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PRINCE SULTAN
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# IS446 Evaluation project

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## Dataset used

In this project we are using the GBU dataset which is mostly used for Face recognition (FR). The Good, the Bad, and the Ugly (GBU) Face Challenge Problem was established to encourage the development of algorithms that can recognize changes in still frontal faces throughout many alterations. The Good, the Bad, and the Ugly is divided into three sections. The Good section comprises image pairs that are thought to be simple to recognize. The bad section contains pairs that are harder to recognize. The ugly section contains pairs that are difficult to recognize.

We did the KDE graph for the three types of the files (Bad, Good and Ugly) where Orange is the genuine and blue is the imposter

Then we compared the three types in one line graph where x-axis is the error rate and y-axis is the verify rate and the colors are like this:

Red is Ugly _ Blue is Bad _ Green is Good

## Model 1: Facenet

The KDE

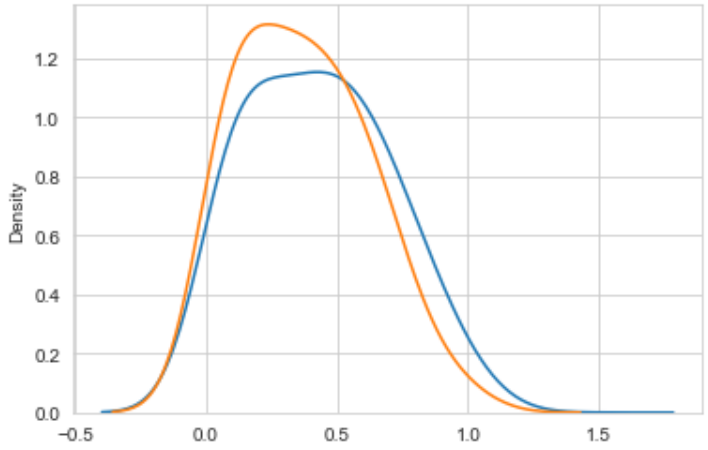



*Figure 1: Bad-files*

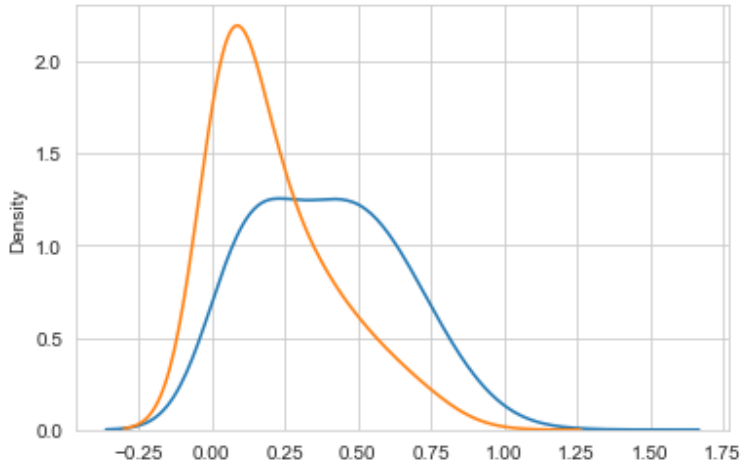



*Figure 2: Good-files*

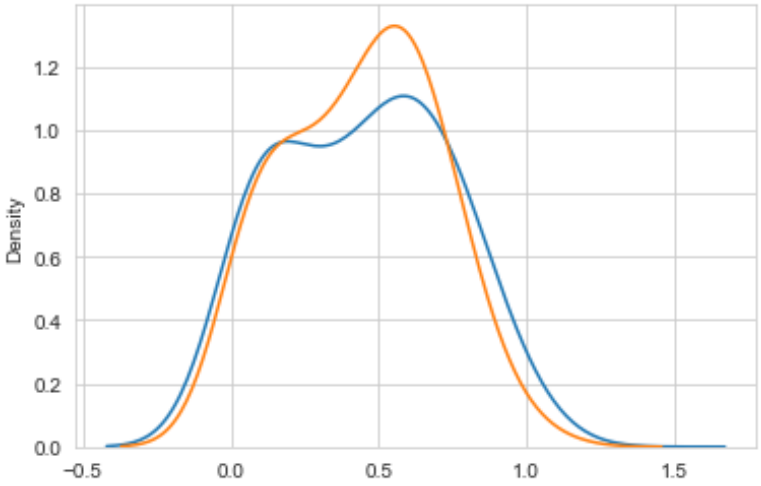



*Figure 3: Ugly-files*

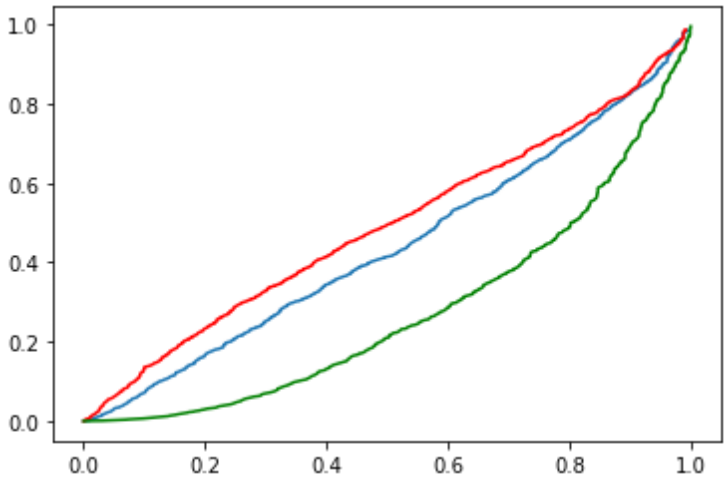



*Figure 4: Red is Ugly _ Blue is Bad _ Green is Good*

# Model 2 OpenFace

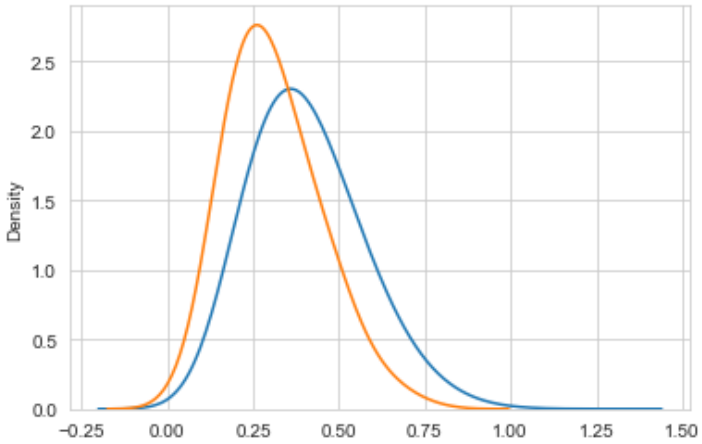



*Figure 5:Ugly*

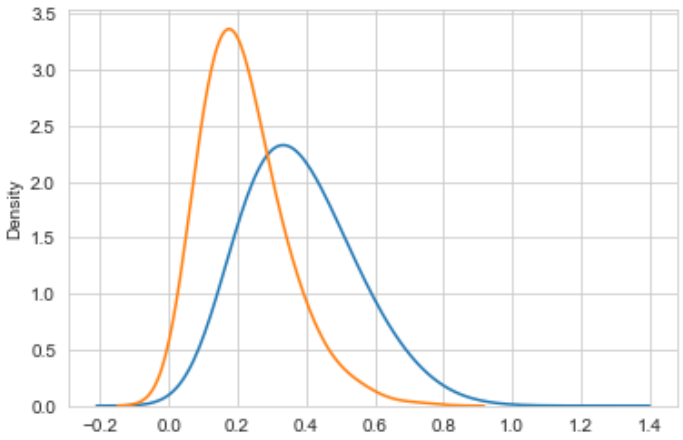



*Figure 6:Bad*

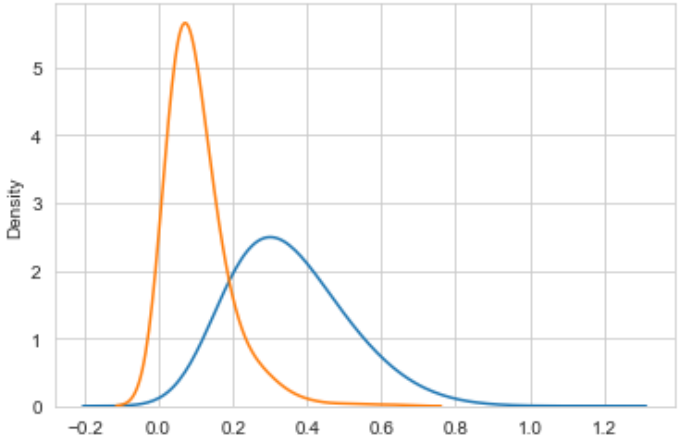



*Figure 7:Good*

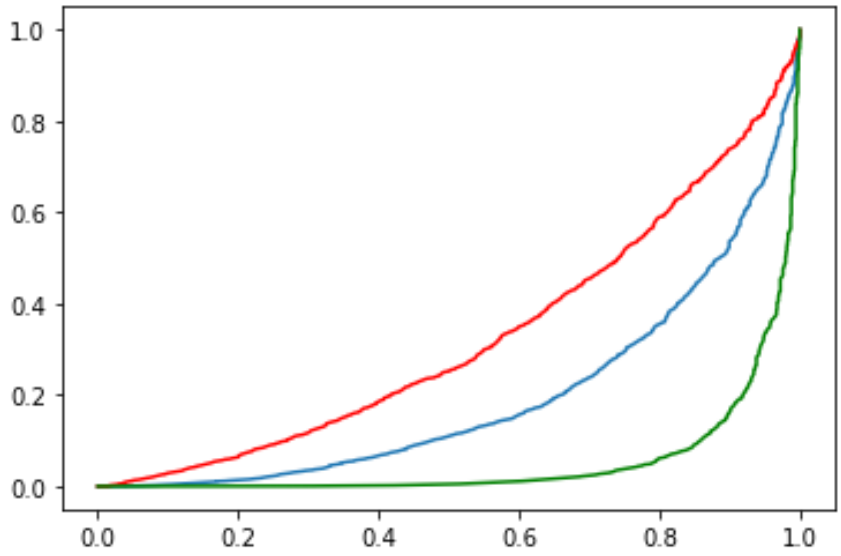



*Figure 8: Red is Ugly _ Blue is Bad _ Green is Good*

## Model 3: ArcFace

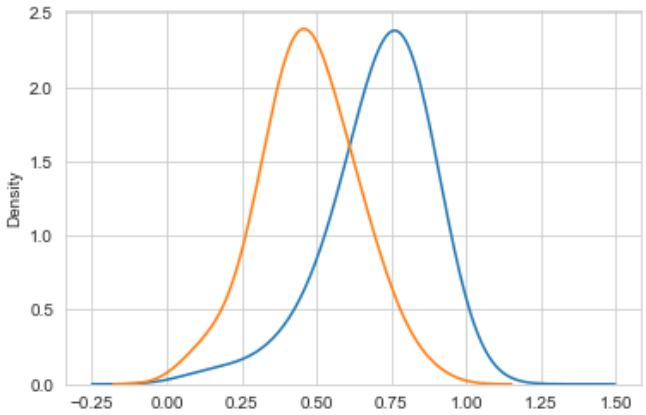



*Figure 8:Ugly*

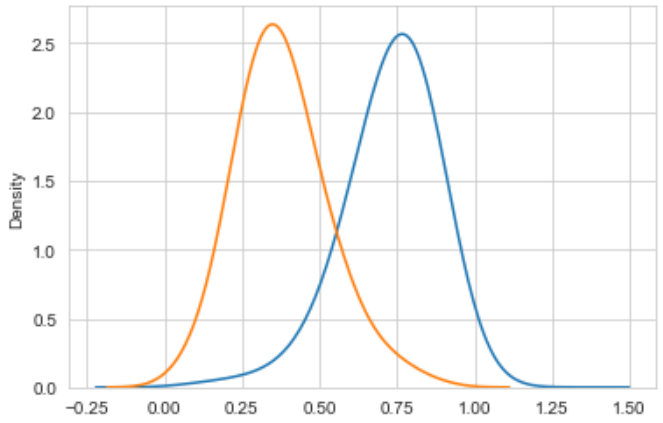



*Figure 9:Bad*

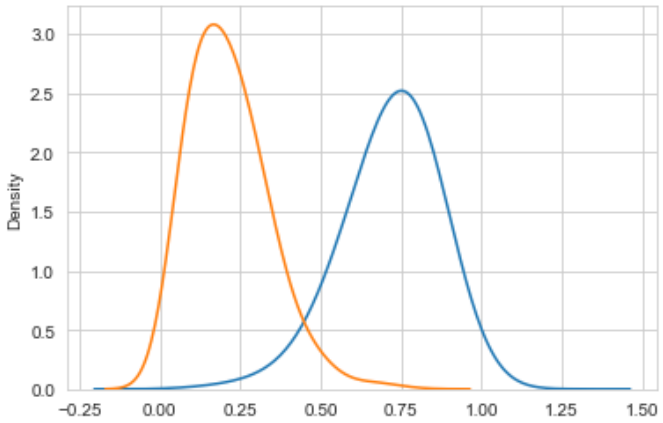
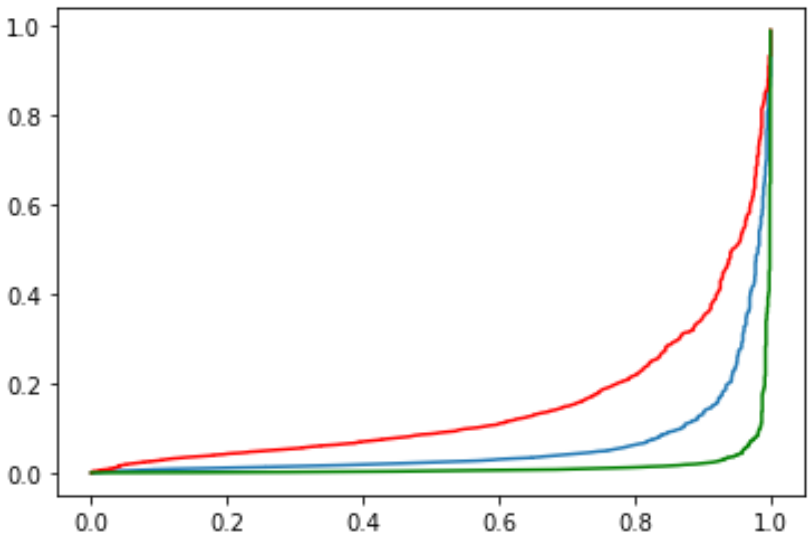



*Figure 10:Good*



# Analysis

We did all of the models in Jupyter lab program (from anaconda) after finding that it is faster than colab from Google.

Note:  in our notebooks we did the models in the same code where we changed the name in the code immediately and for the notebooks are small because we did not do a cells for each model

Also the embedding that are calculated with the distances for each model (each has three Good, Bad and Ugly) are on the link bellow: (need PSU account)

https://drive.google.com/drive/folders/1eUVNeT8TOa0Ifrc2JVZgqbA_1Js2c4kg?usp=sharing

We can also notice that in bad and ugly especially with small embedding that graphs are near to each other while in Good we can see a good distance

## Comparing with Nour Al Din Embeddings:

Nour give as the distances and we calculate the models (Deep Face, VGG and Facenet)

We did the KDE graph for the three types of the files (Bad, Good and Ugly) where Red is the genuine and blue is the imposter

### DeepFace:

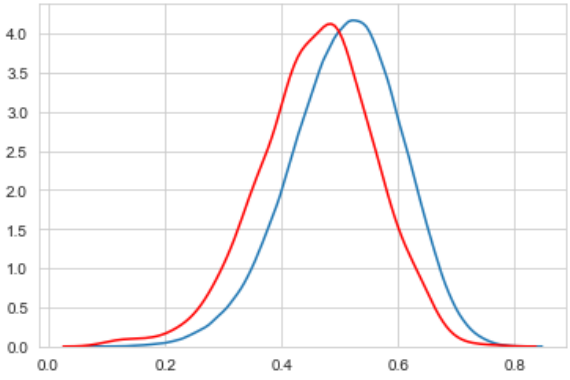



*Figure 11:Ugly*

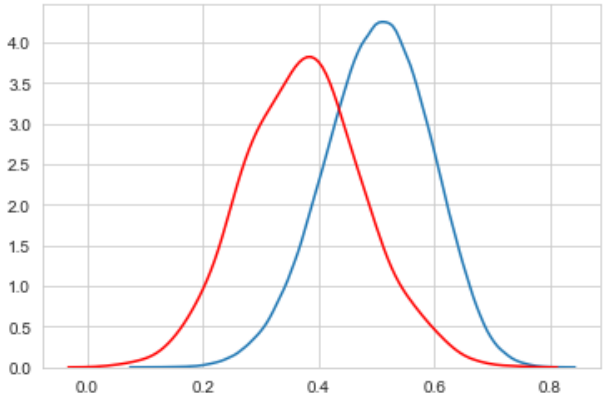



*Figure 12:Bad:*

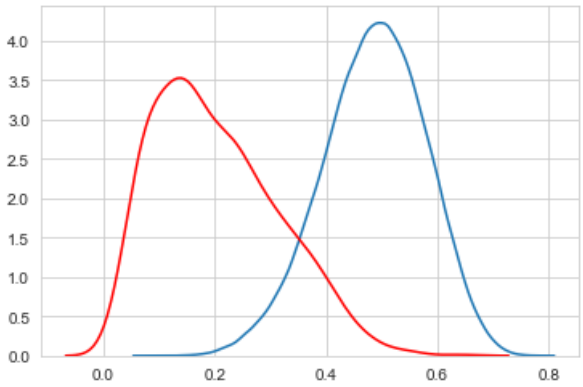
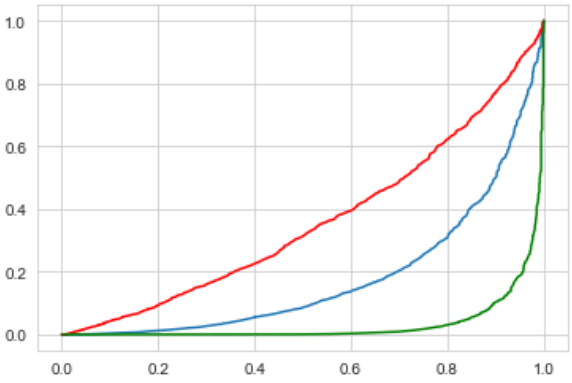



*Figure 13:Good*



## VGG:

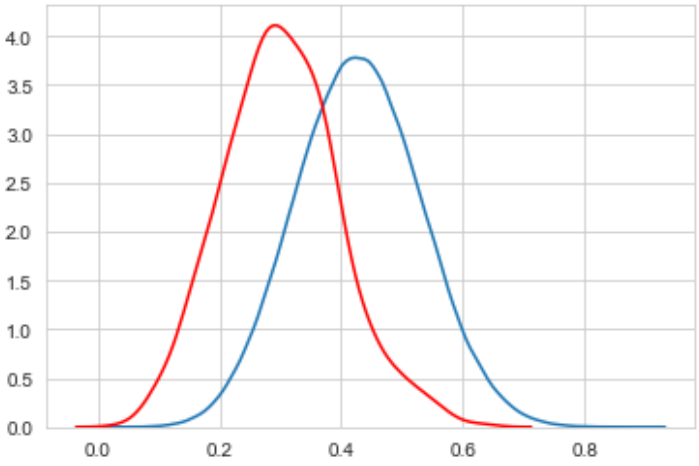



*Figure 14:Ugly*

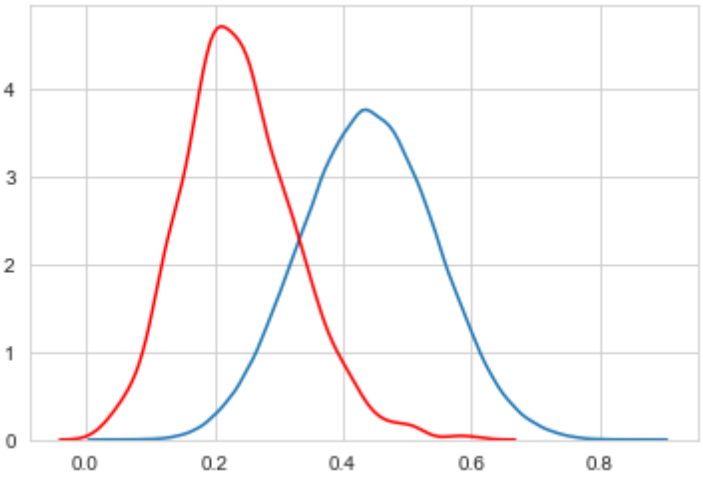



*Figure 15:Bad*

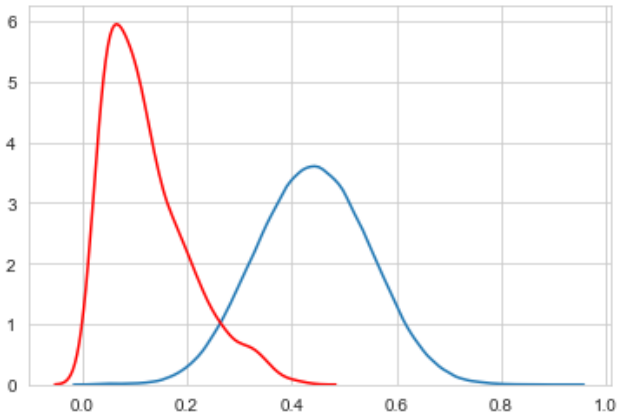
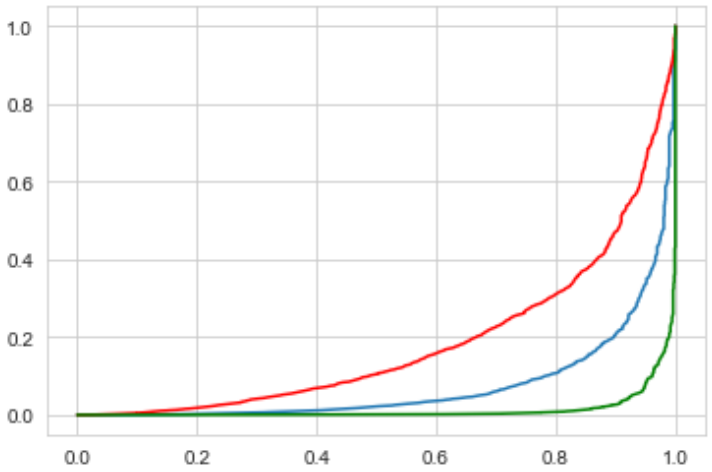



*Figure 16: Good*




Conclusion:

In the end we can see the ArcFace is a very good model (with 512 embedding) and also DeepFace is a very good one also