

# Cool IEEE template for Project 2 - Face Swap!

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## I. INTRODUCTION

This thing (swap.py) can swap or replace faces on images or videos using either triangulation or TPS methods!!!

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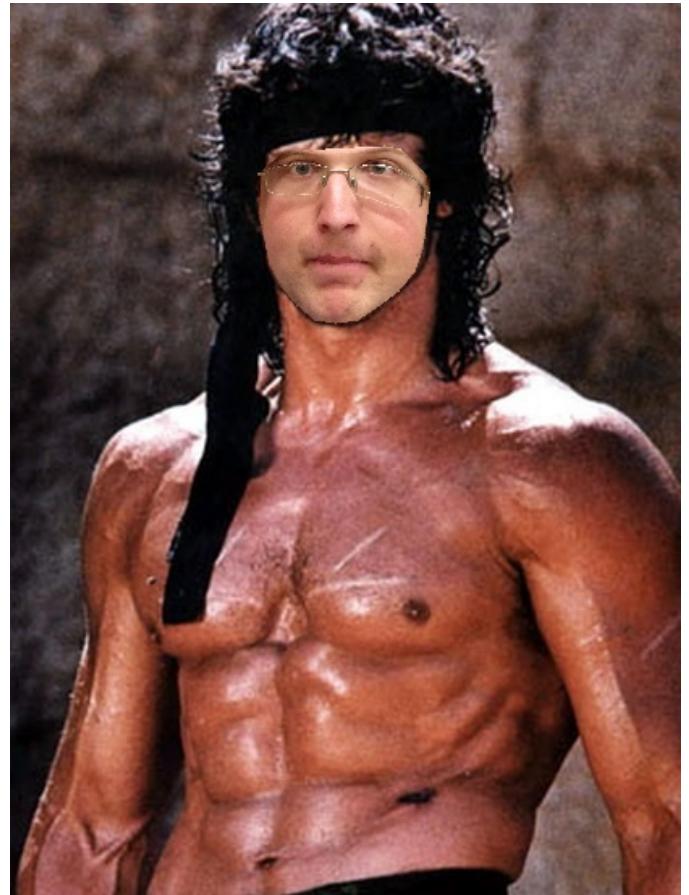
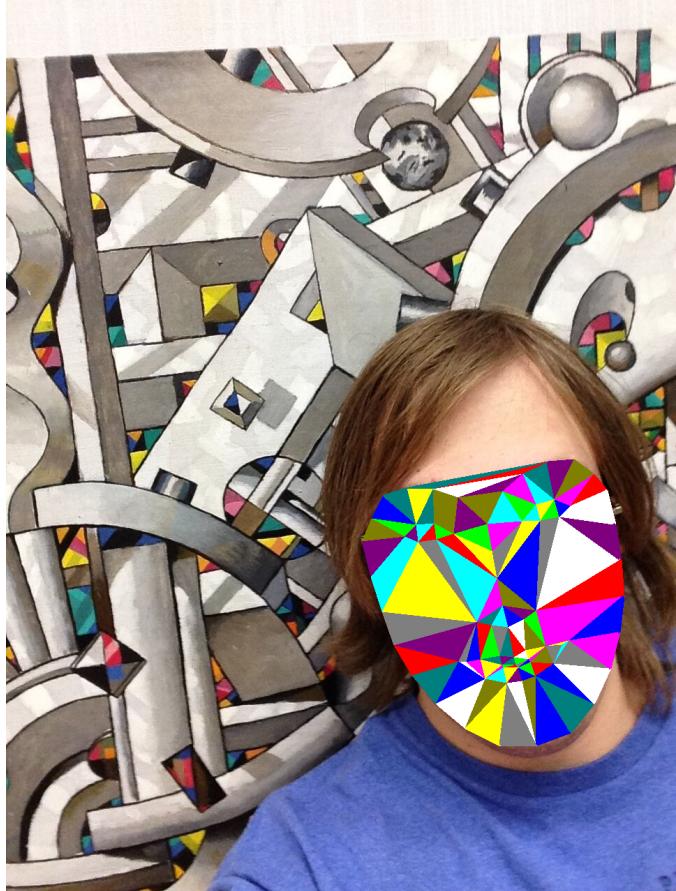
### A. Triangulation method



It all starts with landmark detection. Then you find corresponding triangles and try to convert pixels from one triangle onto another. In the end you blend in the face onto the target image.

Map the triangles:





Then you copy corresponding pixels using weird matrix transformation:

Finally, blend your face with the target:



#### B. TPS method

TPS is \*far\* better in terms of implementation and performance - for this project the method was adapted for running on multiple cores!) It is just one step - make the transformation function and apply it!

Before blending:



After:



Sexy, right?

#### C. Videos

Working with videos is basically like working with images. Many images... So, sometimes those people on videos move around and... flicker. We have a Kalman filter to counter that (one kalman for each landmark) - see the difference between './TestSet/Test1Out\_no\_kalman' and './TestSet/Test1Out\_tps\_kalman' to see the difference (the first one is done with kalman filter off). Another video (just for the reference) is './TestSet/Test2Out\_tri', where the face of Scarlett is overlaid on the random face on 'Test2Out\_tri' video - that was made just to show that you can also use the triangulation method to make videos (obviously!), as other videos were made with TPS - it is faster).

The video quality also plays its role - check out the './TestSet/Test3Out'! Also see './TestSet/Test3Out\_debug' to see how face detection fails. Face detection also fails when people rotate their head too much:



## REFERENCES

- [1] Patrick Pérez, Michel Gangnet, and Andrew Blake. Poisson image editing. In ACM Transactions on Graphics (TOG), volume 22, pages 313–318. ACM, 2003.