A computer algorithm to quantify creativity in art networks

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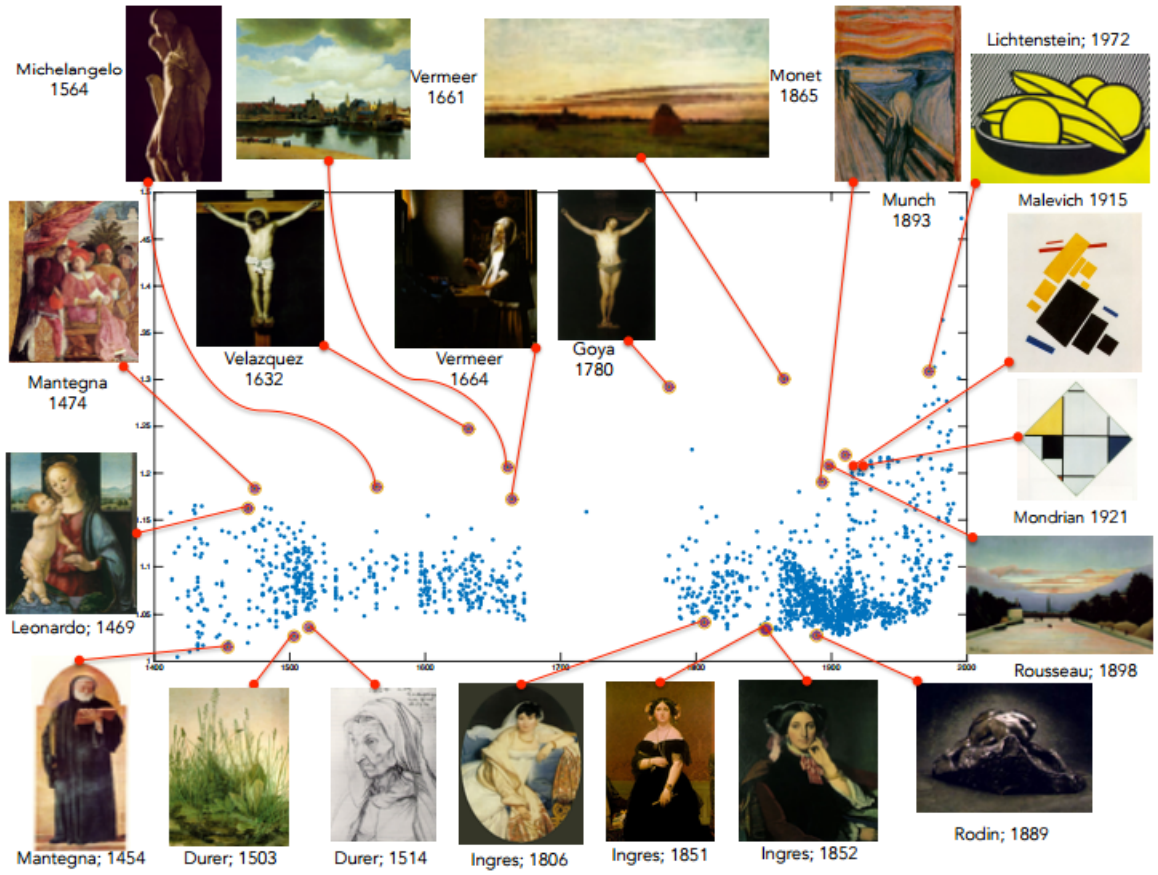

Creativity scores for 1710 paintings from Artchive dataset. Each point represents a painting. The horizontal axis is the year the painting was created and the vertical axis is the creativity score (scaled). Credit: Ahmed Elgammal, Babak Saleh, Rutgers University

A team of researchers at Rutgers University has taken on the novel task of getting a computer to rate paintings made by the masters, based on their creativity. They have written a paper describing their approach and the results they have obtained in running their algorithm and have posted it on the preprint server *arXiv*.

The value of art lies in the eye of the beholder, some may find a particular painting moves them to tears, while another feels nothing—such is the intangible nature of the human mind and its reaction to stimuli. Creativity, on the other hand, is a little more easily recognized, whether in art, the sciences or other areas. In this new effort the team at Rugters sought to bring some science to the fine art of creativity recognition, as it applies to one of the most recognized fine arts—paintings done by masters over the years. Traditionally, labeling a work of art as creative has fallen to art scholars with years of training, background and love of the work—it has to have something new, of course, but it must also, according to the researchers, have demonstrated some degree of influence, i.e. be copied by others that come after. They set out to create an algorithm that once finished could rate the works by masters, based on nothing but creativity.

To create that algorithm, the team started with what are known as classemes—where a computer recognizes an object in a picture and assigns it to a particular category. Next, they found a way to access a huge database of famous paintings that was easily accessible, Wikiart, which has among other things, approximately 62,000 pictures of famous paintings. Then finally, they applied theoretical work being done with network science to help with figuring out which paintings were a clear influence in the creation of other paintings.

Putting it all together and running the algorithm resulted in generating a list of paintings with rankings based on creativity. The approach apparently worked, as the researchers report that for the most part, their

algorithm results matched very closely with art expert assessments over the years, though there were a few exceptions here and there. The team suggests the algorithm could be used in other contexts as well, such as sculpture, literature and likely other science based applications.

More information: "Quantifying Creativity in Art Networks" arxiv.org/abs/1506.00711