

# Computational Media Research

## CMPM 202, W2019

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# Reading Responses

Find something that you disagree about...

- What is art? How is it different now than 10 years ago? What will it be in another 10 years?
- Is there a fundamental difference between previous technologies and ML in terms of art making potential?
- Even given unlimited data from increasingly varied sensors, will some forms of intelligence resist computability? Why or why not?

# Creative AI

NeurIPS Workshop on ML for Creativity and Design

IEEE VIS Arts Program

SIGGRAPH Arts Gallery and Arts Papers

ACM/EG Expressive

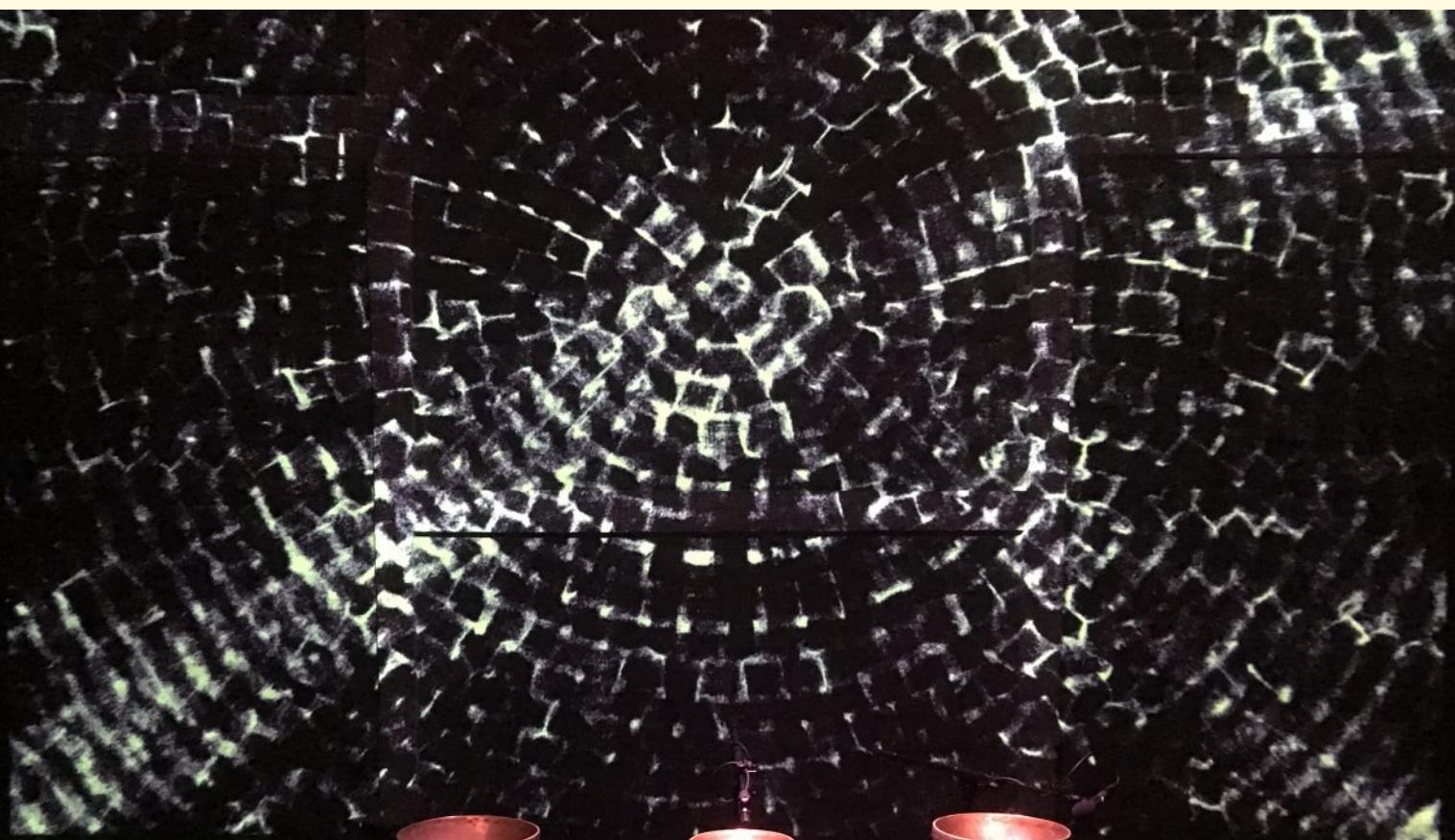
FDG Workshop on Procedural Content Generation

- Performance & Interaction
- Image / Sound / Text Processing
- Meta-art

# Expressive Performance

- Classifying Inputs/Gestures/Sounds & mapping them to artistic outputs
- Rebecca Fiebrink, Wekinator
- Kima by Analema Group, based in London
  - Synaesthetic mapping of voice to image





# Expressive Performance

## Google's Magenta

- Piano Duets; Idea generators; Musical interfaces
- Explore the use of ML as a means to generate new ideas, and they build collaborative prototypes that you can perform or compose with
- Make musical plugins for Ableton and other audio creation programs

X CONTINUEEEEEEE

Drums Melody

Input Clip

Choose Track

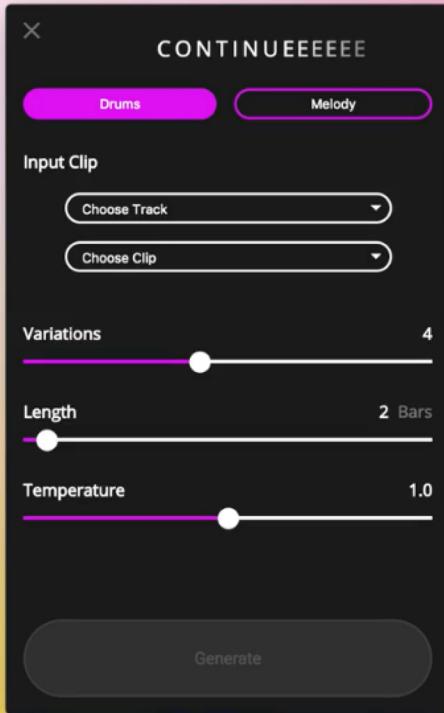
Choose Clip

Variations 4

Length 2 Bars

Temperature 1.0

Generate

This interface is titled 'CONTINUEEEEEEE' and features a pink header bar with 'Drums' and 'Melody' buttons. Below is a 'Input Clip' section with dropdowns for 'Choose Track' and 'Choose Clip'. A slider for 'Variations' is set to 4. The 'Length' is 2 Bars, and 'Temperature' is 1.0. A large 'Generate' button is at the bottom.

X GROOVAE

Drums

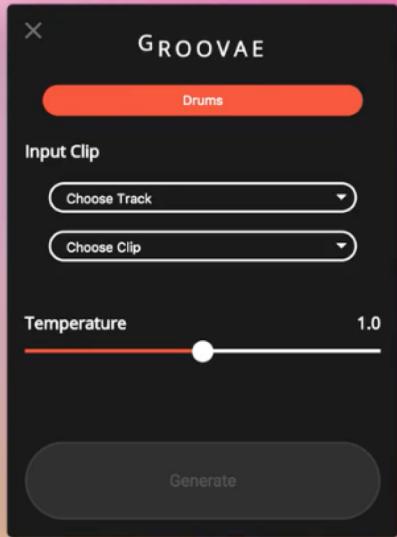
Input Clip

Choose Track

Choose Clip

Temperature 1.0

Generate

This interface is titled 'GROOVAE' and has a red header bar with 'Drums' and 'Melody' buttons. It includes an 'Input Clip' section with dropdowns for 'Choose Track' and 'Choose Clip', and a 'Temperature' slider set to 1.0. A large 'Generate' button is at the bottom.

X GENERATE 4 BARS

Drums Melody

Output Location

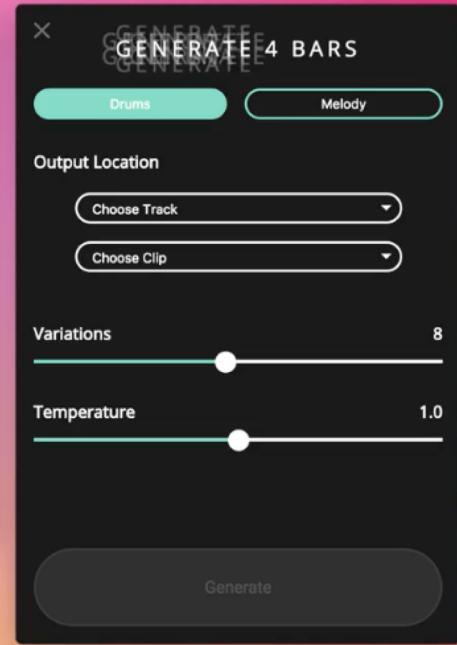
Choose Track

Choose Clip

Variations 8

Temperature 1.0

Generate

This interface is titled 'GENERATE 4 BARS' and has a teal header bar with 'Drums' and 'Melody' buttons. It includes an 'Output Location' section with dropdowns for 'Choose Track' and 'Choose Clip', and sliders for 'Variations' (set to 8) and 'Temperature' (set to 1.0). A large 'Generate' button is at the bottom.

X INNTTEERRPPOOLLAATE

Drums Melody

Input Clips

Choose Track

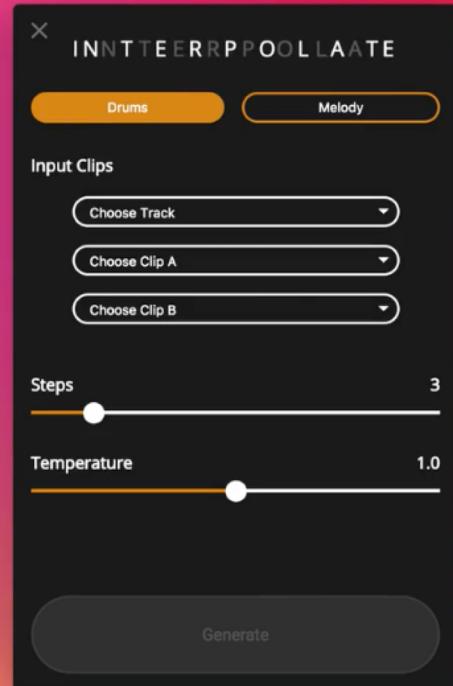
Choose Clip A

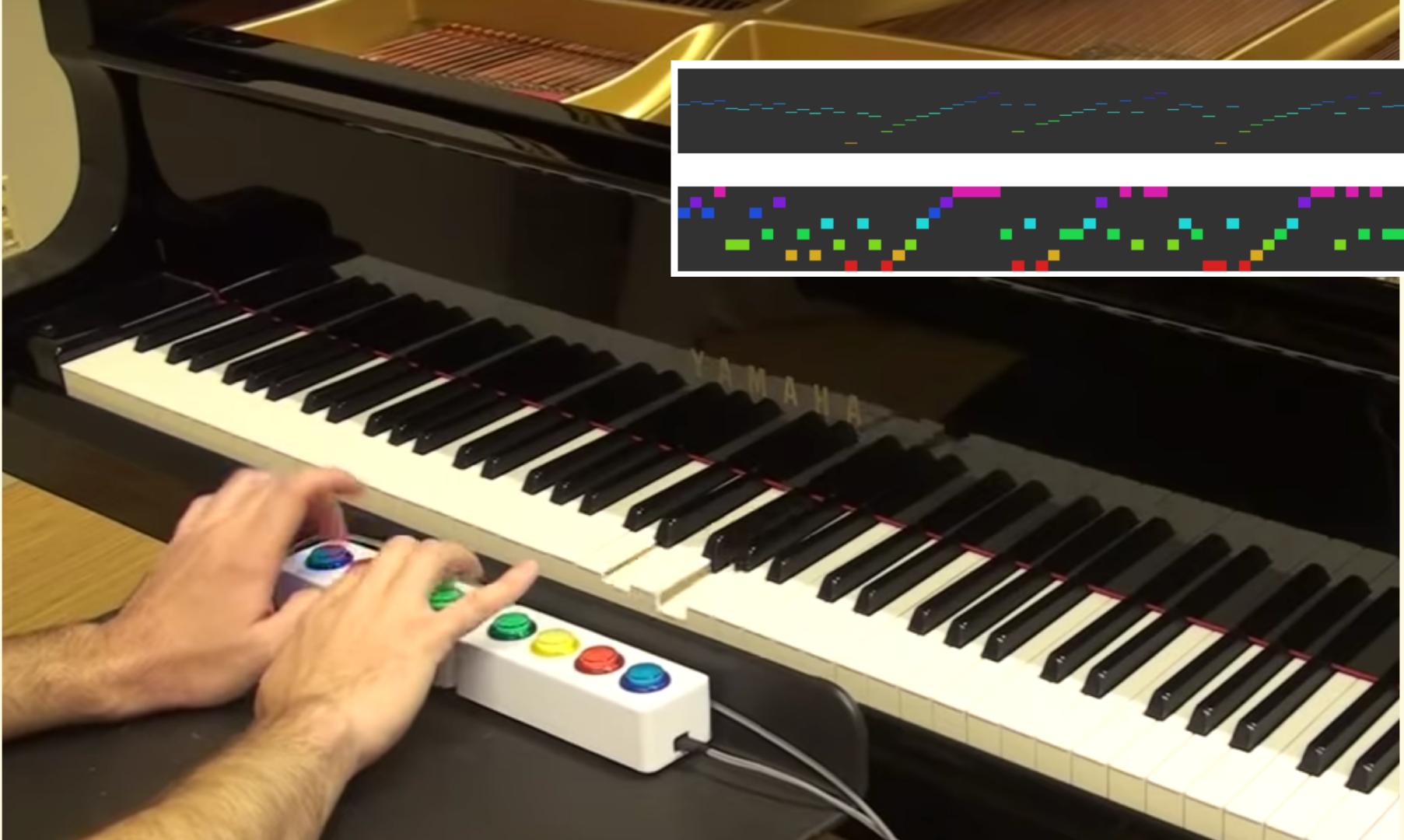
Choose Clip B

Steps 3

Temperature 1.0

Generate

This interface is titled 'INNTTEERRPPOOLLAATE' and has an orange header bar with 'Drums' and 'Melody' buttons. It includes an 'Input Clips' section with dropdowns for 'Choose Track', 'Choose Clip A', and 'Choose Clip B', and sliders for 'Steps' (set to 3) and 'Temperature' (set to 1.0). A large 'Generate' button is at the bottom.



# Deep Dream

- Originally developed as a way to identify which features were used to classify an image
- Accentuates the feature, blending it back into the image so that it increases the confidence of a particular output neuron
- Can be repeated, with surreal results...



# Computed Curation

- Philipp Schmitt's project to use ML algorithms to automatically title and arrange a book of photographs

a bench sits on a beach [confidence: 6.52776043656966%]



walkway, boardwalk, sea, winter, vehicle, pier, coast, snow, ocean, dock

a train that is on a grassy hill [confidence: 22.4423426698951%]



highland, mountainous landforms, mountain, atmospheric phenomenon, hill, building, field, rural area, farm, landscape

a crowd of people watching a large umbrella  
[confidence: 67.6608493624627%]



Berlin, Germany, August 2014.

crowd, people, spring, festival, tradition

a yellow boat sitting on top of a bridge  
[confidence: 18.754580435873%]



Los Angeles, USA, October 2016.

vehicle, ship, sea, sailing ship, mast, watercraft, tall ship, walkway, dock, pier

# Learning ideal images

- Tom White, "Synthetic Abstractions"
- Trains a NN to generate images that will maximize being classified as belonging to a certain category across multiple NN architectures used to classify images (imageNet, inception, resNet, etc).
- Results in examples of "ideal" objects, as learned from a labeled set of data
- The resulting image scores higher than any real image from the training set





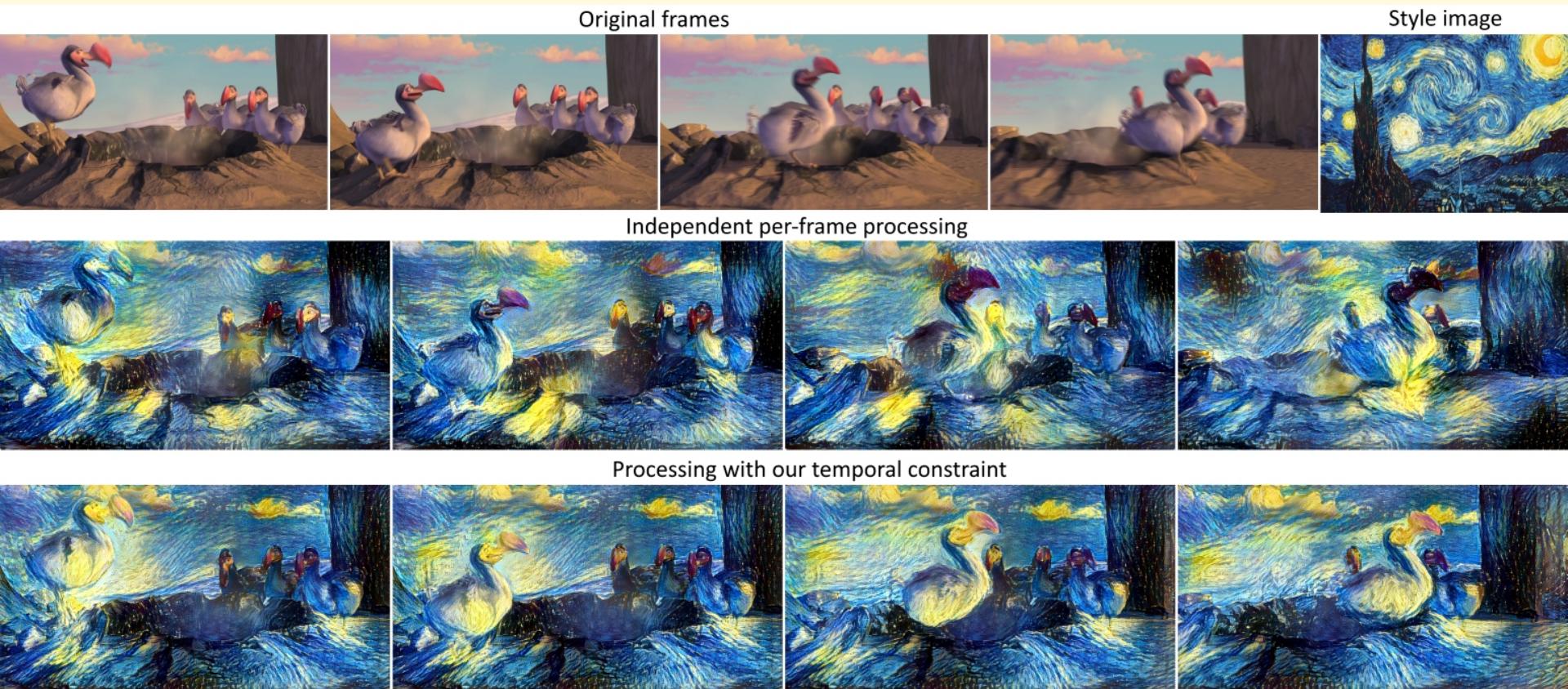




# Style Transfer

- Gatys, "A neural algorithm of artistic style" (2015)
- Ruder et al., "Artistic style transfer for videos" (2016)
- Huang et al., "Real-time neural style transfer for videos" (2017)
- Chen et al., "Stereoscopic neural style transfer" (2018)





- Karras et al., "A style-based generator architecture for Generative Adversarial Networks" (2018)



# Drifting through latent space

- Faces, paintings
- [https://twitter.com/darren\\_cullen/status/1060225126313156613](https://twitter.com/darren_cullen/status/1060225126313156613) (Darren Cullen)
- <https://twitter.com/genekogan/status/1058759055056035840> (Gene Kogan)

# Creative intelligence

Many interesting questions:

- How do you define an artist's style? (even with Neural Style - disconnect between implementation and understanding)
- How does a photographer compose a scene?
- How do authors present material to make it the most engaging?

# Swarm Vision, George Legrady



# Creative intelligence

- Huge opportunities for applying deep learning to ask questions like this, which could have practical applications and perhaps will help us learn more about our own creativity.
- Not to replace artists or designers or musicians, but to augment or invent creative processes

# Homework

## Remember!

- Project 1 due Thursday 1/17, short presentation = ~3 minutes per group, show your output of the WFC algorithm. If possible, please have your entire demo within the Readme of your github repo and send me the link before class

## Next class:

- Reading Responses + Homework for week 3 will be assigned on 1/17
- Introduction to TensorFlow
- Installation, where to find tutorials
- Classifying numbers with a CNN