

Drafting Poems: Inverted Potentialities

Eitan Mendelowitz

Center for Research in Engineering, Media and Performance (REMAP)

University of California, Los Angeles

102 East Melnitz Hall, Los Angeles, CA 90095-1622, United States

eitan@cs.ucla.edu

ABSTRACT

Drafting Poems: Inverted Potentialities challenges preconceived notions of intelligence, creativity, and authorship. In *Drafting Poems*, an artificially intelligent poet reacts to user stimuli creating meaningful verse. As users sketch on the surface of a glass drafting-table, the system gathers statistics on how the users are drawing. These statistics inform a probabilistic text generation system that creates original poetry. While this work builds on a rich tradition of algorithmic poetry, its focus on the creation of meaning represents a fundamentally different expressive goal and hence *Drafting Poems* signifies a new movement, the *AI Aesthetic*.

Categories and Subject Descriptors

J.5 [Computer Applications]: Arts and Humanities: Fine arts.

General Terms

Experimentation, Human Factors

Keywords

Poetry generation

1. INTRODUCTION

In *Drafting Poems: Inverted Potentialities*, users are invited to draw with dry-erase marker on the surface of a glass drafting-table. Displayed on the table is a soup of letters. The letters drift across the table repelled (like magnets) from the marker, an eraser, and each other. When a participant draws on the table, the letters move fluidly as if being stirred. When a participant erases their drawing a digital version of their sketch shatters, calling attention to the quantized nature of digital media. The eraser may also be used to push letters about the table. The movement of letters and the shattering of drawings provide the user with immediate visceral feedback from the installation.

As participants draw on the table the installation gathers pen movement statistics. These statistics inform an AI system, *the Poet*, which generates verse commenting on the gap between the analog and digital. The Poet does not spin its verse in a vacuum but in direct response to the user's drawing. The faster the user

draws, the more the poet talks about speed and sampling error. The more the user draws curves, the more the poet writes about quantization and estimation. The longer a user pauses between strokes the more the Poet talks of impermanence. If the installation goes unused the poet becomes despondent and lonely. The following text is a typical phrase from the system:

*“The ethereal is evocative of its foundation,
Yet serrated and notched,
It conjures the analog
Only from afar.”*

2. RELATED WORK

While *Drafting Poems*' physicality is related works that deal with interactive tables [3,4,5], its essence falls within the tradition of algorithmic poetry. There is a long tradition of algorithmic poetry dating back at least 1500 years to Optatianus Profyius who wrote the recombinant poem *Carmen XX*. [1] The art movements most associated with algorithmic poetry are the Dadaist, the Surrealist, the Oulipo, and recombinant poetics. These movements concentrate on human creation of meaning arising out of random associations. [2][10] *Drafting Poems*' focus, however, is on the non-random creation of meaningful text. Therefore it relates most closely to Ray Kurzweil's *Cyberart Poetry* [6], Michael Mateas' *Terminal Time* [7], David Rokeby's *The Giver of Names* [9].

Cyberart Poetry uses natural language processing techniques for algorithmic poetry generation. The *Cybernetic Poet* reads writing samples of poetry from a particular artist and then generates original poems in that artist's style. The beauty of the work is not merely in its output, poetry, but in the system that creates the poetry itself.

Terminal Time, by Michael Mateas, uses a text generation system, which he designed, to construct an “ideologically” stilted documentary covering the last 2000 years. The ideological slant of the generated documentary is based on audience attitudes as initially measured in a pole. The system not only generates the text of the documentary but chooses images, video, and music to accompany the text and edits the media elements together in real-time.

The system uses its ability to generate a complicated shed light on the subjective nature of all media. While the stilted documentary itself is compelling, the artistic value of the piece lays in the knowledge that a meaningful documentary is created by a computer in response to user-input.

Of the works discussed in the paper, *The Giver of Names*, by David Rokeby most resembles *Drafting Poems*. In *The Giver of Names* participants place objects on a pedestal. The system then “sees” the objects through a video camera, performs an image analysis, and then constructs a grammatical text using words

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inspired by the objects. Over time, *The Giver of Names* learns associations between objects from user interaction. It is these associations that form the basis for the constructed texts. *The Giver of Names* directly addresses the ability of artificial intelligence to create meaning from interaction.

3. TECHNICAL DETAILS

Drafting Poems' glass surface is backed with a rear-projection screen. Text and other graphics generated by a PC are projected onto the table surface from a data projector placed on the floor behind the table. This arrangement allows users to view and interact with the table from three sides without blocking the projected image.

The user interacts with the artwork by drawing on the surface of the table with dry-erase markers or by erasing markings already on the table with an eraser. Real-time pen location information is acquired with a Mimio. A Mimio is commercial ultra-sonic pen-tracking device marketed for interactive white-boards.

Drafting Poem's text generation system is a hybrid system combining traditional definite clause grammars with *scripts*. A grammar is a set of production rules. The rules instruct the system how to write a sentence. In their most basic form, production rule are like the rewrite rules learned in grade school. For example, a sentence can be rewritten as an article followed by a noun and a verb. Every grammar has a lexicon, a list of permitted vocabulary words classified by their type of speech.

Scripts encode specific situational information. Usually used for machine understanding, a script describes common or reoccurring event as a series of actions.[11] In *Drafting Poems*, scripts are used as generative structures, a meta-grammar. Instead of aiding the system in language understanding, the script guides the system in the creation of text. An example script is "write about the physical, write about the process of sampling, write about the digital."

In *Drafting Poems*, all scripts, grammar rules, and lexicon entries also contains semantic information. Every object in the text generation system is tagged with extra information denoting their usage relative to the user's pen data. For example, rules that produce short sentences may be tagged for used when the participant draws short lines. Contemplative words are tagged for use when users draw slow curves while sensational words are tagged for use with highly angular drawings. All tags are probabilistic in nature.

Tagging allows the user to dynamically modify the text generation system through their actions on the meta-level (the script level), the grammar level, and the level of individual word choice.

Once a verse is produced by the text generation system it is sent to the graphics system, which displays the verse near the current location of the pen.

4. CONCLUSIONS & FUTURE WORK

Using a scripts-based natural language generation system, *Drafting Poems: Inverted Potentialities*, successfully creates compelling poetry based on user input. Future work includes the transition from a "smart object," a drafting table, to "smart rooms" – a poetry generation system that reacts not just to pen input but also to a sensor network reporting on the greater context in an environment.

Related to the Oulipo and recombinant poetics the *Drafting Poems: Inverted Potentialities*' text generation is combinatoric in nature. However, like the works of by Kurzweil, Mateaz, and Rokeby, *Drafting Poems* uses artificial intelligence as its medium. *Inverted Potentialities* displays the *AI aesthetic* in which an intelligent system, in dialog with user interaction, creates and expresses meaning.

5. REFERENCES

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