Relative Entropy of Jackson Pollock's Art: Drip vs. Dark

Stone, Elizabeth

The purpose of this project was to determine if an algorithm could be used to quantitatively analyze paintings. It was hypothesized that there would be a significant difference between the periods which Shannon's Relative Entropy would detect. First, the color of the painting was recorded at each centimeter of a diagonal line on the painting. A matrix was then comprised of the color sequences. This was done for 5 paintings of the Drip and Dark period. Next, the matrices were analyzed for their relative entropy. Using a 2-variable Independent Means T-test in which a $p<0.05$ was significant, a p of 0.433 was obtained, refuting the hypothesis. The hypothesis can be reasonably rejected in favor of a null hypotheses, that there were no significant differences between Pollock's Drip and Dark period. The significant difference in standard deviation of the relative entropies, with the Dark period at 8.91 and the Drip at 2.98, quantitatively accounts for the qualitative differences. The larger variation can be attributed to the unfavorable circumstances of Pollock's life at the time. Then the relative entropies of 10 Mondrian paintings were obtained. Using 2-variable t-test in which a $p<.05$ was significant, as a means to determine the difference between the Mondrian and Pollock paintings, a p of 0.0063 was obtained, proving a significant difference between then artists. This method of analysis could be applied to test the authenticity of a painting. In addition, Shannon's Relative Entropy could be used in the military to maximize efficiency in their communication systems.

Awards Won: