Face Verification

By Abdullah Kassem and Rafik Yacoub
Under the Supervision of:
Prof. Moustafa Youssef and
Eng. Sherif Moustafa

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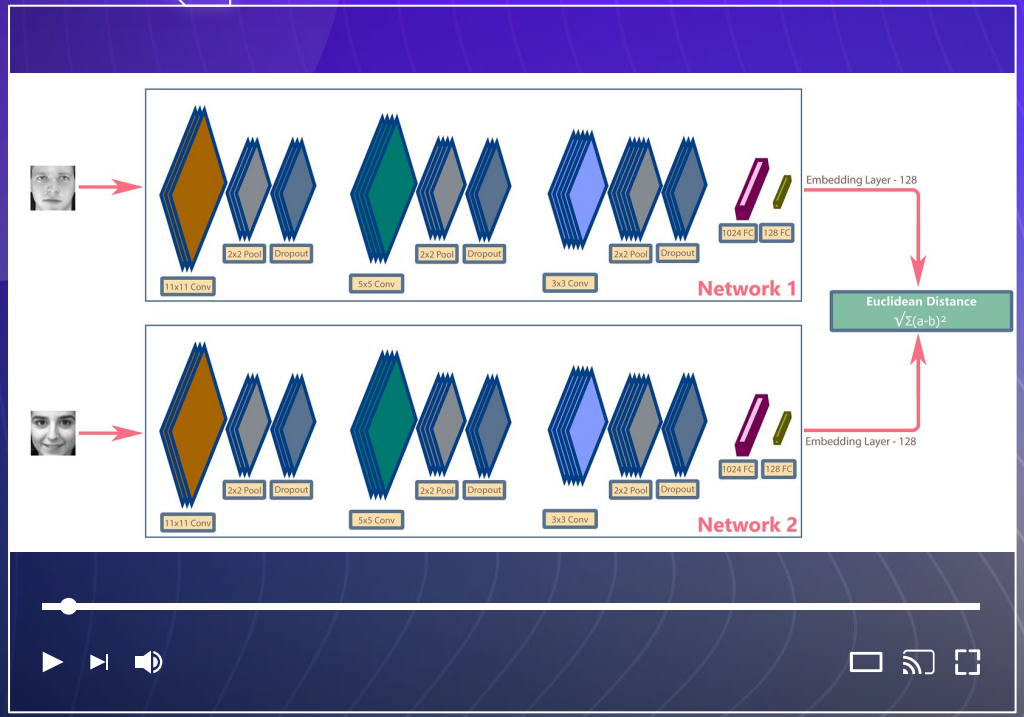
Problem?

Face Verification: is the process of extracting facial features from an image and then comparing them to the facial features of another image to verify the identity of the person in the image.
Real-life example: face ID feature of cell phones.

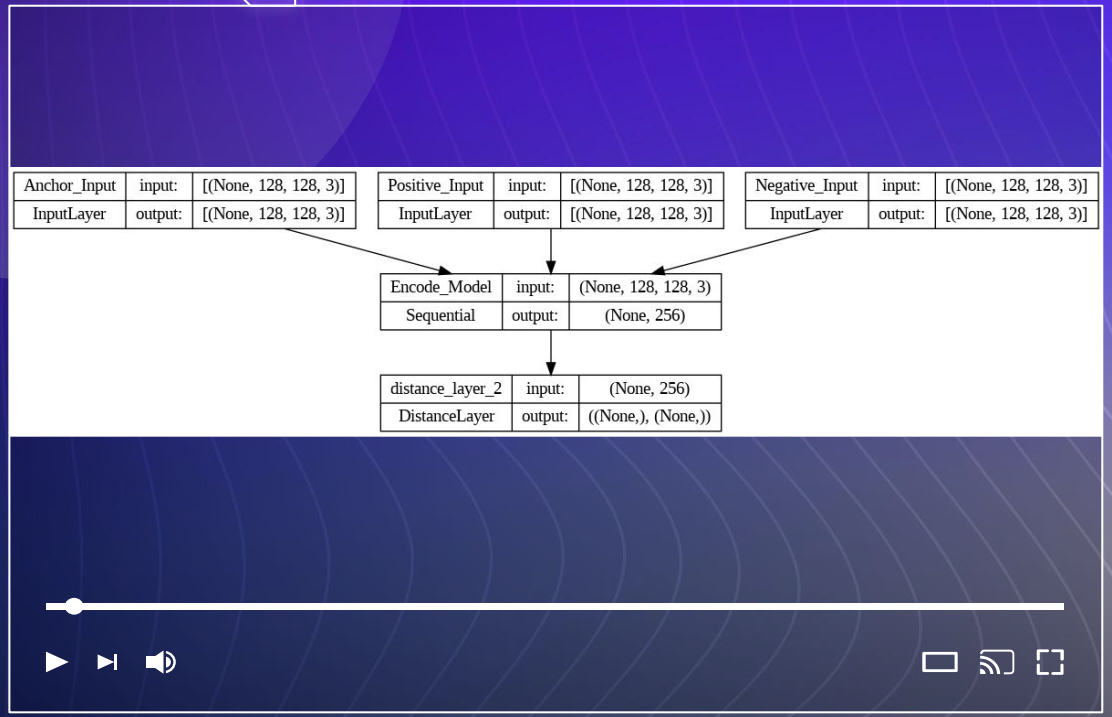
01 Model and Updates

The Original Model, Updates, and Final Model.



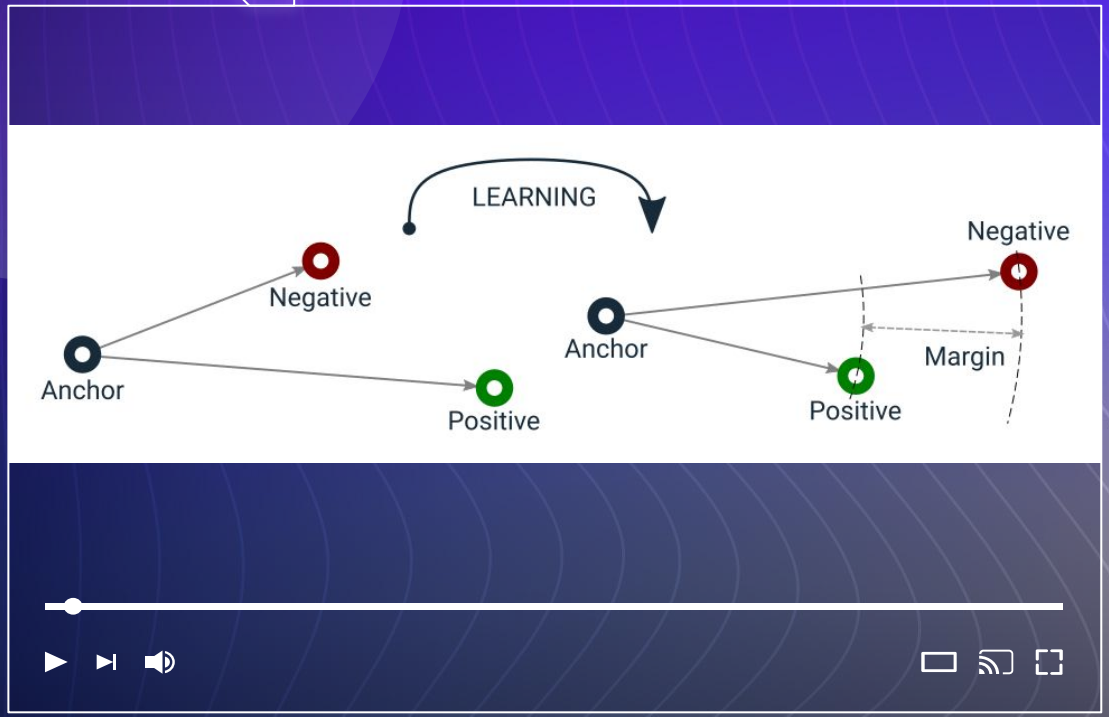
Original model

Siamese Network as the encoder
Using pre-trained model Xception.



Original model

Followed by distance layer



Learning process

Triplet loss function

Proposed Updates

Hyperparameter Tuning

Added Live Face Verification

Fixed Problems

Data Augmentation

Hyperparameter Tuning

- Pretrained model
- Margin
- Pooling
- No. of frozen Layers
- Activation Function
- Batch Sizes
- Augmentation Percentages
- Network Architecture

Data Augmentation

We did simple image augmentation by doing the following:

H-flip - Rotation - Zoom - Brightness - Color Distortion - Blur

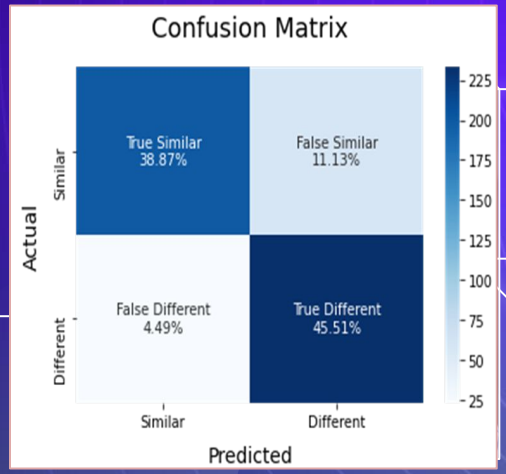
Fixed Problems in Notebook

- Data was split into 2 subsets only.
- Train/test were getting mixed up, each Colab session
- Data was not being shuffled
- Calculated more metrics other than Accuracy

Added a Live Demo

Open camera in Colab and compare that face with a reference Image.

Results

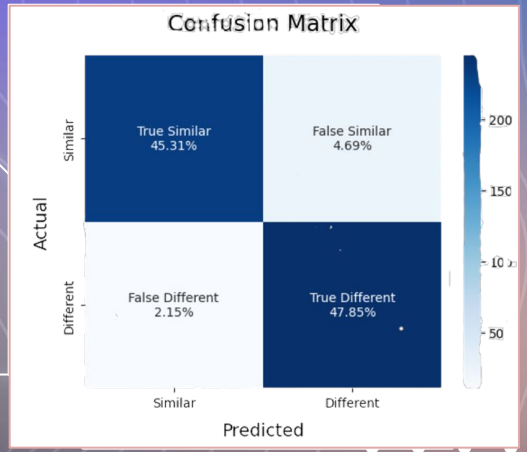


Initial

Accuracy: **84.375%**

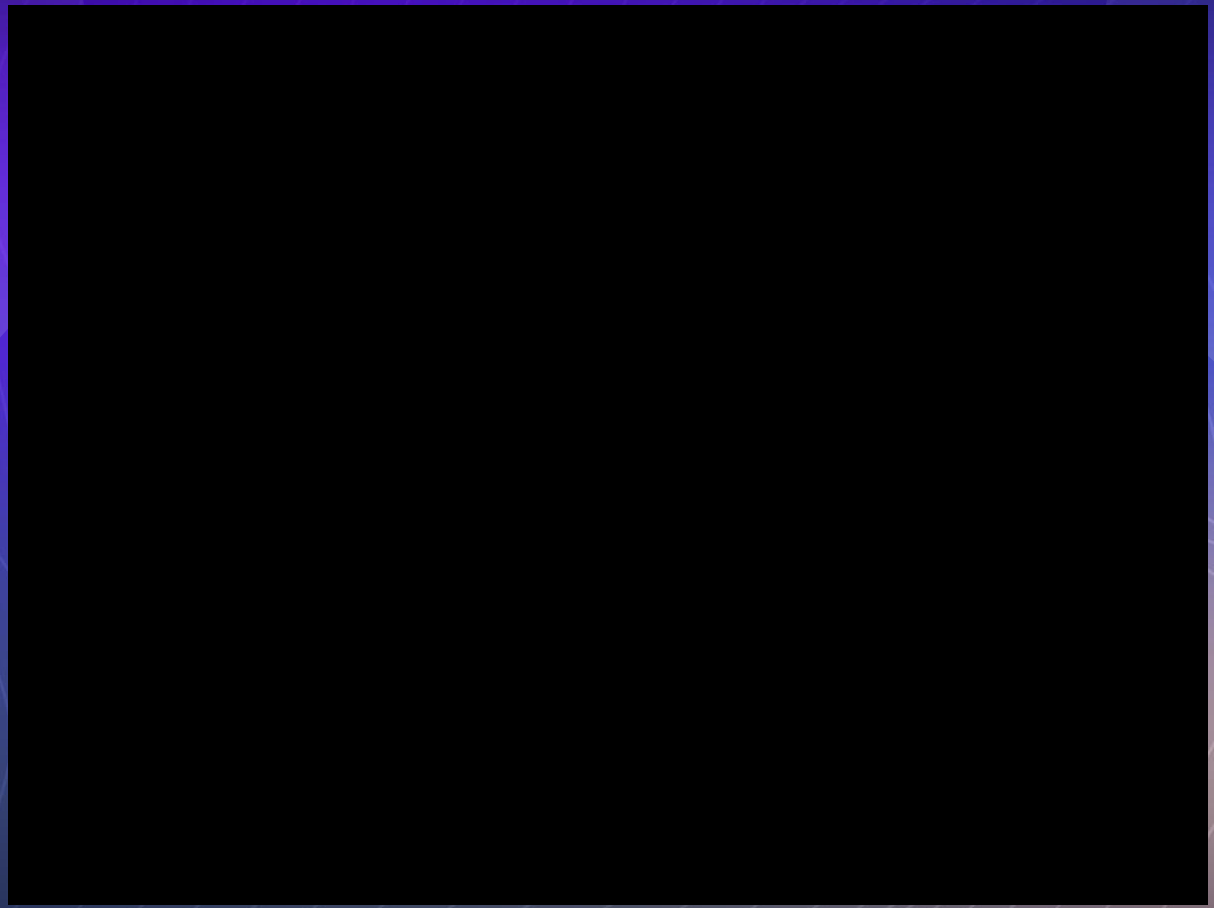
Final

Accuracy: 93.164%
Recall: 95.7%
Precision: 91.1%



Demo

Live Face Verification



Conclusion and Future Work

Model is Biased

One-Shot Learning

Still Far from STOA or product.

Learned to work with limited little resources (colab + small dataset) by using pre-trained model and data augmentation

Contributions

Abdullah

- Tried to change the number of the unfrozen layers
- Tried to change the pooling from average to max
- Split the dataset into 3 fixed subsets to solve the earlier problem.
- Added more evaluation metrics
- Did data augmentation to the training subset.
- Tried different activation functions.
- Worked on preprocessing data for the demo.

Rafik

- Tried using ResNet50 instead of Xception
- Added option to shuffle data for the augmented data.
- Tested different augmentation percentages
- Tested different batch sizes Added function to do face extraction and alignment.
- Added live face verification
- Worked on preprocessing data for the demo.

Thanks!

Do you have any questions?