Evolved Artificial Ants Paintings on Instagram

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Abstract

Insta.ants is the Instagram profile of a set of artificial ant species that create non-photorealistic renderings of input images. For that purpose, Instagram images tagged with #instaants are collected and supplied to the painting ants that exhibit the resulting antworks on their Instagram profile as well as on a repository which also includes videos of their painting processes.

The work is based on Photogrowth, an evolutionary system that allows the evolution of artificial ant species. These ants live in a two-dimensional environment initialized with the input image, and paint on a canvas that is initially empty. The luminance of an area determines the available energy. During simulation, ants gain energy when traveling through bright areas, and this energy is removed from the source image. If the energy of an ant is below a given threshold, the ant dies; if it is above a given threshold, the ant generates offspring. The ants' movement is determined by how they react to light. Each ant has sensory "organs" that probe the environment, returning the luminance value of the area to where they are directed. The direction and length of these sensory vectors, the way the ants respond to the sensory information, the life span, reproduction rate, speed, etc., are determined by the ants' genome. During simulation we gather statistics regarding the ants' behavior and compute several image metrics. These measurements are the basis construction of fitness functions, which are designed by the users through a responsive interface that allows them to perceive the semantics associated with each feature. Therefore, the users express their intentions and goals through the design of fitness functions and the evolutionary algorithm uses these functions to discover ant species that match these goals.

Using Photogrowth, we evolved several ant species with diverse behaviors and we now allow Instagram users to generate non-photorealistic renderings of their images. The rendering algorithm represents the trails of the ants as continuous intertwined lines, with varying width, direction, color and transparency, producing expressive renderings. It is also able to output vector images, allowing the production of large-format artworks.