Computationally modeling creativity: implementation and response to a computer being creative on its own

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Is it possible to make a computer program creative own its own. If you did, how would you evaluate the human response to its creative output? Through neuroimaging studies, theoretical and empirical work on the psychology of creativity, and simulation, we are gaining insight into the once mysterious process of creativity (Andreasen, Boden, Feinstein, Gabora).

Our main research direction is to explore computer creativity modeling as a technique to better understand the creative mind. Our work is based on new discoveries in human creativity, especially in terms of fluid contextual focus (Gabora), which has been implemented into this evolutionary software (DiPaola). Human creativity is not just a matter of eliminating rules but assimilating and then breaking free of them where warranted. Indeed a considerable body of research suggests that the creative process involves not just increased fluidity or free associative thought, but increased fluidity tempered with increased restraint. From this human creativity research we have created a computer evolutionary artificial intelligence (AI) program that is fluid between being tightly focuses on the portrait resemblance (similarity to the sitter image, which in our case is John Collier's famous portrait of Charles Darwin) or can swing, based on functional triggers, towards a more open associative process around intertwining and at times contradicting 'rules' of abstract portrait painting (DiPaola, Gabora). The approach gives us novelty and innovation from within, or better said, responding to a structured system -- a trait of human creative individuals. The computer code is capable of abandoning a focused goal like resemblance, in favor of wider creative pursuits associated with art making (composition, color theory over resemblance), which paradoxically often allows the focused goal to be better achieved.

The automatic creative output was generated over ~ thirty days of continuous computer use. Example pieces (40 images) were then framed and submitted to galleries. The output has been accepted (juried) and exhibited at six major galleries and museums including the TenderPixel Gallery in London, Emily Carr Galley in Vancouver, and Kings Art Centre at Cambridge University as well as the MIT Museum in Boston, and the High Museum in Atlanta. This gallery of work has been seen by tens of thousands of viewers who see the related artwork as an aesthetic piece that ebb and flows through seemly creative ideas even though it was solely created by an AI genetic computer program using models of human creativity. While these are subjective measures, they are standard in the art world. It should be noted that no attempt to create a 'creativity Turning Test'. Besides the issues surrounding the validity of such a test (Jennings), it was not feasible in such reputable and large art venues.

We will discuss our technique for parsing cognitive mechanisms of human creativity such as contextual focus and evolving visual grammars, and blending these metaphors syntactically into a computer artificial intelligence AI program. We will also document the human response to the family of work situated in art galleries and museums around the world.

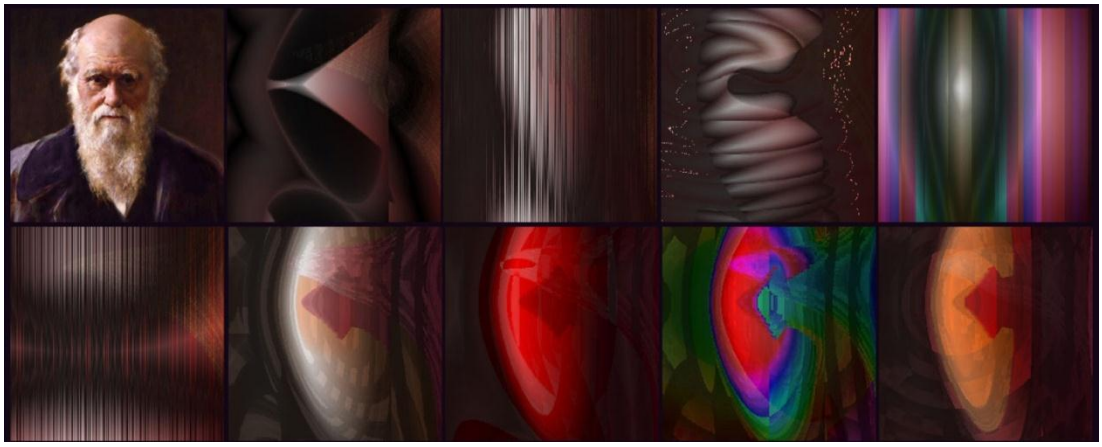

Fig 1: The artwork (excerpt) creativity moving towards the sitter image (first image) of Darwin using genetic programming written by the author, (these images are from the journal Nature article). See darwinsgaze.com

Fig 2: These images have been seen by thousands in the last 2 years and have been perceived as creative art works on their own by the art public, including above at the MIT Museum in Cambridge, MA.

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