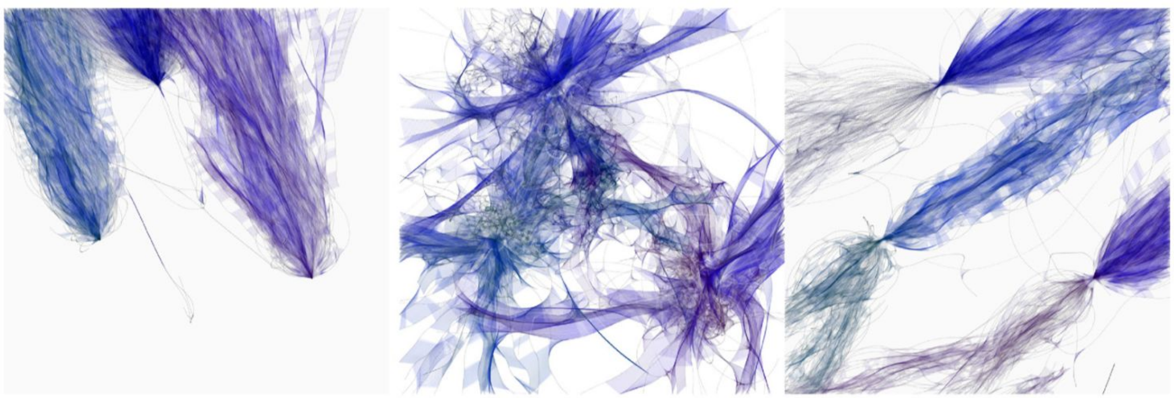
Miles Schneider
Artificial Life
Dr. Joseph Fusion
Portland State University Dept. of Systems Science

A. Eldridge *You Pretty Little Flocker*: Exploring the Aesthetic State Space of Creative Ecosystems



(a) $SP = 1.0$ (b) $SP = 0.0$ (c) $SP = 0.5$

Figure 1. Example stills from *You Pretty Little Flocker*, illustrating the effect of altering size preference (SP) on the resultant form.

In "You Pretty Little Flocker", Alice Eldridge (2015) takes Craig Reynolds' classic "boids" flocking algorithm and modifies it to create an art project. The figure shown here depicts snapshots of her algorithmic art in action, with each frame representing a different parameter region.

In the original "boids" algorithm, agents flock together using a simple set of rules by which they separate, align, and cohere (Reynolds, 2001). Eldridge makes some key changes to the Reynolds algorithm. First, whereas agents used to be uniform in size, Eldridge gives them a range of sizes. Next, a global variable is implemented by which agents have a size preference (SP). At one end of the SP spectrum, agents are willing to flock with any other agent. At the other end, agents will only flock with others who are identical in size. Between these two extremes, agents will flock with others who fall within some range of size disparity. Lastly, the alignment protocol is modified such that not only do agents align with neighbors who meet their size preference qualifications, but they steer away from those who do not.

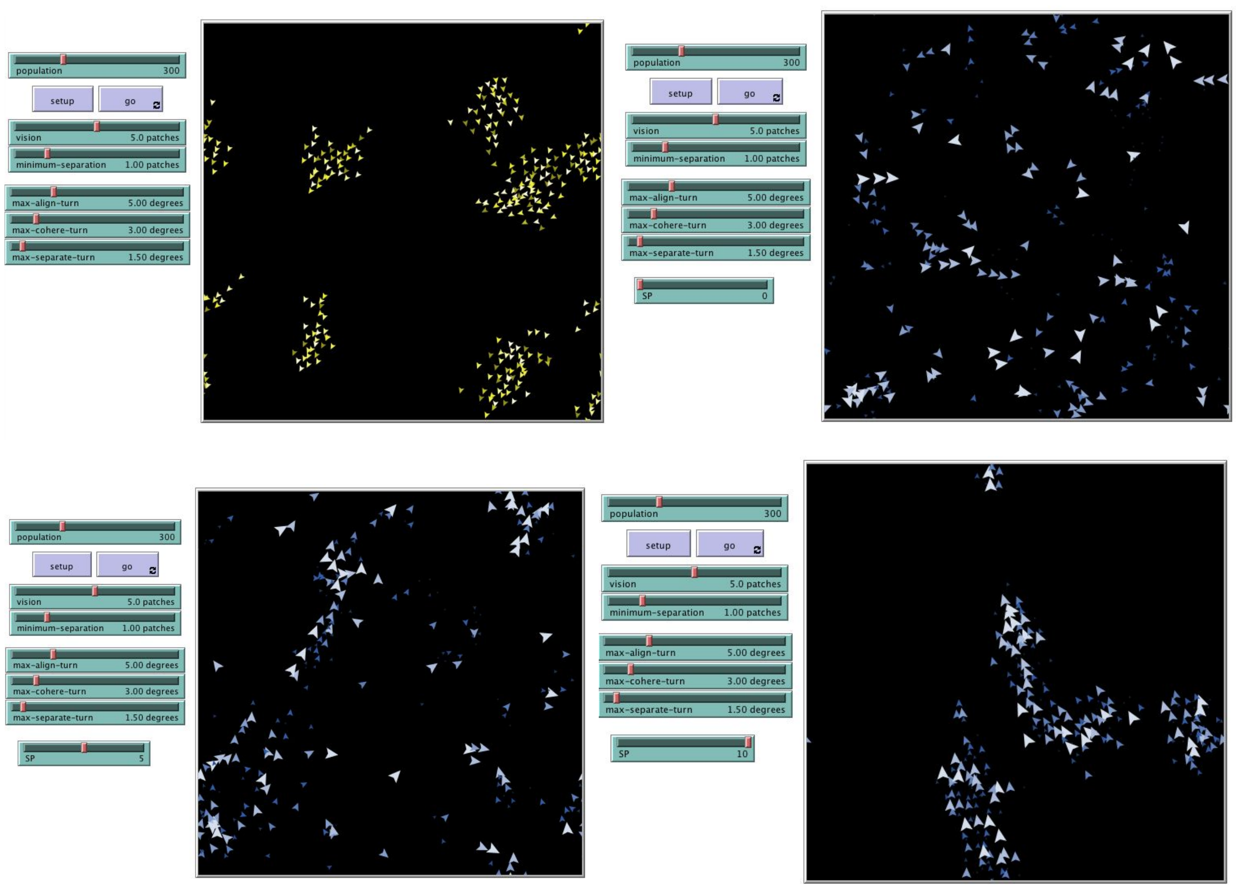
Some visual modifications are also added to the algorithm in order to serve the project's aesthetic goals. Agents are represented by single pixels, and whenever two touch, a line is formed between them. Heading determines the line's color, agent size is encoded in the line's opacity, and distance between the agents influences saturation. The visualization is not cleared between time steps, so the images seen in Figure 1 represent an extended run, or a history of the simulation.

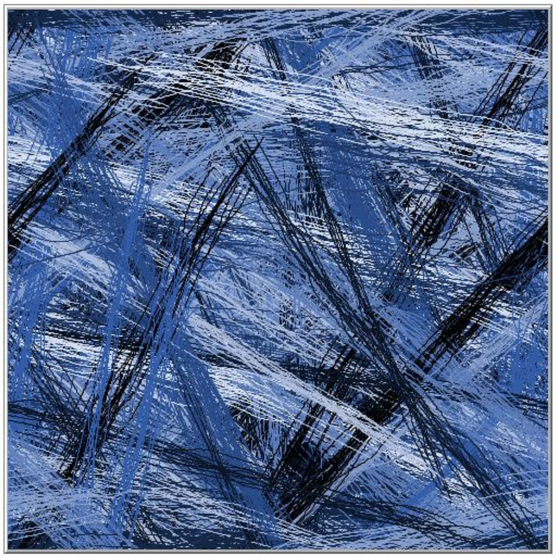
I wanted to attempt recreating some of Eldridge's work in NetLogo, but with limited ability and time, I only got so far as integrating some of the rules surrounding size. Still, the results are interesting.

I began with the flocking simulation built into the NetLogo model library (Wilensky, 1998). This model functions similarly to the "boids" model, without being identical. I added code to have agents in this model take on a random size parameter between 1-10, and set the size of their icons to be proportional to this number, for ease of viewing. I also set their hue to be proportional to their size, after deciding to limit my efforts to just tracking size, rather than completely replicating Eldridge's entire visualization scheme.

In line with the "Pretty Little Flocker" approach, I added a global variable, again ranging from 1-10, for size preference. Then, I modified the procedure which agents used to identify their nearest flockmates to incorporate this SP variable, such that agents would only identify nearby agents whose size was at most [SP] different from their own.

Given just these minor modifications to the NetLogo flocking model, interesting visual elements already develop. Shown below, clockwise from upper left: first, the original model, next SP set at 0, then 5, and finally 10. The addition of the size parameter provides a much stronger sense of the dominating factor organizing the sub-flocks of agents.





In the spirit of Eldridge's work, next I replaced the standard "arrow" icon with a single pixel, and had the agents draw a line wherever they moved. In this setting, I was able to reproduce some aesthetic elements of "Flockers", even while lacking a great deal of the visual modifications used in that piece. Additionally, I found (as did Eldridge) that under these conditions, the resulting visualizations were both aesthetically pleasing and informative. The images on the left represent three runs of this experimental setup, over approximately 700 timesteps each. From top to bottom, SP is again set at 0, 5, and 10 respectively. When SP is at 0, the clear preference for flocking only with agents of identical size, along with the history of flight paths these sub-flocks take is clear to see. In the visualization for SP=5, one can see a much higher intermixing of sizes, although some "striation" shows through where small subflocks form. Near the beginning of the SP=5 condition, sub-flocks take curling flight paths, but eventually settle into a unified plane of travel (here, roughly North-South). Lastly, in the SP=10 condition, all agents flock indiscriminately, as depicted by well mixed lines of all different shades of blue.

I will end this by pointing out that this exercise in replication fulfills in many ways Eldridge's stated goal in the "Flockers" project, of coaxing artists away from using ready-made computer interfaces in their work, in favor of getting their hands dirty by doing a little programming. Even adding just a few lines of code to this model helped me pick out informative details in the resulting visualizations.

And they're pretty.

References

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