Principia Textilica:
Threads of Ancestry and Community

Project Documentation

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1 Principia Textilica

1.1 Context

1.2 Complexity

Complexity: a number of simple elements with simple behavioral rules can model a complex system. (My background? Finding patterns in the real world to model and solve a problem, reduce complexity. For a handcraft/artsy approach: turn it around and start from the rules to create a pattern.) Suitable for computational support. Applicable to a textile technique.

1.3 Ideas

For inspiration I looked at topics that have fascinated me for years: (include graphic(s)) - Swarm Complexity (simple rules for every part create complex behavior) - Networks/Graphs - "Living" things (plants/fungi/insects/animals) - Macramé (Knotting), Dying, Painting on Fabric, Sewing, Felting

Since I tend to put a soul into everything that even remotely displays some sort of life, I decided to limit myself to techniques/topics that would support this idea. Easy for the computational part: I decided to go with a simple swarm model, which means I have a number of individuals which are controlled by a set of rules concerning themselves and their environment (= the other members of the swarm). How I would translate that into something textile, I was not so sure at first, but I started with a thread-based idea, where each thread is seen as an individual. Macramé and Embroidery were favored candidates.

2 Code Implementation

2.1 The Pond/Fish tank

I implemented a single swarm simulation very similar to the "Boids"-idea. The simulation is in 2D and has 2 main elements: the tank and the fish. The tank started out as rectangular, but I found a circle to be more aesthetically pleasing (softer, more natural shape) as well as more fitting for an embroidery hoop. The circle embodies the simple inside/outside-world that I need. The tank restricts the movement of the fish inside. The fish swarm consists of individual fish that – exceptions are the color and the name – start out as equal clones. There are several more, but the most important fish parameters/properties are: - Size of field of view - Distance for avoiding other fish (Privacy) - Distance for following other fish (Company) - Speed for making turns Each fish can be either harmless or predatory towards other fish. There is no randomness in my program (again, except for the generation of colors). - If it is a predator or not.

2.2 Code Samples

2.3 Parameter Variation + Observations + Images

2.4 Unused Parameters

3 Textile Implementation

3.1 Preparation?

3.2

3.3 Finished Piece

4

5

5.1

Trial/Error runs? Unused parameters? References/inspiration/ideas: - Boids (Flocking simulation) - Pattern Generation - Changing Pattern in something fix First (implemented) sketched out idea: School of fish in a tank/pond, 2D to reduce scope of work: - Boids – idea for behaviour: seek companionship, avoid predators, walls and companions that get too close (company, safety, privacy) - (explain some parameters to finetune behaviour, also predators no real danger, like the problems we run from – they won't kill us, but starve us emotionally) - (explain main mechanism: finding the direction vector in each step, no randomness involved) - Other alterations/ playing with ideas: start with one fish that can spawn children (keep on moving or die after spawning)

Intermediate result: - Tracking positions in pixels : image with traces on picture (pixels, not lines) - Image with connecting lines (data = lines)

Role of Textiles in this? - Threads/knots as small part with defined behaviour (1. idea) - Errors over time, two tanks with same starting population grow apart (2. Idea, did not quite work, funny because with handcraft that happens : no identical pieces) - Connections to ancestors (3. Idea, without predators) - Connections to ancestors should limit the "life" of the fish somehow (3. idea) : threads also limited, no infinite resource in real life, limited freedom? - -¿ include death somehow? Maybe the thread becomes limited depending on how close you were when your ancestor died : shorter thread? - New connections to fish you are close to for a longer time : frienships/partnerships (different color/weight?) Textile finished piece: - Embroidery: pixelated image to threaded image (boring) - Connections to threaded image(series) (better? Development of generations) - Tree (knots/perls? = fish, length of edge is also determined by fish-bowl-movement) / graph : flexible TODO: startled spreads with a delay ("reaction time")

Code