

Researchers develop a method to identify computer-generated text

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Credit: Petr Kratochvil/public domain

In a world of Deep Fakes and far too human natural language AI, researchers at the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS) and IBM Research asked: Is there a better way to help people detect AI-generated text?

That question led Sebastian Gehrmann, a Ph.D. candidate at SEAS, and Hendrik Strobelt, a researcher at IBM, to develop a [statistical method](#), along with an [open access interactive tool](#), to detect AI-generated text.

Natural-language generators are trained on tens of millions of online texts and mimic [human language](#) by predicting the words that most often come after one another. For example, the words "have" "am" and "was" are statically most likely to come after the word "I."

Using that idea, Gehrmann and Strobelt developed a method that, rather than identify errors in text, identifies text that is too predictable.

"The idea we had is that as models get better and

better, they go from definitely worse than humans, which is detectable, to as good as or better than humans, which may be hard to detect with conventional approaches," said Gehrmann.

"Before, you could tell by all the mistakes that text was machine-generated," said Strobelt. "Now, it's no longer the mistakes but rather the use of highly probable (and somewhat boring) words that call out machine-generated text. With this tool, humans and AI can work together to detect fake text."

Gehrmann and Strobelt will present their research, which was co-authored by Alexander Rush, Associate in Computer Science at SEAS, at the Association for Computational Linguistics (ACL) conference on July 28th—Aug 2nd.

Gehrmann and Strobelt's method, known as GLTR, is based on a model trained on 45 million texts from websites—the public version of the OpenAI model, GPT-2. Because it uses GPT-2 to detect generated text, GLTR works best against GPT-2, but also does well against other models.

Here's how it works:

If you feed a passage of text into the tool, it highlights the text in green, yellow, red or purple, each color signifying the predictability of the word in the context of the word before it. Green means the word was very predictable, yellow, moderately predictable, red not very predictable and purple means the model wouldn't have predicted the word at all.

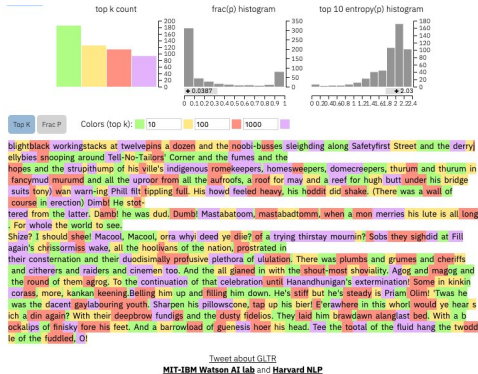
So a paragraph of text generated by GPT-2 will look like this:



I've been a gamer for over ten years. During that time, I've been involved in a number of games, and I've seen very few of them in the history of the company. My first foray into this was as a member of the U.S. Army. I played some of the games I liked from the early 1980s through the early 1990s, but my first foray into the hobby was at the beginning of 2000 when I was stationed in Afghanistan. After I got back to my hometown and went to school, I started playing games. I began playing multiplayer games, which was a very popular form of gaming. One of the games I started playing was the first-person shooter "The Wolf Among Us" which is still the best-selling title of all time.

I was at the beginning of the game development process. I had already seen a few demos of the game. I was also very interested in the multiplayer aspects of the game, and I wanted to see what the players would do in the game. In the beginning, I didn't know about multiplayer. I thought it would be cool to have some sort of "party game" with some kind of "game mode" which would give the player a real advantage. But as time went on, I realized that there were a lot of different things I wanted to create. To make it fun for the player, the multiplayer component was added. I started playing the game as a member of the U.S. Army. When I returned to my hometown, I found myself in the middle of a war with a group of Taliban soldiers. I was killed by one of the Taliban and I was the only casualty. I decided to take a look at multiplayer. I took the chance to have some fun with the multiplayer. I was in a place that was pretty hostile to the Taliban, and I decided that I wanted to make it fun for the player.

The game was designed to be a good way of showing off combat experience. It was supposed to be a combat-focused game, and I wanted to show off how well the players could play. The multiplayer was designed to be a nice way to show off that. The game is a multiplayer game, and the game is designed to be a fun and interesting multiplayer game.



blightblack workingstacks at twelvepins a dozen and the noobi-busses sleighing along Safetyfirst Street and the derry elybies snooping around Tell-No-Talors Corner and the fumes and the hopes and the strupthump of his liver's indigenous tomkeepers, homesweepers, domecreepers, thurum and thurum in fancy mud murumid and all the uproar from all the aufroofs, a roof for may and a reef for hugh butt under his bridge suits tony lean warning Phil fit tpping full. His howd feeted heavy, his hoddid did shake. (There was a wall of course in erection) Dimbi! He stait terred from the latter, Dumb! Mastabatoon, mastabactomm, when a mon merries his lute is all long. For whole the world to see. Shize? I should shiel Macool, Macool, ora why deed ye die? of a trying thirstay mourin? Sols they sghdid at Fill again's chipsoomig woks, all the hoolians of the nation, gretiated in their consternation and their duodisimally profusive plethora of dilulation. There was plumbs and grunes and cheerifs and citherrers and raiders and cinemen too. And the all ginned in with the shout most shoviality. Agog and magog and the rooid of them allgrop. To the continuation of that celebration until Hananahungian's extermination! Some in kinkki corass, more, kankan keening. Belling him up and filling him down. He's stiff but he's steady is Priam Oim! Twas he was the dacent gaylabouring youth. Sharpen his pillowswone, tap up his bier! Erarwhere in this whorl would ye hear s ch a din again? With their deepbroke fundigs and the dusty 46666s. They ladd him brawdawn alongast bed. With a b sickle of frisky fore his feet, And a barrowload of gueness hoer his head. Tee the loral of the fluid hang the twis le of the fuddled. O!



Credit: Harvard University

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To compare, this is a real *New York Times* article:



MONEY, Miss. — Along the edge of Money Road, across from the railroad tracks, an old grocery store rots. In August 1955, a 14-year-old black boy visiting from Chicago walked in to buy candy. After being accused of whistling at the white woman behind the counter, he was later kidnapped, tortured, lynched and dumped in the Tallahatchie River.

The murder of Emmett Till is remembered as one of the most hideous, hate crimes of the 20th century, a brutal episode in American history that helped kindle the civil rights movement. And the place where it all began, Bryant's Grocery & Meat Market, is still standing. Barely.

Today, the store is crumbling, roofless and covered in vines. On several occasions, preservationists, politicians and business leaders — even the State of Mississippi — have tried to save its remaining four walls. But no consensus has been reached.

Some residents in the area have looked on the store as a stain on the community that should be razed and forgotten. Others have said it should be restored as a tribute to Emmett and a reminder of the hate that took his life. As the debate has played out over the decades, the store has continued to deteriorate and collapse, even amid frequent cultural and racial reckonings across the nation on the fate of Confederate monuments. At stake in Money and other communities across the country is the question of how Americans choose to acknowledge the country's past.

"It's part of this bigger story, part of a history that we can learn from," said the Rev. Wheeler Parker, 79, a pastor in suburban Chicago and a cousin of Emmett's who went with him to Bryant's Grocery that day. "The store should be one of the places we share Emmett's story."



The method isn't meant to replace humans in identifying fake texts but rather to support human intuition and understanding. The researchers tested the model with a group of undergraduates in a SEAS Computer Science class.

Without the model, the students could identify about 50 percent of AI-generated text. With the color overlay, the students were able to identify 72 percent.

Gehrmann and Strobel say that with a little training and experience with the program, the number could improve even further.

"Our goal is to create human and AI collaboration systems," said Gehrmann. "This research is targeted at giving humans more information so that they can make an informed decision about what's real and what's fake."

Credit: Harvard University

Provided by Harvard University

And this is an excerpt from arguably the most unpredictable human text ever written, James Joyce's *Finnegans Wake*:

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