Artwork - Symbiotic Chromatics

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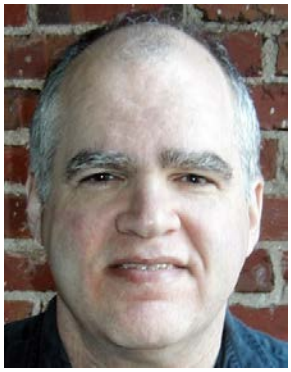

Abstract

Symbiotic Chromatics is an artificial life artwork that generates complex emergent patterns in realtime based on simple rules inspired by biological symbiosis. It is easy to install and allows variable scenarios. The 4K image can either be projected for full wall coverage or presented on a large flat screen.

The popular conception of symbiosis is typically limited to mutualistic symbiosis. In such a relationship two or more species support the needs of each other. For example, bees gather nectar from flowers providing them nutrients. But in doing so they rub against the flower's pollen and go on to distribute it to other blooms for reproduction. Both the bees and the flowers benefit each other.

Where Darwinian "survival of the fittest" suggests a harsh world of competition, some find comfort in knowing the natural world also has systems where "everyone wins" through cooperation. This romantic metaphor gives some a sense of hope for an all too often violent humankind.

But as is so often the case, the natural world is more complicated than our wishes and expectations. Along with mutualistic symbiosis there is also parasitic symbiosis where one species preys on another, offering only loss in return. There is also commensal symbiosis where benefits flow in only one direction, but no harm is done in the other.

In this piece only mutualistic symbiosis takes place, but nevertheless there is no utopic happy ending.

Chromatics, a term invented by the artist, are tiny 2D virtual creatures that live on a grid similar to cellular automata. Each has a single gene, a number from 0 to 360. That gene corresponds to a position on a painter's colour wheel and determines the colour of the chomatic.

Chromatics cannot reproduce on their own. Rather, they can only help other nearby chromatics to reproduce, and they do so selectively. A given chromatic is surrounded by four other chromatics (left, right, above, and below), and it will

replace three of them with the species that has the most harmonic colour of the four. However, once in a while the colour gene will mutate, introducing random colour changes in the reproduction process.

(In this piece perfect harmonic colours are those 90 degrees apart on the colour wheel. Other colour harmony rules could potentially be used by changing the code.)

The piece tells a story in two acts.

Initially the there is a grid of chromatics that either have random colour genes or are all a single species with the same colour gene. In the first case the random chromatics quickly begin to self-organize. The process of selective reproduction creates checkerboard-like textures, each with two harmonic colours via symbiosis and irregular borders.

In the case where the entire field is a single species and colour, mutations introduce enough variation that irregularly shaped checkerboard-like textures again emerge with harmonic colours. After the first five minutes or so one cannot tell whether the starting point was a single colour or random colors.

The self-organization of these checkerboard-like textures in the first act demonstrates the power of mutualistic symbiosis.

But in the second act something less friendly emerges. At this point colour-harmonic pairs of species have symbiotically teamed up to claim territory. But there is now competition between communities of symbiotic pairs. Mutual symbiosis is still in effect, but harsh battles for territory will wipe out some colour pairs, nevertheless. Nature is both harsh and nurturing.

It should be noted that an audience can enjoy this piece without having first learned about the interpretations and technicalities spelled out here. The emergence of colourful patterns and the competition between different checkerboard-like textures is obvious to the eye. Some will find themselves cheering on their favourite colour harmony pair in competition. It's a bit difficult to describe, but the updating of dozens of the tiny chromatics per second creates a very satisfying effect something like raindrops hitting the windshield of a car.

1. Installation Requirements

As noted earlier, Symbiotic Chromatics can be configured by the artist for various wall or screen sizes and resolution. This can be done in literally five minutes. It's important that the display be of sufficient size to create a somewhat immersive experience.

The system automatically fades out one instance and then starts again from scratch. That interval can be minutes or hours long depending on the traffic flow and expectations of the venue.

The system can easily be shut down overnight and restarted in the morning by most gallery staff.

The artist can bring the needed computer from the US to Europe, but bringing a large display or projector is difficult. It is hoped that the venue can provide a 4K display or projector that is HDMI compatible. A dimly lit area is preferred to a brightly lit area. The installation does not make sound.