mouth and Eye Digital Make-up on the male

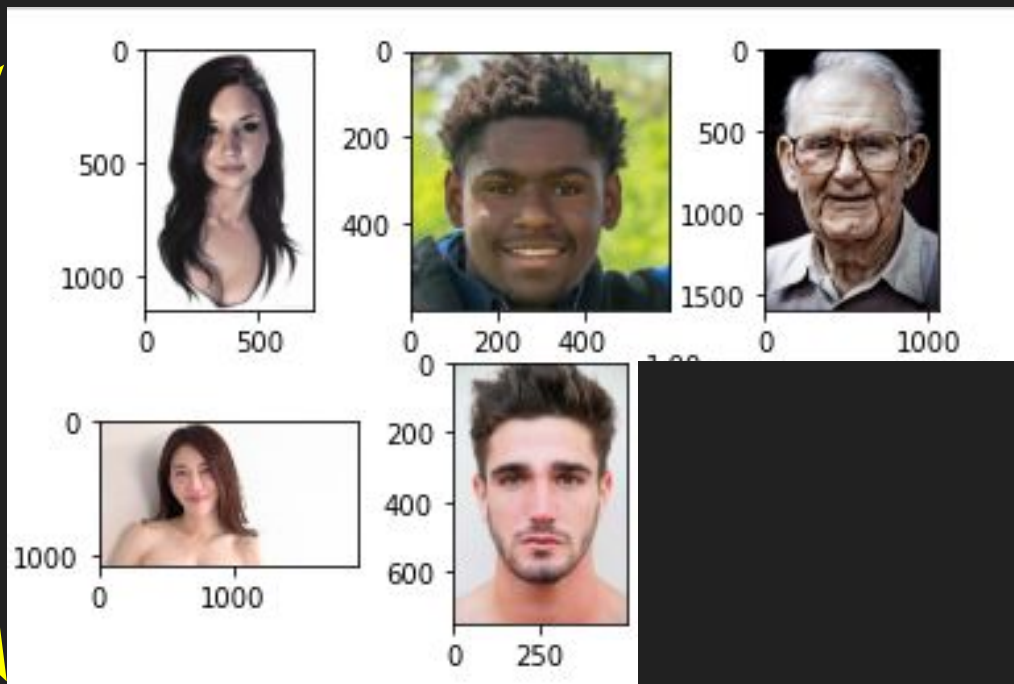


The lips are drawn as polygon using the landmarks of each images

# Training and Modeling

The model was trained with 5 images. Each is a person of different race and gender.

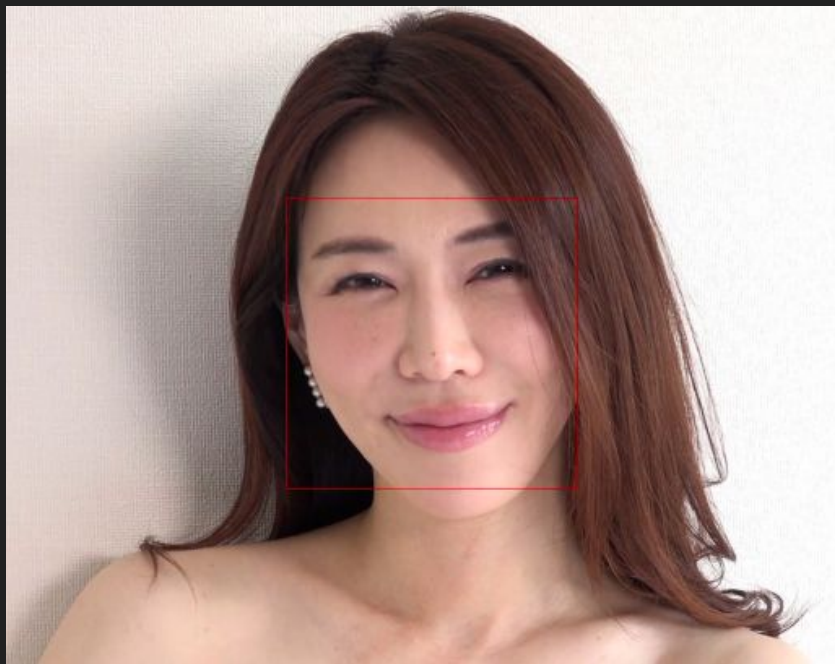
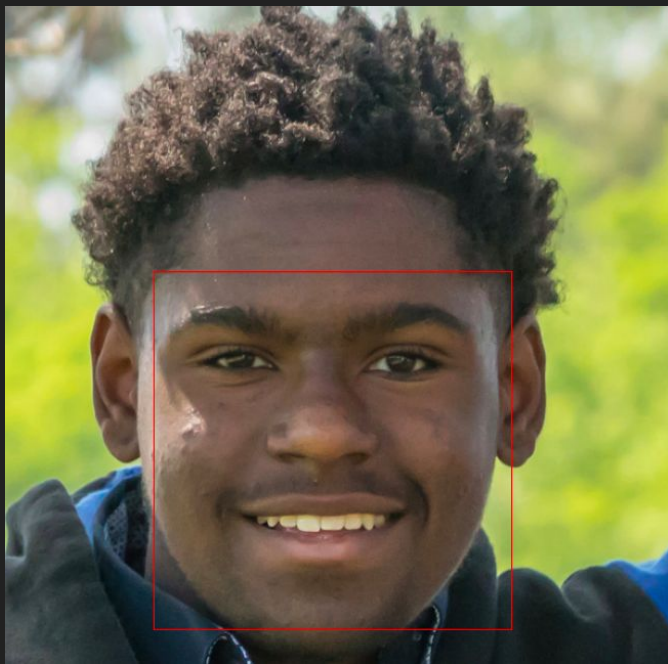
The training set





# Training and Modeling

The face detection were generated for the training sets



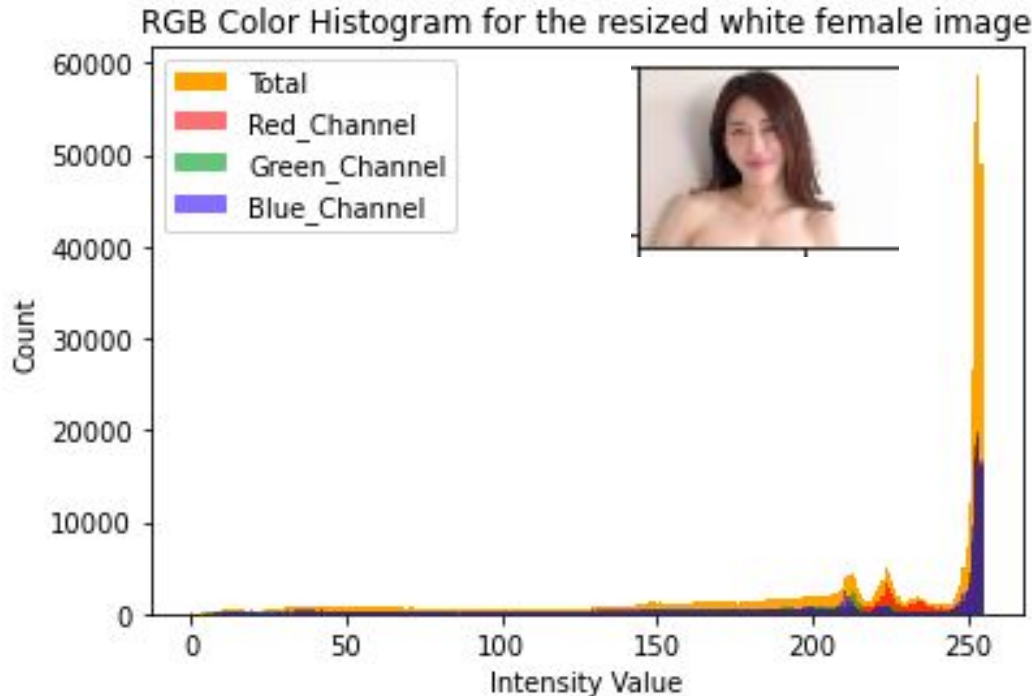
It detects where the faces are in the images. The red box indicates where faces were detected



# Training and Modeling

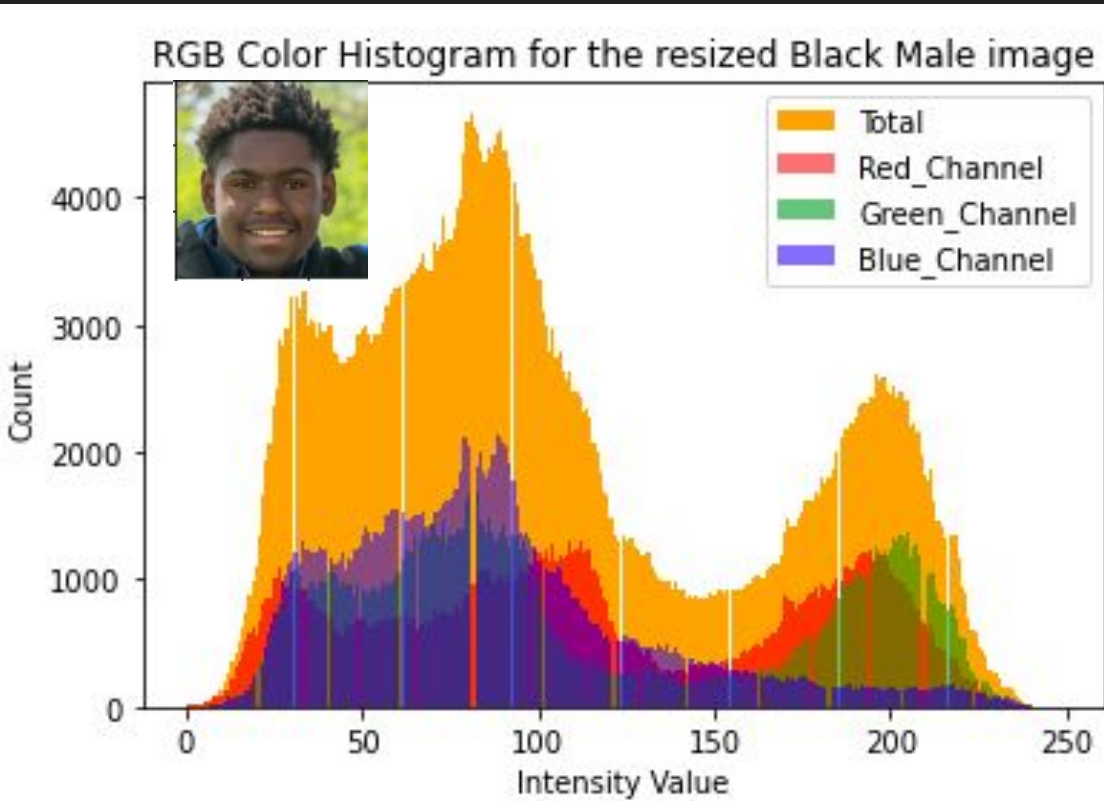
- The face encodings turned information like eye, ear, color, size and gaps into numbers.
- During face landmarkings, information like eyebrows, nose bridges, etc are then grouped together. Unlike the face encodings that return set of measurements without specificity.

# Exploratory Analysis



- The intensity of blue channel were higher than the rest of the channel. The green channel was the least.
- Less color were detected because of the white background.

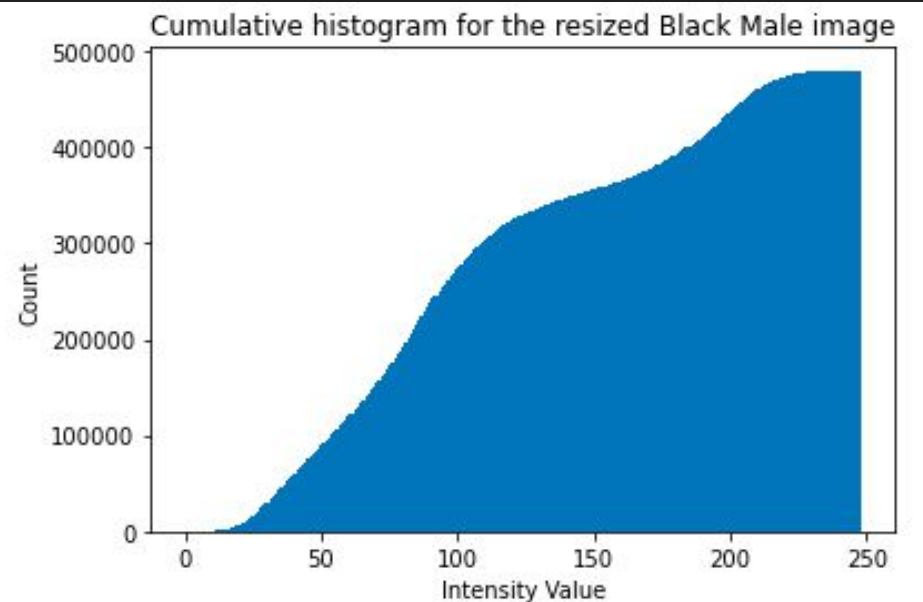
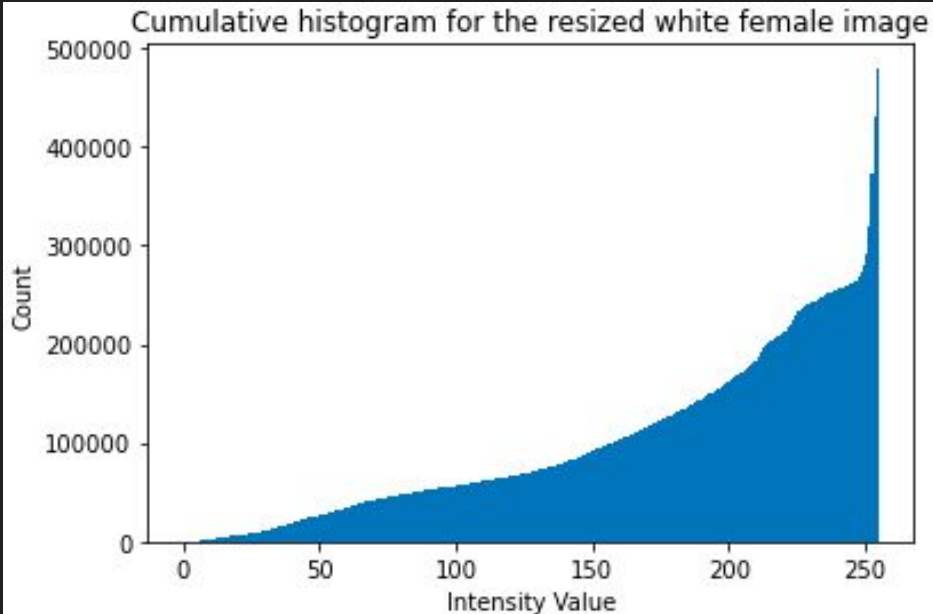
# Exploratory Analysis



- Lots of color visibility in the black male image due to the outfit and background.
- Although the red channel seemed to be distributed throughout the image, the Blue channel followed a similar distribution with the total color channel at first before fading out.

# Exploratory Analysis

Both images have different intensity level. The white female image has lowest intensity level at about 10 and highest at about 265. While the black male has its lowest intensity value at about 15 and highest at 245.



# Conclusion and Recommendations

- The system worked 100% on images it has seen before. Not very good with new faces, some improvements would be needed.
- Due to the nature of the dataset used for this project, it was difficult to test model to recognize all images in the Humans\_faces folder. The folder only had a few repeated ones. They are almost entirely different people. Even when someone is repeated, they still have the same outfit and not rotated. I think training the model on the same person but in a different outfit would be a great idea.
- Next step: Make a small upgrade to the system that will allow it to classify images as males or females and categorize them as young or old.

# Thank You

Thanks for listening, and special thanks to my mentor Luka Anicin for the unwavering support I have gotten.