TEACHING GENERATIVE ART TO UNDERGRADUATE STUDENTS AT A TECHNOLOGICALLY ADVANCED UNIVERSITY: ITS CHALLENGES AND REWARDS

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Abstract:

At the University of Advancing Technology I have designed a generative/algorithmic art class that I have been teaching for two years now with a growing interest in the student body.
The class introduces generative art through a brief historical background and its precursors with roots in conceptual art, and with a focus on the end of XX century and XXI century trends. The overall class objective is to have the students understand some of the GA concepts that entail process, not the end result, an art creation based on a simple set of parameters that run a very complex, always original, never-ending process. From stills, to live coding, to interactive art, to bio generative art, to algorithmic architecture student gain knowledge of various heterogeneous trends in order to be able to produce their own algorithmic art, starting with traditional media and progressing into a digital realm.
The profile of students in class varies, from programming background, digital design and art, to game design and animation background. Hence the challenge of having the students (rooted in traditional art forms) to grasp this new approach to art whose artistic creation is the process, not a finished product. How to place generative art that resides at the intersections of arts, sciences and technology in a school curriculum that is very much technically oriented (not an art school) presents a challenge for me as an educator and a designer.
Through a video material, and interactive student artworks it is my intention to showcase their growing understanding of generative art and an ultimate embracing of this new art form, focusing on my few students who have found their art direction in generative art.

"And despite the fact that the basis of this mathematical way of thinking in art is in reason, its dynamic content is able to launch us on astral flights which soar into unknown and still uncharted regions of the imagination." [1]–Max Bill

My journey into algorithmic/generative art began with my interest in new art movements that have emerged as a result of the close collaborations between sciences, new technologies and arts. When I worked on my first hypertextual project, an interactive piece of multimedia fiction, I was fascinated by multilinear paths and manifold stories within many other sub-stories with no set endpoint. The feedback I got was interesting, as many people from different fields who embarked on that journey to carve their own story based on many possibilities liked the process, but what about the end? “I never knew where my story ended,” was a common remark. This is where it all began: with the concept of generative art having its immediate roots in early concept art forms with names such as John Cage, La Monte Young, and movements such as Fluxus and Happenings in the 1960s, all of which relied heavily on chance encounters, random input, and a sense of unpredictability. I felt my multimedia fiction fit well into that indeterminate framework.

University of Advancing Technology:

The university where I have designed and taught generative art class for two years is a technologically advanced school that actively utilizes the Year-Round Balanced Learning (YRBL) model for addressing different learning styles. The YRBL model consists of five delivery methods, including modified lecture, tutorial teaching, group recollection, student teachback, and discovery learning. Students engage in both synchronous learning activities in regular class periods and asynchronous activities. Group activities and teambuilding are strongly encouraged within the synchronous and asynchronous environments. My class fits very well into this model, especially the section that addresses teachback and discovery processes. Generative art is, indeed, all about journey of discovery; as such, it is a new art form stemming from many intersections found at the level of scientific, technological, and artistic interplay.

My school is a niche school that fulfills the needs of students who are passionate about emerging technologies, game design and programming, network security, software engineering, and multimedia, among many others. The art program serves as a support program across disciplines, not as one that exists as a separate major. The school’s vision to “**enrich societal advancement by cultivating thinking innovators for our technology-driven world [2]”** coupled with rich developments in the world of multimedia arts, motivates our faculty to redefine the status of art classes in order to be able to understand new trends; they are also loyal to our technologically driven vision. As part of this effort, generative art and bio/genetic art classes have been designed to address these new art directions—directions that also fit well within the school’s technological orientation. On the other hand, it has been a challenge to have the traditional art faculty embrace art-technology integration and cross-disciplined collaboration. Questions of whether generative art is an art form after all, since it inquires about the process and not the finished product

have been common threads in our discussions.

Related to these issues is the student population who choose our school for the reasons mentioned above. Furthermore, because the school doesn't attract art-driven students, who still have to take required number of art classes of their choice (as our art classes, such as drawing and painting, serve as a very important foundation for almost all our majors), the question remains how to lure those students into generative art curriculum and explain to them its aesthetic values in today's society, and convince them that they will indeed create artworks.

Most of my students come to my class for one or more of the following reasons:

- Because they are programmers and think they will heavily use programming languages they are very familiar with to create "something," so this should be an easy "win" of required credits;
- Because they cannot draw;
- Because there are no prerequisites to this class; or
- Because they are intrigued by the new concept.

Furthermore, what complicates and simultaneously enriches a class environment is the varying profile of students from backgrounds in programming, digital design and art, game design, and animation. The students who chose not to be part of this class often believe they need to know too many programming languages to be able to be successful or they despise math in general. They may also believe it is not possible to think of generative art as art, based on the course description, as follows:

Description of the algorithmic/generative course:

Algorithmic art is a new form of artistic creation that emphasizes the process of creating a work of art, rather than the final product. The course gives an overview of its historical perspective emphasizing the essential role of concept art as a direct precursor to the algorithmic art.
Students will be encouraged to make artwork using various media and including physical objects that evolve over time based on a clear set of instructions, and often require an active role of the viewer/participant.

The curriculum outlines some of the following topics:

- Introduction
- Origins and Early Algorists
- Characteristics of algorithmic art: process, indeterminacy, open form, natural processes and enumeration
- New algorithmic work:
- Overview of Genetic Algorithms
- Overview of Algorithms and Architecture

Objectives of the class as outlined:

Critically analyze various methods for creating art through algorithmic processes, and apply those concepts to the creation of original, generatively-driven art creations.

Performance objectives:

- Develop a basic understanding and facility to solve visual problems algorithmically;
- Explore aesthetic ideas and visual structures through algorithmic processing of graphic data;
- Identify the historical precedents, philosophies, artists, and output of the algorithmic art movement;
- Write a comparative analysis of the differences between algorithmically generated art and traditional art;
- Determine the most appropriate algorithmic approach to art, in order to achieve a desired aesthetic result;
- Create a multimedia work in which the differing media elements interact according to an algorithmic rule set; (not necessarily computer generated);

To get to the level of understanding what algorithmic art entails requires freeing the mind from the traditional concepts of art as a finished product and embracing the art of abstraction that Max Bill talks about. This is a difficult undertaking. In my experience, it includes overcoming several obstacles:

- Understanding the art of abstraction that has no immediate connections with the world surrounding us and that is not burdened with the common questions, “What does it mean?” To be able to see art solely for an aesthetic pleasure, rather than digging deep for its hidden meanings, is an accomplishment for my students. To paraphrase Magritte in response to the above question: it doesn’t mean anything, because mystery means nothing either, it is unknowable. Seeing is what matters; seeing must suffice.

- Understanding the code as material and that it is its execution that brings the artwork its aesthetic quality.

- Understanding of generative art as being based on a set of instructions/parameters, which can be very simple, but which do not necessarily have to be a computer code.

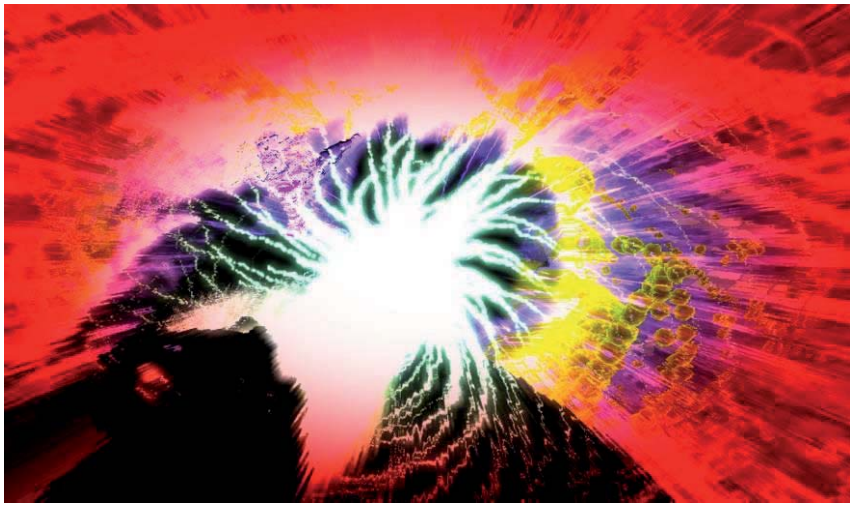
- Understanding that a simple set of instructions/code, when executed, generates an infinite number of possibilities, where each one of them becomes original, whenever the code runs again.

In that vein, we start with simple recipes using physical materials that can potentially generate infinitely varied results. This initial step proves to be beneficial for the understanding of the basic concepts. To have a good, original concept is what my students struggle with. To stay away from computers in our technology-driven society and still be able to generate algorithmic artwork is a challenge. And yet the students have come up with very interesting interactive, generative art projects based on varied sets of physical materials.

From that point, when the students seem to have a grasp of some of the concepts of generative art abstractions, and when they become excited about the open-ended

process and infinite possibilities, they begin to build and further explore their initial concepts in the digital realm. Along the way they get acquainted with many algorists who use various media to create their algorithmic artwork that inspire them.

The following are some examples of student works; for the most part they are interactive as the audience become co-authors of the project, active participants who choose their own path of art discovery, a point which brings me back to my opening remarks and my own hypertextual project.



Nick Pfisterer, student, algorithmic art class, Summer 2009

John Pinto, student, algorithmic art class, Summer 2009

Several students completed their road to self-discovery and found their artistic language in generative art. Those students continue to flourish as they embrace generative art's immense possibilities and find ways to combine them with their majors, such as software engineering or game programming. Along the way, they find this art's real world applications.

To be able to stir the imagination of a few students in my generative art class, and to

see them inspired to create and solve complicated code puzzles to visualize their generative art concepts, is a rewarding experience. Those students we encourage to continue work on their generative art assignment as it grows into their senior innovation project, as part of the required curriculum for graduation.

References:

[1] The Mathematical Approach in Contemporary Art, Max Bill,
http://hebert.kitp.ucsb.edu/studio/a-m/mb-maica.html

[2] University of Advancing Technology: Mission, Vision and Values