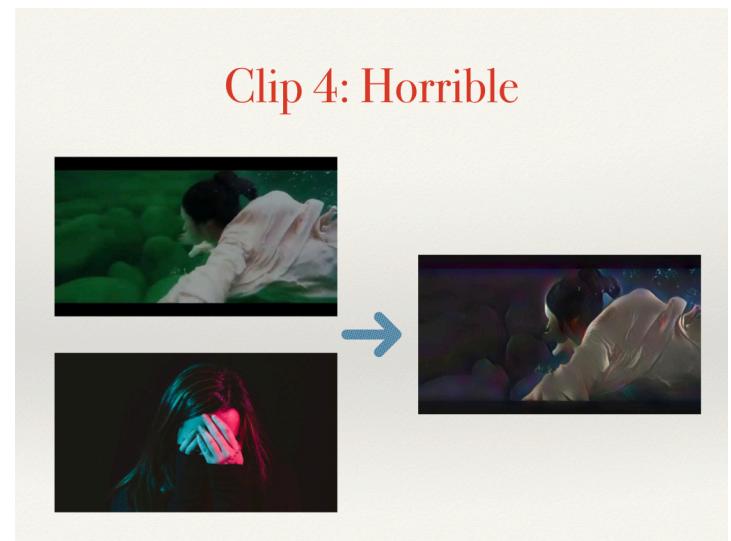
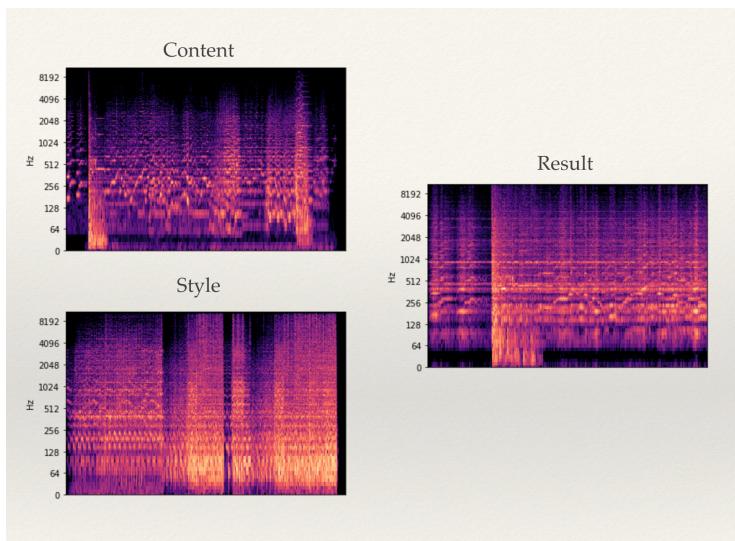


Machine Learning for the Arts
UCSD FALL 2019
FINAL PROJECT

One Film, Four Flavors



Yudi Wang, yuw043@ucsd.edu
University of California, San Diego
Department of Electrical and Computer Engineering

DESCRIPTION

In this project, I combined the video-style-transfer and audio-style-transfer to reconstruct the famous film clips. trim 4 clips from the original movie and try to transfer it into four certain themes with different stylized video and audio combination: playful, sad, angry and horrible. The video-style-transfer algorithm I adopted is based on dividing and combining frames. For the audio-style-transfer, it combines the deep learning method as well as traditional signal processing and the input and output are both audio instead of midi archives. After trying tens of times, the output result video are quite interesting.

Concept:

My another inspiration actually comes from some funny videos, in which they replace the original background music with ridiculous ones. As a result, the audience may feel they watched another movies. This is really interesting and I want to create some pieces like that.

I do love the famous bamboo fighting scene from the film Crouching Tiger, Hidden Dragon and feel it can be reconstructed into different themes.



Fighting can be playful if the aims of both participants are playing or practicing. Sad scene can be meaningful if at least one participant feel reluctant but do have to fight with the other. Angry is the most direct reason of many fighting and it is the first theme that come to my mind. Last one, the audience may feel horrible if the fighting area is mysterious or one of the character are .

Technique:

• video style transfer

Basic idea of video style transfer is first dividing the video into a sequence of frames, then apply the arbitrary style transfer algorithm on these frames one by one. The last simple step is combining these stylized frames together and thus we have a style transferred bamboo fighting videos. For the style transfer step, I choose the arbitrary-style-transfer model which is flexible and manageable. The original video format is mp4 and the retransferred one is avi which has small memory assumption.

• audio style transfer

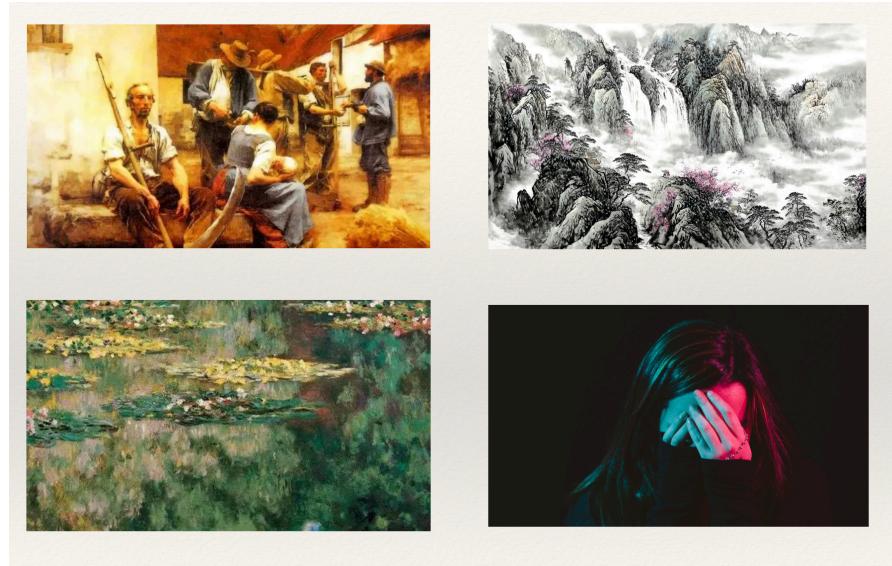
Basic idea of audio style transfer is synthesizes audio "content" and "style" independently using the magnitudes of a short time Fourier transform, shallow convolutional networks with randomly initialized filters, and iterative phase reconstruction with Griffin-Lim. Both input and output for this algorithm are audios

instead of midi archives. In order to make comparison between different styles, I adopt the same music content with different styles. The result is quite interesting.

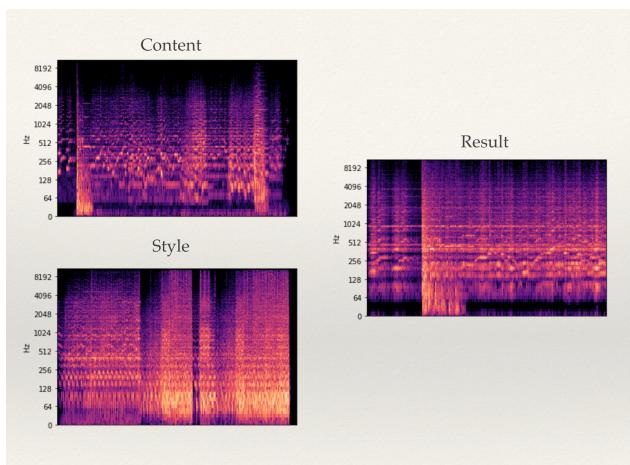
Process:

- **video style transfer**

For each of the four themes, I collected around twenty pictures in different styles via internet and test them using a 1 seconds cut from the bamboo fighting. After testing, since the majority of stylized result is not so satisfying, I only picked up about five pictures for each theme to work on the whole 30 seconds cuts. Finally, pick up the best one out of the five and adjusting the parameters of the stylized weight. The final picked four pictures are shown as below:



- **audio style transfer**



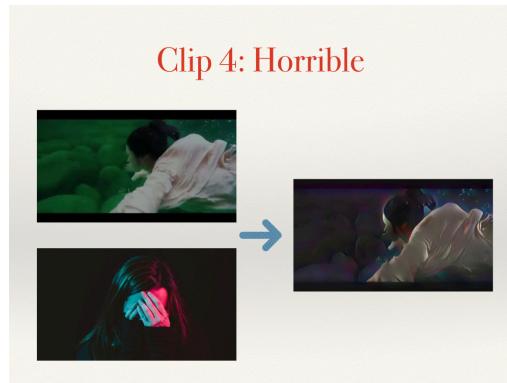
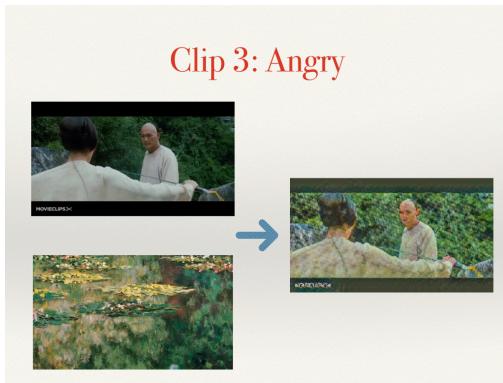
Audio style transfer process is actually harder to control comparing with the video style transfer process. Similar with the video one, I select about twenty music to stylized with the theme music from the film. At first, I put the whole version of the content music and the style music, but the result contains lots of noise and also the calculating time is super long (about one hour per time). Thus, I cut the content and the style music, choosing most representative part. This time, about one third song performs pretty well since the noise is not so obvious and you

can distinguish the content melody in a different style.

After doing this two stages, I use the iMovie offered by the Mac OS system to combine the stylized audio and video. I adjust the speed of this two slightly so that they can better work with each others.

Result:

Video style transfer result for each four theme can be briefly shown as below:



The demo of the audio style transfer can be found in the result part.

As for the combined one, I do love the horrible theme since the generated background music are the best. As a result, this clip do create a horrible atmospheres at least for me.

Reflection:

For the final result, I feel that it is really hard for the movie maker to create a certain emotions. The best one is the horrible and I'm not very satisfying with the third angry one. The reason is that horrible is an easier emotion to convey by choosing certain music but not the angry. If you

want the audience think that character is angry, maybe better to use some lines and let the character roaring instead of trusting music.

REFERENCE:

[1] Arbitrary_Style_Transfer

https://github.com/elleryqueenhomels/arbitrary_style_transfer

[2] Audio Style Transfer

https://colab.research.google.com/drive/18_DckMGM-fsSthIqZI9sOAIY6l3pIDLD?sandboxMode=true#forceEdit=true&offline=true&sandboxMode=true

CODE:

GitHub Repository Link: <https://github.com/ucsd-ml-arts/ml-art-final-bizarre.git>

RESULT:

The final version of the stylized video combining with stylized audio can be viewed at the below link:

<https://drive.google.com/file/d/12pjGmoAiRq0AkjolQnozrbZgFUJSfF16/view?usp=sharing>

For audio style transfer, a demo below can better explain the whole process:

<https://drive.google.com/file/d/19J2Poh7G0ao1kJXAwahaEhx9if50gdFH/view?usp=sharing>

Also, the Youtube link for the content music as well as the final chosen style music are posted below:

- Content Music:

<https://www.youtube.com/watch?v=S5AjtMNnWf0&list=PLW2r9GbkzeG3H2ljCanmZnlJGwg8Ui0no&index=1>

(Crouching Tiger, Hidden Dragon OST #1 - Crouching Tiger, Hidden Dragon)

- Style Music:

- Part 1: https://www.youtube.com/watch?v=ZvJE_BEADpl (食之契約 櫻之島BGM: 如夢似幻)

- Part 2: <https://www.youtube.com/watch?v=m1eKVWn0vls> (Dans la Maison Theme Soundtrack - Philippe Rombi (HD 1080P))

- Part 3: <https://www.youtube.com/watch?v=JOb0AuZ9Gzs> (Mark Petrie - Go Time Extended)

- Part 4: https://www.youtube.com/watch?v=3G2TF4jgJC&list=PLzBLlrZhm6tZYLPWUh_rRmjg_6DH-0PpO&index=3 (Requiem for a Dream [Música de Suspense] Full theme song)