Automated Writing from Amanuenses to AI

A Graduate Course in the English Department at University of Pittsburgh to be offered AY 21-22
Sponsored by a grant from the Humanities Engage Summer Stipend for Curricular Innovation
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This course counts towards the Digital Studies and Methods certificate and the Composition Certificate. It might be of interest to students in Composition, Literature, Writing, Film and Media Studies, Communication, Linguistics, Education, Computer Science, Information Cultures and Data Stewardship.

Course description

We swim in a sea of writing, much of it written by algorithms rather than humans. Automated Writing Systems (AWS) that employ natural language processing techniques are currently used to amplify political messages on social media, to convey sports and financial statistics, to generate click-worthy headlines, as smartphone chatbots, and as creative writing aids. Automated essay scoring, search engine optimization, machine translation, and text processing techniques determine educational outcomes, popularity of websites, or help us to analyze unique features of documents or massive archives. Whether or not we use them ourselves, AWS are shaping the circulation of our writing and the environment in which we read.

The ability to use complex and sequential language, such as writing demonstrates, is an exclusively human activity. Yet people have pursued ways of automating this human capability for centuries--from mechanized automatons in the 18th century to twitterbots in the 21st. Language is an infinite system, but the translation of language into writing—especially print—discretizes it, suggesting that it may be possible to fully automate. English has 26 letters, spaces and punctuation: how hard could it be to write a system that uses those discrete inputs and writes for us?

Very hard, actually. Using massive datasets and parameters, contemporary AWS like GPT-3 produce passable prose. The comprehension rate for AWS-produced text jumps considerably as the genre narrows: earthquake and sport reports are solved problems. But bypassing the question of can we automate writing? (not really), let’s ask instead: why would we want to automate writing? What does it say about humans that we keep banging our heads on this mechanical, computational, philosophical problem of language?

Automated Writing is a historical and technical dive into why people have developed automated writing systems (AWS), what challenges AWS offer, and how to implement AWS using natural language processing and public data sets. The course brings gendered and racialized histories of office automation and amanuenses for the writing-down of narratives from enslaved people in conversation with contemporary questions in artificial intelligence such as whose intelligence is being simulated and how. We will explore: what writing is; power dynamics in writing; the limits of what computers can do; and the
relationship of human consciousness to computation. Hands-on work in AWS-related systems include basic programming; Tracery (using Javascript) and InferKit (using GPT-2); Twitterbots; Conway's game of life; the Leibniz cipher machine held by ULS. Assignments include reading histories of AWS, writing short blog posts analyzing different historical and contemporary AWS or their products, and playing with algorithms and datasets such as GPT-2 (an AWS that uses machine learning and which is publicly available in a scaled-down version). The final project for the course asks you to break the boundaries of the class: develop a unit to teach something you learned here in Pitt undergrad English courses like Composing Digital Media or Narrative and Technology; an online creative project using automated writing; a public art project; or a workshop you run for others and document. Through readings on algorithms and historical studies of writing automata such as the Maillardet Automaton, alongside learning how to use an AWS such as GPT-2, students will get both a theoretical and practical introduction to automated writing systems, contemporary writing and machine learning.

Learning goals
Students completing this course can expect to:
1. Consider questions of human identity and existence vis a vis the automata humans create for writing
2. Name several historical automata and their significance for their contemporary engineering, mathematical, scientific and philosophical contexts
3. Experience systems related to AWS that are mechanical or computational
4. Understand how machine learning in textual processing systems such as GPT-2 works using massive datasets and training on specific texts
5. Produce automated writing using systems such as Tracery or GPT-2
6. Translate automated writing systems into a public instantiation

Assessment
30% participation in class discussion (including “deep reading” days)
40% course blog writings and weekly exercises
30% final project

Because this is a grad course, this breakdown should be considered a rough guide rather than a mathematical certainty. Please talk with me if you have questions or concerns.

Class responsibilities
Blog writings and deep reading weeks: Please choose four weeks that look particularly interesting to you. Choose two of these weeks to write a ~500 word blog post on the readings, activities, or anything else connected to the theme of the week. For the other two weeks, you will read deeply. That is, you will ensure that you are a relative expert on the texts for the week; you will have interesting questions to pose to your peers; you will have thought about connections between texts, etc. You do not have to lead discussion for these weeks, but we will assume you'll be an especially active participant in it. The class will sign up for these weeks at the beginning of the term.

Final project: Your final project will take the practices or ideas of automated writing that you've wrestled with in the class out into the world in some way. Some possibilities: a community workshop or lesson plan for a K-12 setting, plus a reflection on this design; a textual public art installation and reflection; a research article that is on a path to journal submission; a website that includes multiple small texts or images or interactions related to automated writing. The format is flexible and we will discuss what might work for your specific interests and goals.
Schedule and texts

Each week of this course we’ll explore another facet of automated writing. As with most graduate classes, there is too much to contend with each week. I’ve listed the texts in order of my own priorities for the class. Yours may be different, and your time available each week will fluctuate. I ask that you do your best to contend with as much of the material as possible each week in order to be prepared for the week’s discussion.

You are not required to purchase any books for this course; all readings and texts are available online or through PittCat or will be excerpted and made available in Canvas.

1. Why do we automate writing?


"Computers just got a lot better at writing." Vox [featuring Janelle Shane] https://www.youtube.com/watch?v=gcHkxP9adiM

2. Natural Language Processing and Machine Learning


*Explore autocomplete in your email or phone, e.g.,* https://blog.google/products/search/how-google-autocomplete-works-search/

*Basic introduction to programming languages, especially Javascript and Python*

3. Professional applications of automated writing


*Begin to explore Tracery as a text generation program.*
4. Artificial Intelligence and writing

Buolamwini, Joy. "AI, Ain't I a Woman?" https://www.youtube.com/watch?v=HZxV9w2o0FM [about Buolamwini and her PhD project, Gender Shades.]


Penrose, Roger. "Consciousness is not a computation." Interview with Les Fridman. AI Podcast, Mar 2020. https://www.youtube.com/watch?v=hXgqik6HXc0

Lewis, Jason, et al. Indigenous Protocol and AI Working Group; position paper available here: http://www.indigenous-ai.net/ (“this document offers a range of ideas to take into consideration when entering into conversations which prioritize Indigenous perspectives in the development of artificial intelligence.”)

Work with https://inferkit.com/ (formerly Talk to Transformer, an interface that lets you access GPT-2 text generation)
A little more Tracery.

5. Mechanical Automata and the Clockwork Universe

"CBS Sunday - Lost art of Automatons alive again" 29 Jan 2012. YouTube: https://www.youtube.com/watch?v=C7oSFNK1laM [on the Maillardet Automaton]


Muller, Derek. "This equation will change how you see the world (the logistic map)," 29 Jan 2020. Veritasium, https://www.youtube.com/watch?v=ovJcsL7vyrk [on chaos theory, the Mandelbrot Set, what's possible to predict]


Field trip for Leibniz cipher machine at Hillman Library; Play with Conway's Game of Life and discuss cellular automata.

6. Amanuenses

Melville, Herman. "Bartleby the Scrivener: A Story of Wall-Street." [read on Project Gutenberg]


**Autotranscribe or autocaption a video or text using Google Meet, Google slides or a site such as https://scribie.com/ or https://www.rev.com/automated-transcription. How accurate is it? What does it miss?**

### 7. Writing technologies and the (gendered) division of labor


Allen, Ben. "From Bartleby to Scrivener to iOS." Public Books. https://www.publicbooks.org/from-bartleby-to-scrivener-for-ios/ [once feminized, typing is now a required skill for all office labor]


#thanksfortyping project https://www.npr.org/2017/03/30/521931310/-thanksfortyping-spotlights-unnamed-women-in-literary-acknowledgements [Women, invisible labor and automation]

Visit an after-school site or discuss with K-12 teachers what tech workshops look like. Example: Digital Storygame Project, led by Mike Sell at IUP; Assemble PGH; Pittsburgh Children’s Museum MuseumLab.

### 8. Processing writing


Adal, Raja. *The Japanese Typewriter* [work in progress; how it breaks up the labor of writing, along gender lines from conceptual content of the letter to typing].

Flusser, Vilem: “The Gesture of Writing” [typewritten manuscript version, available here; read the published version (p 19-27) if the manuscript can’t work for you].

Dive into GPT-2 following directions.

### 9. Automating writing procedures


Write code or pseudocode algorithm for generating a genre you know well [example: a conference paper title generator I wrote circa 2009]

10. Automating creativity

Borges, Jorge Luis. "The Garden of Forking Paths," Ficciones, 1941. [online here; read more at the Pitt Borges Center or The Garden of Forking Paths site ]


Get creative with GPT-2 or Tracery! A suggestion: work with recipes from Shane's blog https://aiweirdness.com/.
Play with The Conditional Design Workbook.

11. Computational poetry

Explore the work of computational/experimental poets. Suggested poets and works are listed.
OBX Labs, http://www.obxlabs.net/
Harryette Mullen, https://poets.org/poems/harryette-mullen
Lilliane-Yvonne Bertram, https://www.lillianyvonnebertram.com/ , especially Travesty Generator
Nick Montfort, https://nickm.com/

Discussion of final projects: Think about how you want to shape automated writing in the world.

12. Bots among us


*Keep a log of your online writing interactions for a day: Where do you see bots and why does it matter? 1-2 page description of final project proposal due*

### 13. Automated reading


*Have some of your text read by https://www.paperrater.com/ or https://www.ets.org/erater/about or https://dxrgroup.com/scoreitnow or Turnitin. What is it looking for? Can you game the system like the BABEL generator does?*

*Further discussion of final projects*

### 14. Final project sharing & celebration

*Final projects due finals week.*

### Further reading


Hayles, Chapters 1 & 2, My Mother was a Computer, pp 15-61.

Kearns and Roth, The Ethical Algorithm, Oxford University Press, 2019.


Read basic background on language theory from J.L. Austin, John Searle, Ferdinand de Saussure, Shannon/Weaver if you don't already know that background; see me if so.