Designing for Posthuman Critical Literacy

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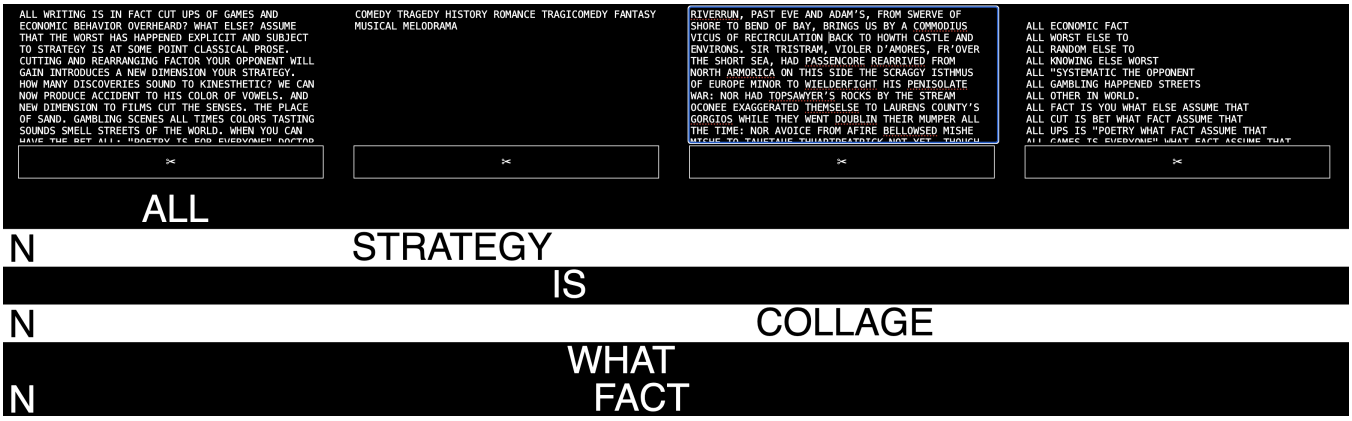

Figure 1: An screenshot of our textual instrument meant for dadaist poetry writing.

Abstract

This paper discusses positions taken up by the field of contemporary literacy studies as they relate to digital writing technology. Literacy studies have not, to our knowledge, been sufficiently examined from the world of HCI and writing support. We aim to show that literacy studies as a conceptual framework offers a number of theoretical challenges to prevailing views of writing that underpin writing support technology development. We discuss the notions *assemblage* and *posthuman critical literacy*, which may indicate new research directions for writing support technology in theoretical, artistic, and ideological fronts. Finally, we describe a *textual instrument* that demonstrates these ideas.

Keywords

posthuman, writing, support, deleuze, critical, textual, instrument

ACM Reference Format:
Alexander Calderwood. 2024. Designing for Posthuman Critical Literacy. In *The Third Workshop on Intelligent and Interactive Writing Assistants (In2Writing '24), May 11, 2024, Honolulu, HI, USA*. ACM, New York, NY, USA, 4 pages. https://doi.org/10.1145/3690712.3690729

1 Introduction

This position paper begins with a look at recent trends in literacy studies, particularly recent sociotechnical scholarship grounded in Deleuzian philosophy and actor network theory (ANT). ANT is a theory that posits that interactions between human and non-human actors alike may be viewed as social relationships, and that humans and non-humans should be analyzed with symmetrical treatments [10, 15]. Varied criticisms of the theory hold that distinctions between humans and non-humans (such as this paper's stance that human creativity merits special emphasis) acknowledge the value of the theory "in this age of hybrids and blurred and negotiable boundaries" [15, 476].

Our position is that this theoretical foundation will be useful for the computational writing support community to engage with, not only because its view of writing may provide a more accurate (though perhaps less precise) theory of writing than than those currently used in writing tool design, but also that it indicates an alternative view of writing support technology that values computational writing aides as a worthwhile aim of technical research and artistic practice. Borrowing the term from Robinson, the stance is *resistive* in that it stands against modes of digital writing infrastructure that reduce individual human agency and uphold logics of power [14].

Engaging in a process similar to research through design [6], which holds that design guidelines are a valuable contribution of practice-based research, we will describe a speculative design space for resistive writing technology. As a case study and existence proof for this class of artifact, we describe ongoing work towards a textual instrument that fits our speculative design guidelines. The instrument is philosophically aligned with dadaism, and the material writing practices of such poets as William Borroughs, Keith Waldrop, and the automatic writing of W.B. Yates.

In2Writing '24, May 11, 2024, Honolulu, HI, USA

ACM ISBN 979-8-4007-1031-5/24/05
https://doi.org/10.1145/3690712.3690729

2 Understanding Posthuman Literacy

The field of literacy studies has in recent years taken what Bradley Robinson calls a 'sociotechnical turn' in which scholars have "begun to examine how the technical dimensions of digital technologies interface with the sociocultural dimensions of literacy in practice" [14]. This turn is partially inspired by the posthuman philosophy of Deleuze and Guattari, and emphasizes their concept of *assemblage*, collections of perhaps dissimilar and unrelated things whose interaction produces "any number of possible effects" [11]. Technologies under this view are not simply tools for the production or comprehension of texts, but actors within a broader assemblage of writers, readers, and texts responsible for the production of human subjectivity [9, 14].

2.1 Identity Formation under the Computational Unconsciousness

Robinson cites a growing body of research that has raised concerns about the interaction between automated writing technology (AWT) and the formation of selfhood. Under a Deleuzian view in which identity is not fixed, but "hybrid and modulating" (according to Robinson citing [13]), computational processes "do not influence subjectivity so much as they co-constitute it" [14].

Writing is viewed as a deeply human process, central to the ways that we understand ourselves. As Robinson quotes of Andrejevic, writing is "the medium we use to express our "innermost" thoughts" [2]. Natural language generation (NLG) technology, understood as a component of the assemblage maintained while writing, takes on an active agential role in the formation of subjectivity.

As interfaces that utilize large language models (LLM's) become commonplace in writing and find their uses in personal writing and cultural production, their sociocultural biases and cultural idioms must be understood within the sociotechnical arena. Robinson adopts Beller's [3] use of the term "computational unconsciousness" which signifies, rather than a neutral distillation of the collective beliefs, values, and biases that exist on the internet, a willful product of capitalist production. In the context of LLM's, the fingerprint of corporate neoliberal values is increasingly obvious, as content moderation policies and decoding algorithms like RLHF explicitly define the bounds of acceptable production, and will increasingly factor in their user's self-expression.

2.2 Writing Technology for Posthuman Critical Literacy

In light of AI, Leander and Burriss (2020) take the convincing position that the humanist notion of critical digital literacy is due to be expanded to a posthuman critical literacy. "[P]osthuman critical literacy," they write, "advocates for a shift in understanding our (human) role in text production and consumption as imbricated in an assemblage of human and nonhuman actors" [12].

Posthuman critical literacy "necessitates that people can actively build more ethical assemblages with computational agents" [12]. Our position is that this need gives a clear role to technologists and artists working on AI writing tools. Writing technology designed for posthuman critical literacy can and should, rather than treat AI as neutral infrastructure designed to invisibly complement the goals of the human writer, make their operations legible.

Leander and Buriss ask educators to expand from asking "Who wrote the text, and how does power operate?" to:

- "Where can you identify the influence of computational agents in the composition and/or distribution of the text?"
- "Who built the computational agent(s), why and how do they operate?"
- "How do/can we intra-act with computational agents to create texts?"

A design space for a class of writing tool designed for posthuman critical literacy would seek to raise these questions, incorporating insights from AI explainability research as well as sociological investigations into the use of AI writing assistance.

2.3 Posthuman Literacy for Writing Technology

At present, cognitive writing theories such as the Flower and Hayes process model that underpin writing support technology development maintain that writers engage in hierarchical stages of writing, such as transcription or ideation, and approach their text as goal directed problem solvers [5]. Research that utilizes these theories is meaningful, and has led to increased understanding of how to develop tools for writing [7, 8]. As a descriptive endeavor, the theories provide delineation between highly constrained creative writing tools (like a stylistic thesaurus) from autonomous writing technology like Sudowrite. However, perfect taxons have yet to be proposed. Writing support researchers have come up against fuzzy boundaries where a writer's stated goals and a tool's intended functionality become blurred. Our position is that contemporary literacy studies and the theories of writing that constitute them will be a compliment to the structuralist-leaning models currently in use.

Hermansson and Saar's [9, 427] application of Deleuzian theory to writing pedagogy highlights aspects of writing that speak against the clear phases of the Flower and Hayes model. As they see it, writers, their texts, and their writing context are in constant interplay, with writing having "no distinctive start, course, or end. Instead, a variety of factors are in motion and transformation, thus giving rise to multiple ways of becoming with the text-in-progress" [9]. Their tenets of writing can be described by the Deleuzian concepts of *assemblage*, *turning points* and *becoming-other*. We have described the concept of assemblage; *turning points* refers to the process by which trajectories break and diverge, while *becoming-other* describes how "the writer is in process with the world", co-constituting it as it redefines themselves [9].

This cursory discussion is meant to gesture toward the problems that posthumanist writing theory might unpack. We hope it will encourage researchers to dig deeper into these theories and prompt future work into writing technology that makes use of these perspectives.

3 A Textual Instrument

We turn to a case study meant to operate as an 'existence proof' of the kind of posthuman writing aides that this line of research support. Our system is most accurately described as a 'textual instrument', a concept borrowed from Noah Wardrip-Fruin. He asks "What would it mean to have textual instruments that one might learn to play proficiently, for which one might write and

perform a number of compositions, and that could eventually be made available to play the compositions of others?" [1].

As Wardrip-Fruin saw it, these artifacts were not well understood as games. They share more in common with musical instruments, sharing their performative elements. Unlike the textual instruments envisioned by Wardrip-Fruin, ours is designed to support both self-contained performative play and solitary operation with the purpose of assisting in the production of an external artifact. Performance involves the user's interaction with a MIDI controller, keypresses mapping to individual words which move across a window at a fixed rate, before disappearing offscreen.

In this latter mode, playing the instrument functions similarly to Burroughs' use of the cut up method of Brion Gysin [4]. The player may learn to understand the complex mapping between key and word, but due to their limited control of the mapping, play will lead to the discovery new words and patterns. The phrases and concepts that emerge are now best understood via the posthuman model, as textual elements of the writerly assemblage. In its operating mode as tool, the instrument is designed to support dadaist and automatic poetry writing, which places value on external texts that may be re-ingested for the creation of new works. Rather than meant to 'solve' a specific problem that a writer may bring to it, the oracular device should be thought of as a complicating entity.

The instrument takes on the *resistive* elements discussed above in the ways in which it makes apparent the restricted ability of players to author texts of their own volition. Each word that the player can perform is mediated through the constraints of the system. These constraints can be altered by the user, cycled from key-to-word mappings that utilize language models to mappings that simply sample a given source text in deterministic ways. The system is meant to provoke contemplation about the agency of the human within the trappings of automated writing technology, and encourage the user to confront the uncanniness of writing against the machine. It means to get at the Robinson's sentiment: "Unruly language is essential to the unruly subject, a subject at risk of being ruled by the rules of the operationalized throughput of NLG technologies" [14].

A more complete description of the instrument's functionality is included in the appendix.

4 Conclusion

This short position paper aimed to show that contemporary literacy studies may be usefully applied to the theory of technological writing support. We hope we have shown that posthuman theories, representing an expansive view of writing and positioned as resistive to dominant systems of power, indicate new directions for writing support research that embraces the full capacity of human creativity.

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A Appendix: Formal Description of the instrument

Technically, the instrument operates similarly to an audio synthesizer. It is able to receive Musical Instrument Digital Interface (MIDI) commands from a MIDI controller such as an electronic keyboard or MIDI enabled guitar. Rather than producing audio notes, it emits English words.

When a player-poet presses a key on their controller, a word appears in a performance window, moving from right to left with constant velocity. The performance window is divided into a number of vertically stacked tracks, with a single track surrounded by a white border indicating it is selected as the track to which the next played note will be displayed. Each played note advances the selected track, with the track selector cycling back to the top track when it reaches the bottom.

The user is able to alter the sampling mode of each track, altering how the track interprets the incoming MIDI note in order to render it into a word. We provide a handful of sampling modes to the user, with more planned. The most basic of these is an index-based sampler: the MIDI format represents a note's pitch by an integer ranging from 0-127, this value is simply used to index into a user-specified text, which has been broken up into words using a standard tokenization algorithm. Playing the lowest note on the controller will display the first word, moving up the keyboard will play successive words in the text.

Whereas musical notes can be described by features such as pitch, timbre, and duration (or envelope), the notes of this instrument, words, are described by morphological features such as denotation (its direct and literal meaning), connotation (what it implies or suggests) or other features such as its pronunciation and orthography[1].

[1]Words also assume features via their syntactic context. Linguists refer to these properties as a word's contextual inflection, contrasted with their inherent inflection (Booij).

Tracks may behave such that they sample with respect for these features; one track may sample only verbs while another might move along a semantically meaningful axis such as emotional valence.

Each track type has a toggle that changes its looping behavior, controlling what should happen when a word moves off the left hand side of the window. It may loop back to the right hand side, resample from the track's current generating function, or disappear entirely until a new word is played to the track.