

# Fragile Pulse: A Meditation App

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## Abstract

This paper presents *Fragile Pulse*, an (anti-)interactive work of electronic literature about the distracting nature of digital media. The calming text demands the reader’s silence and stillness; otherwise the text itself becomes distracted and anxious.

## Introduction

Contemporary digital media is reshaping the way our minds work, often in extremely dangerous ways. The internet—with its endless forking paths of links and constantly-updating feeds—is making our brains less content with and capable of linear attention (Carr 2011; Hayles 2007). It is both addictive (Young 1998) and a risk-factor for depression and anxiety (Woods and Scott 2016; Young and Rogers 1998). Still, a new wave of “self-care” and “mindfulness” apps have promised new ways of caring for one’s mental state. Headspace, Shine, and Calm provide users with features such as short guided meditations, daily inspirational quotes, and soothing music to promote sleep. Another app, Forest, “game-ifies” the mere act of not using one’s phone. Will our computers and smartphones save us from the problems they have caused?

“Fragile Pulse” is a work of electronic literature that confronts the viewer with this question by representing the tension between linear, “deep” attention and the skittering, impatient “hyper” attention encouraged by digital media (Hayles 2007).

## Fragile Pulse

*Fragile Pulse* presents the reader with a calming, human-authored, linear text, not unlike those that abound on mindfulness apps. Line-by-line, it pulses on the screen roughly at the speed of a relaxed breath. However, this meditative unfolding of text can be disrupted. The program monitors the viewer with a web-camera and microphone. Any sound or movement above certain thresholds will initiate one or more “distractions,” computer-generated deviations from the core text. Contrasting the calming pulse of the main text, these distractions vibrate and blink, drawing attention to themselves in a way that evokes pop-up advertisements. The more sound and movement the system detects, the more dis-

tractions clutter the screen. To re-initiate the main, meditative text, the reader must return to a state of silence and stillness; gradually the distractions will dissipate, allowing the main text to pulse onward. However, sounds will also litter the screen with permanent “ear” emoji, movements with “eye” emoji—a way of keeping score.

## Generating Distractions

The core of *Fragile Pulse* is a Natural Language Generation system. This system contains a series of functions that, given some input, produce a nonlinearly-related output, a textual representation of the distracted mind’s lines of flight.

For instance, given the line “You are eating a perfect blade of grass,” the system may target a word within this line (a noun, verb, or adjective) and then leap to an orthographically similar word in a large corpus (e.g. “glass,” or “perfect”). However, to echo the way that distracted thoughts can quickly spiral into anxious ones, the system does not choose them randomly. Rather, according to a principle of *Affective Filtering*, it is more likely to choose those that are semantically close to a negative word (such as “terrible” or “pain”) according to a vector-space model of language (Mikolov et al. 2013).<sup>1</sup> The principle of *Affective Filtering* applies to other functions that generate distractions. One function, given a target word, will wander to a semantically-related word according to that vector-space model, again prioritizing words that are close to certain negative terms. Other functions rely on semantic relations mined from a large number of Project Gutenberg texts using SpaCy’s dependency parser (Honnibal and Johnson 2015). Given a noun such as “wolf,” it will choose a transitive verb of which this noun is the subject according to (noun, verb) patterns mined from the corpus, prioritizing those verbs that that are close to “kill” or “hate” (e.g. “bite”).<sup>2</sup> This produces an anxious question such as “What if a wolf bites me?” Using (adjective, noun) pairs mined from this

<sup>1</sup>Cosine similarity between Google News vectors was used. See: <https://code.google.com/archive/p/word2vec/>

<sup>2</sup>Sometimes antonyms (e.g. “terrible” and “wonderful”) may be judged to be similar by this model; additional filtering omitted words that were closer to certain positive words than certain negative words. Likewise, semantic proximity between (noun, verb) and (adj, noun) pairs was used to emphasize related words.

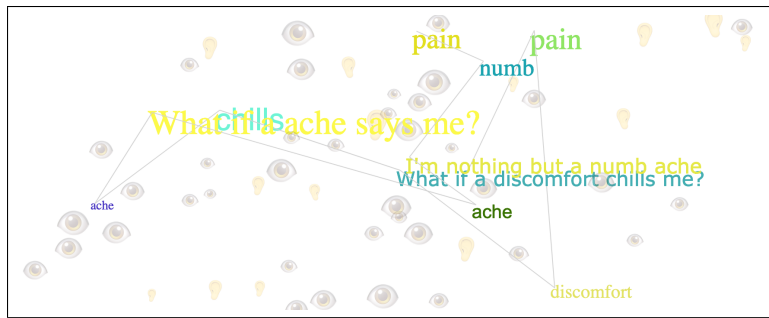


Figure 1: A fit/flight of distractions. Lines chart the semantic wandering. Eyes and ears document movement and sound.

corpus and prioritizing adjectives close to words like “terrible” and “useless,” another function produces self-critical statements like “I’m nothing but a stagnant lake.”

Other functions mimic anxious and distracted thinking while also adding linguistic variety. Using the Twitter API, for instance, one function returns a tweet that contains both the target word and one of a series of emoji that tend to signify sadness or anxiety. Another returns a statement of consumeristic desire extracted from Amazon product reviews (McAuley et al. 2015).

**Chains of Distraction** A key feature of the Natural Language Generation system is that the distraction functions can be arbitrarily chained together. When noise or movement disturbs the main text, the first distraction always takes as its point of departure whatever line of the main text was last pulsing on the screen. However, further distractions leap from the previous distraction, creating associative sequences meant to give the impression of a mind bouncing between thoughts as well as between moods. Disrupting the line “You are standing beneath a solemn moon...” may lead to a chain of distractions such as:

*solemn*  
*sorrowful*  
*I am nothing but a sorrowful foreboding.*  
*foreboding*  
*dreading*  
*I am already dreading work next week.*

### Anti-Interactivity

Computer-generated literature often takes the form of algorithms that operate autonomously. For instance, Nick Montfort’s *Taroko Gorge* (2009) slowly and perhaps meditatively generates a poem line by line, whether or not the reader is following along. Other works in this field are interactive. For example, Camille Utterback and Romy Achituv’s *Text Rain* (1999) requires the reader to become a kind of dancer, catching letters with their limbs as they cascade down a screen. This piece, *Fragile Pulse*, offers a different sort of relation between the reader and the text, a text that only becomes legible with some guarantee of the reader’s attention. Physical stillness and silence have traditionally facilitated

certain forms of highly-attentive reading as well as meditation. In this case, technologies of interactivity (e.g. motion sensing) are deployed only to goad the reader toward the kind of mindful consumption most threatened by digital media. It remains to the reader to decide whether to follow this direction or to “fail” (i.e. never progress through the main, meditative text). Indeed, they may decide that it is more fun to distract the system. But a choice must be made.

### References

- Carr, N. 2011. *The shallows: What the Internet is doing to our brains*. WW Norton & Company.
- Hayles, N. K. 2007. Hyper and deep attention: The generational divide in cognitive modes. *Profession* 2007(1):187–199.
- Honnibal, M., and Johnson, M. 2015. An improved non-monotonic transition system for dependency parsing. In *Proceedings of the 2015 Conference on Empirical Methods in Natural Language Processing*, 1373–1378. Lisbon, Portugal: Association for Computational Linguistics.
- McAuley, J.; Targett, C.; Shi, Q.; and Van Den Hengel, A. 2015. Image-based recommendations on styles and substitutes. In *Proceedings of the 38th International ACM SIGIR Conference on Research and Development in Information Retrieval*, 43–52. ACM.
- Mikolov, T.; Chen, K.; Corrado, G.; and Dean, J. 2013. Efficient estimation of word representations in vector space. *arXiv preprint arXiv:1301.3781*.
- Montfort, N. 2009. *Taroko gorge*. [nickm.com/taroko\\_gorge/](http://nickm.com/taroko_gorge/).
- Utterback, C., and Achituv, R. 1999. Text rain. *SIGGRAPH Electronic Art and Animation Catalog* 78.
- Woods, H. C., and Scott, H. 2016. #sleepyteens: Social media use in adolescence is associated with poor sleep quality, anxiety, depression and low self-esteem. *Journal of adolescence* 51:41–49.
- Young, K. S., and Rogers, R. C. 1998. The relationship between depression and internet addiction. *Cyberpsychology & behavior* 1(1):25–28.
- Young, K. S. 1998. Internet addiction: The emergence of a new clinical disorder. *Cyberpsychology & behavior* 1(3):237–244.