

2010 Preface to *Algorithmic Aesthetics*

In this book George Stiny and I investigate what we believe are deep and perplexing questions about art and aesthetics. What is a work of art? What does it mean to understand or appreciate a work of art? How can works of art be produced?

We are interested in using algorithms and computers to help us in this quest. Algorithms and computers are thought aids we use in our investigation. How can a work of art be created? Let's think about how we might build a computer program or an algorithm to produce a work of art. How can a work of art be understood or appreciated? Let's think about how we might build a computer program or algorithm to give a criticism of a work of art.

In the Introduction we quote Donald Knuth:

“It has often been said that a person doesn't really understand something until he teaches it to someone else. Actually a person doesn't really understand something until he can teach it to a computer, i.e., express it as an algorithm. ... The attempt to formalize things as algorithms leads to a much deeper understanding than if we simply try to understand things in the traditional way.”¹

We are not especially interested in using computers to create new media for artworks or new types of artworks. We are interested in traditional art – painting, sculpture, architecture, symphonies, plays, operas – and how we might understand them and appreciate them and create them. We want to use algorithms and computers and computation to help us in our understanding.

The key intellectual assumption of the book is given right at the beginning of Chapter 2 in the brief discussion of Kenneth Craik's work.

“In *The Nature of Explanation*², Kenneth Craik proposes a general model for the process of thought. This model provides the basis for the structure postulated for criticism algorithms and design algorithms. Craik's model consists of three essential processes:

- (1) “Translation” of external process into words, numbers, and symbols.
- (2) Arrival at other symbols by a process of “reasoning,” deduction, inference, etc., and
- (3) “Retranslation” of these symbols into external processes...”

¹ Donald Knuth, “Computer Science and Mathematics”, *American Scientist*, vol. 61, no. 6, 1973.

² Kenneth Craik, *The Nature of Explanation*, Cambridge University Press, 1943.

There it is. A work of art can be “translated,” represented by a string of symbols, by a “description” in the terms of *Algorithmic Aesthetics*. “Symbols” here simply are finite characters in an alphabet, like letters or digits or punctuation. Bits (0’s and 1’s) are the simplest set of symbols. Characters represented by ASCII codes or Unicode are other sets or alphabets of symbols.

Really? One of Beethoven’s Late Quartets can be represented as a sequence of symbols? How? By the score? By the sequence of bits in the .wav or .mp3 file recorded at a performance?

Once we allow a description that is made up of some (possibly very long) sequence of symbols to substitute for the work of art itself then the game is up. Now we are in the world of symbol processing and algorithms. This is the key assumption in the book, that we can capture everything of interest in a work of art, or in the world, in a description made of symbols. And on the other end, the “retranslation” in Craik’s words, that from a detailed description, from a very detailed score or plan or script, we can mechanically construct a work of art. We know lots about symbol processing. All computer programs do is symbol processing. If we can translate works of art into sequences of symbols or sequences of symbols into works of art then we can apply what we know about symbol processing, about algorithms, to art and aesthetics. That’s what we try to do in this book.

George Stiny proposes an alternative to using symbols as the basis for computation in his book *Shape*³. I recommend it to you.

A personal note, if I may. The book *Algorithmic Aesthetics* was written by George Stiny and myself between 1974 and 1976. We both were in our late 20’s and had just finished our Ph.D.’s. We had applied to the U.S. National Endowment for the Humanities (NEH) for a grant to research and write the book. We were told over the telephone by an official in Washington that the grant had been approved, but somehow it never was. We decided to pursue the research and write the book anyway. George and I worked part-time at various positions. We had apartments near each other in West Los Angeles, near the Farmer’s Market. We managed to spend lots of very pleasurable time smoking cigars and drinking Earl Grey tea and talking out the ideas and writing the book.

As the end of the book was in sight we had thoughts of writing more books in the same light, using the exact same algorithmic structure. “Algorithmic Science” would be next. “Algorithmic Ethics” would follow. Instead we decided to formally begin our official academic careers. I accepted an academic position in Boston and George in Milton-Keynes, England.

Algorithmic Aesthetics was published by University of California Press in 1978. The print run was 1,000 copies. When these sold out after 15 years, University of California Press declared the book out of print and returned all rights to the authors. Copies of the book became very difficult to obtain. We subsequently put the book up for free at algorithmicaesthetics.org, first as a page-by-page scanned copy in 2003 and then as a .pdf in June 2009. In the less than a year that the .pdf has been posted over 15,000 copies have been downloaded.

³ George Stiny. *Shape: Talking about Seeing and Doing*, M.I.T. Press, 2006.

Thank you for your interest. Please feel free to email me at gips@bc.edu.

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