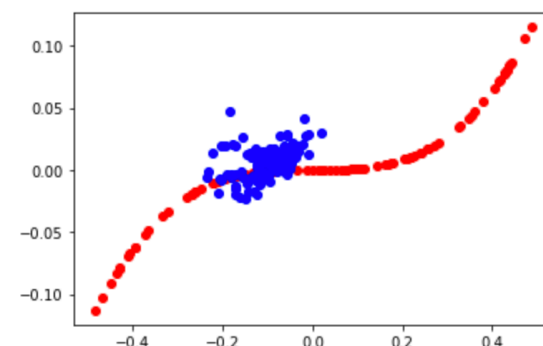# BirDreS²

MACHINE LEARNING FASHION AND THE NATURE
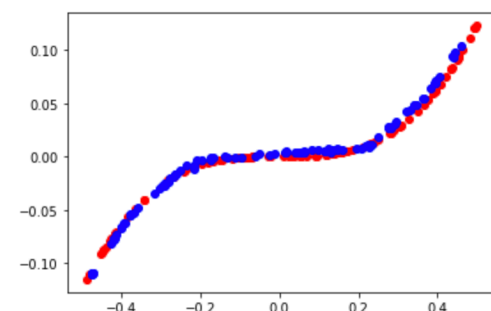
Birds
× Iris van Herpen Couture
= ?

by Hanul Park

Nature offers us creative resources.

HOW WOULD DATA OF
ORGANIC LIFE FORMS IN NATURE INTERACT
WITH CONTEMPORARY FASHION DESIGN?

Epoch: 5000, Acc_real: 0.4000000059604645, Acc_fake: 1.0

Epoch: 50000, Acc_real: 0.46000000834465027, Acc_fake: 0.49000000953674316

Machine learning helps us manifest.

HOW CAN FASHION DESIGN DRAW DIRECT
INSPIRATION FROM NATURE THROUGH
STYLEGAN TECHNOLOGY?

BIRD DATA

For bird data, CalTech's Birds (2011) dataset from kaggle.com has been accessed at first. The initial dataset included 200 different bird species with 11,788 PNG file images. Then, selection of bird species with stricking visual features took place, leaving the dataset with 83 different species and the total of 4980 photographs. Then, selection of 1 largest and clearest image per bird took place, leaving the dataset with only 83 images.

"Caltech-UCSD Birds 200 (CUB-200) is an image dataset with photos of 200 bird species (mostly North American). The total number of categories of birds is 200 and there are 6033 images in the 2010 dataset and 11,788 images in the 2011 dataset. Annotations include bounding boxes, segmentation labels."

- Tarun Kumar, Kaggle

6 successful examples of production after 9 total hours of styleGAN training are shown on the right:

Initially, the project planned to use only the images of birds that have gone extinct. The reasons of extinction varied, but the primary cause was due to environmental issues, such as climate change, global warming, deforestation, and desertification. However, it was proven to be extremely difficult to collect images of extinct species during the research process. The project had to shift its direction from environmentally oriented inquiry to a more visually driven endeavor, while recognizing the potentiality to involve its initial inquiry at an appropriate time in the future.

For fashion data, the visionary designer Iris van Herpen's haute couture dress images were manually collected from the archive of the brand's official website. The total 400 PNG files from 15 distinct collections were compiled into a dataset. All of Iris van Herpen's haute couture collections have been accessed, and their official titles are *Roots of Rebirth, Sensory Seas, Hypnosis, Shift Souls, Syntopia, Ludi Naturae, Aeriform, Between The Lines, Seijaku, Lucid, Wilderness Embodied, Voltage, Hybrid Holism, Micro,* and *Capriole* in the order listed on the brand's website.
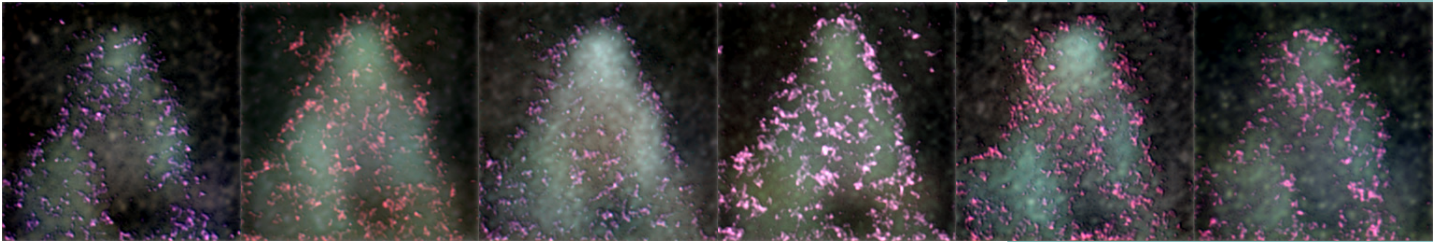
DRESS DATA

Iris van Herpen's haute couture was chosen as the collections are predomonantly dresses, which in essence resembles the appearances of birds. Herpen's pattern-oriented, boldly shaped dress designs invoke organic, kinetic movements of living creatures, especially those of feathered birds.

"Iris van Herpen explores a symbiosis of high technology and the artisanal craftsmanship of couture, through a collection that references the intricacy of fungi and the entanglement of life that breathes beneath our feet. Through 'Roots of Rebirth', Van Herpen notions towards the miraculous lacery of interconnectedness from the natural 'wood wide web,' weaving a dialogue between the terrestrial and the underworld."

- Iris van Herpen, irisvanherpen.com

3 strong examples of Iris van Herpen's haute couture collections are shown on the right:

When machine was trained with the dress data alone, it failed to produce any meaningful results. It was trained for over 6 hours, but the results stayed the same, as shown above.

When machine was trained with the dress data alone, it failed to produce any meaningful results. It was trained for over 6 hours, but the results stayed the same, as shown above. As the first mixed data training attempt, the dress dataset was added onto the ongoing training of the bird dataset, the machine could not even start the learning process, and the following error occured: "axes don't match the array." The second mixed data training approach was to train from the beginning a mixed dataset of selected bird images and randomly seletected dress images. Again, the same error occured: "axes don't match the array."

MIXED DATA

The third and successful method of mixed data training was the following : refine the mixed dataset for bird images and dress images to be axially aligned, by removing all bird images with horizontal layouts and removing all dress images with perpendicularly thin layouts, so that all remaining bird images resemble the general physiological human shapes and all remianing dress images resemble the general phisiological bird shapes. The method was effective, and the project landed on a powerful set of results.

OUTPUT
6 hrs of training

The training sessions lasted for the total of 12 hours, but the most prominent, interesting, and visually notable results emerged after 6 hours and 9 hours. The images from 6 hours of training display elegant layers and fuzzy volumes. The ruffle-like texures add complexity to the overall designs.
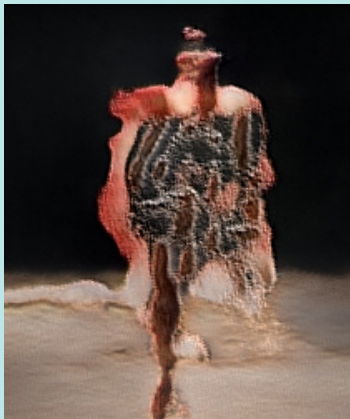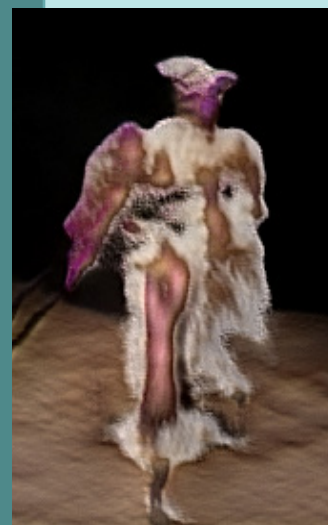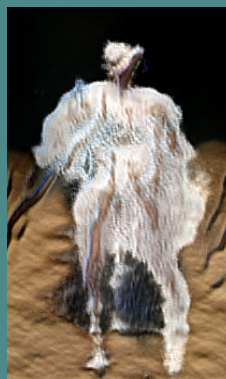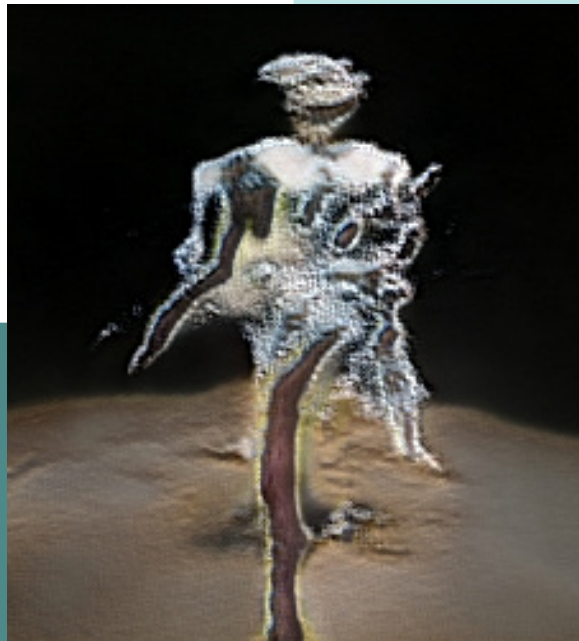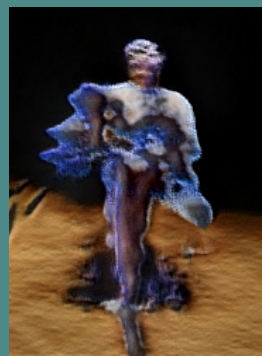
9 hrs of training

After 9 hours of training, the project developed to images of more voluminous, colorful, and dynamical dress designs. The continued training of 10 hours and more started to dissolve the coherent shapes of the designs achieved at 6th and 9th hour points. The reason behind the situation is also up for a new exploration.