

CS351

Semester Project

Style Transfer to Live Camera Feed

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❖ Introduction and Background

➤ Problem Statement

- This Project is more of a proof of concept. It is a demonstrative effort, visualizing the video generative abilities of Ai as it stands today, and discussing its shortcomings, and potential fixes

❖ Overview of the Architecture

➤ Finished Work

- The demonstration uses a variation of an implementation of fast style transfer by Logan Engstrom, using Tensorflow. The transformation is similar to Johnson's [implementation](#), with a small change: rather than using batch normalization, we use instance normalization by [Ulyanov](#), with a slightly different scaling/offset layer. The layers are also shallower (using relu1_1).

➤ Work in Progress

- As it stands, artifacting is a big issue, and depending on the training image, results vary in quality (see demo image). I attribute this to color variation, as well as average object (contrast enclosed) size in the training image. Ideally we would be able to generate more meaningful images even from relatively less “busy” images for training.

❖ Results and Evaluation

- In our efforts, we found the model to work best with visually “busy” reference images, with high contrast, and a good variation of color. It overcomes the non-deterministic nature with the help of the batch normalization, and the offset layer. The usual output would have resulted in a much less visually appealing “flashing effect” caused by the randomness of the output images.

❖ References

- <https://www.youtube.com/watch?v=Khuj4ASldmU>
- <https://github.com/lengstrom/fast-style-transfer>
- <https://cs.stanford.edu/people/jcjohns/eccv16/>
- <https://arxiv.org/abs/1607.08022>
- <https://arxiv.org/abs/1508.06576>
- <https://github.com/reiinakano/fast-style-transfer-deeplearnjs>