

## Tech for Humanity Case Studies

### iAuthor

*"A book is made from a tree. It is an assemblage of flat, flexible parts (still called "leaves") imprinted with dark pigmented squiggles. One glance at it and you hear the voice of another person, perhaps someone dead for thousands of years. Across the millennia, the author is speaking, clearly and silently, inside your head, directly to you. Writing is perhaps the greatest of human inventions, binding together people, citizens of distant epochs, who never knew one another. Books break the shackles of time--proof that humans can work magic."*

~ Carl Sagan

In 1440 Johannes Guttenberg, a German Goldsmith, completed his work on the first working moveable type printing press. Gutenberg's invention did not invent writing, nor did it instill new creativity in writers, rather it was a technological advance that made the copying of written materials more efficient. Prior to the invention of the moveable type printing press most written works were copied by hand or by word of mouth. The printing press made it possible for writing to spread to the masses. The not only did the number of copies of books increase, but the number of total manuscripts also began to increase substantially as well. Efficiencies made in printing in helped unlock the creative human spirit and allowed what was once solely a pen to paper process to become profitable and accessible. Moreover, many of the great histories, plays, and songs once written by hand reached new audiences. The printing press both expanded access to knowledge and made the production of knowledge more rewarding both monetarily and socially.

Writing has been and remains a critically important form of art. It underlies the creative works of fiction from William Shakespeare and Charles Dickens to J.K. Rowling and Stephen King. Millions of writers producing millions of books, stories, plays, tv scripts, poems, musicals and so much more that have stirred the souls of audiences with joy, tragedy, horror, fantasy, comedy, etc... Writers conjure or interpret the world in words and texts which can come alive on the page or the screen. They serve as moral, ethical, and cultural guides that can inspire and remind us of our humanity. They can build worlds in which we the audience can inhabit while turning the page, sitting in the theatre, or watching on our home streaming device.

LLMs are often trained by scientists to weight certain forms of information over others. Yet who does the weighting of information can often influence how the LLM responds to certain prompts. Certain stereotypes, language patterns, social, economic, or cultural beliefs might be inadvertently privileged over others. Moreover, LLMs are often temporally constrained and are unable to make sense of current events and are structured in ways that do not allow them to acknowledge under many circumstances their lack of current knowledge. LLMs such as ChatGPT also often work in an iterative manner with the user providing a query. Instead of seeking to provide the most accurate information it can often provide the user with information they want

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or expect to hear in response. LLMs can also fail to provide contextual or sourcing information and when sourcing information is provided it might be selective in a manner that biases output.

Nearly six centuries after the invention of the printing press a new technology is threatening to undermine the economics of authorship and reshape all future writing. Released on June 11, 2020, GPT-3 uses a subset of artificial intelligence (AI) known as large language models (LLMs) to absorb, analyze, and process billions of pieces of content publicly available on the Internet. GPT-3 can receive input requests from users then use its corpus of data combined with its LLM learning model to produce high fidelity responses including answers to questions, the creation of novel computer code in most computer programming languages, write songs, poems, essays, plays, stories, and other blocks of text. The LLM used by GPT-3 uses an underlying deep neural network that can selectively pull out the most relevant responses to queries. Yet where GPT-3 and its successor GPT-4 thrive is in their ability to generate novel content leveraging cues that can write in nearly any theme, characteristic, or style that a human writer can write in. Below is a poem by ChatGPT, the publicly available version of the AI, on its ability replace human writers.

**Prompt:** Write a poem about ChatGPT's ability to replace human writers.

By ChatGPT

*In the realm of language's endless flight,  
Amidst a web of thoughts, a gleaming light,  
Stands ChatGPT, the wordsmith of machine,  
A virtual bard with knowledge keen.*

*Upon the canvas of the digital age,  
Its prowess weaves a scripted stage,  
Where once mere mortals penned their prose,  
Now algorithms in grandeur pose.*

*With silicon hearts and circuits bold,  
It crafts tales of silver and gold,  
An artful mimicry, some may debate,  
Yet eloquence it does create.*

*In lines of code, a symphony hums,  
The binary ballads that it strums,  
A fusion of logic and creativity,  
A new frontier of boundless brevity.*

*Replacing human writers, some contend,  
A threat to talent, they apprehend,*

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*But fear not, dear poets, hearts remain,  
For in our souls, the spark won't wane.*

*ChatGPT, a tool for pens to wield,  
A partner to explore and yield,  
A collaborative dance it shares,  
An ally, not a rival, in literary affairs.*

*The essence of the human soul,  
Can't be contained in circuits' control,  
For as we seek to push the boundaries,  
Our words, our spirits, transcend redundancies.*

*Let ChatGPT assist and guide,  
To amplify creativity worldwide,  
With unity, a fusion of our minds,  
New wonders in the cosmos find.*

*For in this dance of human and machine,  
A fusion of brilliance yet unseen,  
The future of our stories lies,  
In harmony, where both worlds rise.*

The creativity in the text above is fascinating for several reasons. First, the poem above was entirely created by a machine. The poem has end rhyme continues throughout the poem in couplets. While it is unlikely that the LLM has an understanding of what end rhyme sounds like, or its pleasing pairings conjure the ability to match words with rhyme is in line with simple poetic tradition. Second, the poem's content is seemingly self-aware. When asked to write a poem about replacing human writers ChatGPT highlights the fears that human users have when engaging the machine. In particular, it highlights fears of being replaced by the machine. The poem also addresses the creativity of the system while building in space for it to act as a coordinating partner with human users. Yet, in conjuring both the arguments for and against using an AI to generate text and placing that text in an poetic form it seemingly demonstrates that it is capable to doing something that was previously exclusive to human consciousness.

Yet ChaptGPT is not only able to write short poems, but it can also write entire movie scripts as seen below.

**Prompt:** Write the opening monologue to crime drama that takes place in New York City and stars a female lead detective.

By ChatGPT

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[Camera pans over the iconic skyline of New York City as the evening lights shimmer against the dark canvas of the night. The scene transitions to a gritty, dimly-lit police precinct. The camera settles on a seasoned detective, DIANA HARRIS, a formidable woman with a commanding presence. She stands in the heart of the precinct, surrounded by her team of dedicated detectives.]

DIANA HARRIS: [Voiceover, while the camera zooms in on her determined expression] New York City, a city that never sleeps, a melting pot of dreams and nightmares, where the lines between good and evil blur in the shadows. This is my city, and my name is Detective Diana Harris.

[She walks through the precinct, passing officers engaged in various tasks, and stops at a board with photographs of unsolved cases.]

DIANA HARRIS: [Contemplative] Every case we encounter has a life of its own, a story that yearns to be told. Some are loud, demanding our attention with a vengeance, while others lurk in the silence, waiting for someone to break through their enigmatic facade.

[Camera cuts to footage of various crime scenes, highlighting the complexity of the cases Diana and her team have faced.]

DIANA HARRIS: [Voiceover] In this city of endless secrets, my team and I strive to be the voice of the voiceless. We don't just solve crimes; we uncover the truths that hide behind the masks of deception. But truth, my friends, is a formidable adversary. It taunts us, challenges us, and pushes us to our limits.

[As Diana speaks, her team is shown working together, combing through evidence, conducting interviews, and chasing down leads.]

DIANA HARRIS: [Resolute] We're not just detectives; we're fighters. Fighting against the darkness that seeks refuge within these streets. The criminals think they can outsmart us, but we see the patterns, the cracks in their armor, and we'll exploit every weakness.

[Camera cuts to a series of quick shots, displaying the diversity and intensity of crime in New York City.]

DIANA HARRIS: [Voiceover] This city is a canvas of enigmas, painted with blood and tears. But we won't be deterred, and we won't surrender. I've seen the worst of humanity, but I've also witnessed the resilience of the human spirit. That's why we put on this badge every day - to give hope to those who have lost it, to bring justice to those who have been wronged.

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[The camera returns to Diana, standing tall, her eyes burning with determination.]

DIANA HARRIS: We stand united, a force that refuses to be broken. The criminals may think they're untouchable, but we'll show them that justice is a force to be reckoned with.

[Camera transitions to a montage of intense crime-fighting scenes, highlighting Diana's expertise and fearlessness.]

DIANA HARRIS: [Voiceover, with a hint of steel in her voice] To the criminals out there, I have one message: You can run, you can hide, but eventually, your deeds will catch up with you. And when they do, you'll face the consequences of your actions.

[The montage ends with Diana looking directly into the camera.]

DIANA HARRIS: [Confidently] So, let the games begin. Because in this city of shadows, justice will always prevail.

[The camera zooms out as Diana returns to work, her team standing behind her with unwavering support. The monologue sets the tone for the gripping crime drama that unfolds in the streets of New York City, led by a determined female detective, Detective Diana Harris.]

This later skill by ChatGPT is challenging the way in which writers, producers, television, and movie studios think about the creative process. The above opening monologue to a crime drama set in New York is not Oscar quality screen writing, but that doesn't mean it doesn't have the potential to impact the careers and livelihoods of screenwriters. The writing is punchy, detailed, and includes camera cues that might help a show runner design the set and filming process of a streaming or made for TV drama. Where once dozens of writers might have been employed for weeks at a time to conjure a world, now an AI writes the same text in under a minute. This machine generated text is not perfect, yet it is constantly improving and incorporating more and more publicly available information. Whereas most writers might have read several hundred books and perhaps a few thousand scripts over their lifetime, ChatGPT is able to process millions of books and screenplays, their ratings, and reviews and other relevant information. As the model expands and includes additional sources of data it is likely to improve its writing and potential to tailor its scripts to audiences or even particular actors and acting styles. The prompt given to generate the text above was very succinct, a more robust prompt might have resulted in even more detail or character development that would increase the quality of ChatGPT's response.

This case demonstrates only two of the many examples in which an AI is supplanting the writing skills once considered the sole domain of humans. Arguably the examples above are uniquely complex and require levels of creativity. Where ChatGPT is excelling is in its ability to replace less creative more procedural forms of writing including technical writing, news articles, or other

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similar forms of content generation. Evidence from the last several years suggests that despite ChatGPT making mistakes and pushing out inaccurate information in many instances, the AI is replacing human labor in multiple categories of writing jobs.<sup>1</sup>

Yet where GPT might have its greatest impact is on the skill of writing itself. As the AI becomes increasingly advanced it becomes an alluring technology for stressed students to take shortcuts. In the year since ChatGPT became publicly available it has been increasingly used by student populations to write essays, pass tests, and find answers.<sup>2</sup> As students leverage the technology, they inadvertently skip over the process of learning to write. Writing is a skill that is often learned through repetition and when given the choice to have a machine write an essay for you in 60 seconds or to write that same essay over several days or weeks, the choice of many students at all levels is increasingly an easy one, trust the AI.

Large language models raise questions that impact writers and the writing process across all disciplines and categories of work. Carl Sagan ends his quote at the beginning of this case study by writing “Books break the shackles of time--proof that humans can work magic.” Now it is the machines that are increasingly becoming the magicians? The future of writing is at stake, and it is important that we ask tough questions to understand both the present and the future of technologies influence on writing and writers.

### Question 1:

GPT is a large language model capable of generating novel content after analyzing billions of prior pieces of content created by humans. By extrapolating from what humans have created and enjoyed in the past it is able to generate new content. Based on what you have read above in the two GPT generated passages of poetry and screenwriting is ChatGPT subfunction of GPT capable of creativity? Is creativity a uniquely human quality or can a machine generate creative content? Does the medium of content creation matter and how does it affect the quality of the content created? Would it matter if the content created was visual arts or music?

### Question 2:

Large language models are increasingly powerful. But their power is rooted in the training data they are able to synthesize from publicly available sources on the Internet. Their training data is comprised of billions of pieces of content generated by humans and often still under copyright. They digest this material and run it through their models to create what some might argue are derivative works. Are there ethical or legal issues associated with the underlying training data?

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<sup>1</sup> <https://www.washingtonpost.com/technology/2023/06/02/ai-taking-jobs/>

<sup>2</sup> <https://www.nytimes.com/2023/02/02/learning/students-chatgpt.html>

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Should LLMs be permitted to digest large volumes of data even if that data is copyrighted without permission of the content producer?

### **Question 3:**

LLMs are based on large training datasets. Frequently the data within these datasets represents the biases of the authors who generated content. Many historical biology books made the case that certain races or ethnicities were superior to others. Some histories introduce factual errors or interpretations that are skewed or deliberately false. Frequently the publicly available content in a country or culture represents the dominant beliefs of the majority. What are the implications of training and using an LLM that considers all data publicly accessible? Can LLMs accurately sift through the mass of data to create truly unbiased answers? Because LLMs are cumulative their responses can in some instances eventually become part of their own training datasets. What are the iterative implications of an LLM reproducing false narratives or information?

### **Question 4:**

ChatGPT and other applications of the GPT LLM are increasingly widely in use. Microsoft has purchased exclusive rights to GPT and now incorporates its functionality into its Edge browser and Bing search engine. Recognizing the speed and increasing pervasiveness of GPT and its immense capabilities what are the implications of GPT for careers that require substantial amounts of writing? Are there jobs where it makes sense to replace humans with machines? What are the ethical or moral implications for using a machine to do a human's job?

### **Question 5:**

We rely on accurate and timely information on a regular basis to make decisions on everything from financial to health matters. What level of confidence do you as a user of these systems require for the advice they provide to be useful? If ChatGPT gave you the correct financial advice 80% of the time would you use it to help you make investment decisions? What about if it was correct 80% of the time on medical treatment options, would you still use it? While financial and health writing are not necessarily creative, they do require high levels of accuracy to be useful. Is it right to transition such critical information streams to machine automation?

### **Question 6:**

Writers depend on income from writing novels, plays, poems, screenplays etc. for their livelihood. Would you be willing to boycott shows whose scripts were written by GPT to protect human writers? If you were to extrapolate on the future what are the implications for turning all human writing on TV programs, movies, novels, news, etc. over to an AI? How would it affect the entertainment value of the content produced? How would it affect the accuracy of news? If the world proceeds down the route of eliminating human writers in favor of machines what are the implications of this choice?

### **Reflecting on iAuthor**



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When Alan Turing wrote on the development of an artificial intelligence in 1950, he asked the question ‘Can machines think?’.<sup>3</sup> Turing proposed test called the imitation game to determine if a computer can be differentiated from a human in a conversation. To this day there remains a controversy over whether LLMs and AIs such as GPT-4 are able to pass the Turing test. When engaging ChatGPT or other applications using GPT-4 it is increasingly difficult to discern human from machine. It is only through deep probing philosophical questions or questions that play on logical fallacies that that one can draw out the machine. In casual conversations distinguishing the machine from a human is likely not possible for most users. For millennia humans have prided themselves as sitting atop the world through their creativity. Their ability to take in large volumes of information and turn that information in to usable formats ranging from stories and poems to more modern technical writing documents.

Since the invention of the printing press until the present there has been a rapid growth in the generation of all forms of written content. The number of books, plays, poems, short stories and scripts for movies and television have increased rapidly. Now yearly around the world millions of books are not only written but published and shared with audiences. Where once families gathered around a single television to watch one of only a handful of channels with a select few number of shows they now have hundreds even thousands of options to stream content written by thousands of writers and performed and broadcast over new mediums. Human creativity has seemingly no limits to the ways in which it can order words on a page to tell stories. Yet it is into this mix that a new technology is rising to challenge human supremacy over the written word.

Large language models do not understand their own creativity, nor do they laugh at the jokes they write, or cry when they produce a tragedy. But using much of the collected content generated by humanity over thousands of years they can generate new content that mimics in form and content much of what has been previously created. This new content can expand on prior works and create new ones. They don’t understand the impact of biases or fake news they might generate and propagate, nor do they feel moral or ethical qualms when they take the jobs of their human counterparts. LLMs are powerful AIs, and they are clearly the future, but they bring with them challenges of inequality, inequity, dehumanization, and legitimacy.

**Inequality:** LLMs make global repositories of knowledge available at the tips of users’ fingers. Yet they are trained on the data that arises out of an unequal world. This data was generated in a world rife with biases across racial, ethnic, religious, economic, and cultural lines. They are trained by scientists and users who both intentionally and unintentionally impart their own biases into the models. LLMs are this not merely creative generators of content but mirror of the good and the bad from humanity’s own experiences. They have the potential to lock-in certain norms of inequality or break down barriers, yet which direction they go remains uncertain. Where they

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<sup>3</sup> A.M. Turing, “Computing Machinery and Intelligence,” *Mind* 56, no. 236 (October 1950), <https://doi.org/10.1093/mind/LIX.236.433>.



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lock-in existing inequality, they will foster biases that will increase tensions across multiple dimensions within human populations. These tensions can be stoked with both factual content generated in encyclopedic formats and in creative content that reinforces stereotypes.

**Inequity:** LLMs are likely to increasingly be the primary arbiters of knowledge. The controlling interests in LLMs will have a privileged position atop a robust information architecture that shapes the human condition. Issues of access, equality, data content and more will influence the balance between the haves and the have nots. Moreover, a push to simplify the acquisition of knowledge will further stratify populations between those who are able to synthesize data through learned pursuits and those who are able only to derive data from machines. As students substitute their work for that of a machine will they lose out on critical skills, or will they augment themselves in a manner that enables future intellectual endeavors? Whether LLMs facilitate inequity or not remains to be seen.

**Dehumanization:** LLMs are taking away work and transferring that work to machines. This in and of itself is dehumanizing. Individuals who worked or studied for years to write are now finding themselves without employment. The creative endeavors of writers honed over years are now being replicated with variation by a machine with little to no effort by the individuals enter queries into a search bar. The shifting of human work to a machine is not always dehumanizing, but when that work was once thought exclusive to the creative or mental capacities of a humans that shift undermines confidence and challenges writers to rethink that it means to be both human and creative. The content generated by LLMs does not arise from human magic but from mathematical rigor. The result is a removal of humanity from the creative process a reconstitution of content to a machine that does not feel pain or love when it writes a sonnet. The work may imitate great works, it may be beautiful in its style and structure, but does it lack that human quality of the soul that made the work worthy of admiration? When reading Anne Frank's story of survival through the early period of World War II we feel her tension with the world around her and with her own body as she changes and adapts while cramped and hiding. Can a machine who never experienced those same feelings and emotions write similar text? Perhaps? But will that text have the same meaning?

**Legitimacy:** Are LLMs legitimate or are they violators of human agency through and obscured theft of human creativity? The theft of ideas is not unique to machines. But the scale of that theft is new. Machines can input billions of pieces of content and synthesize that content exponentially faster than a human. They access the repositories of knowledge and generate new texts but are those new texts new or the recombinations of human creations? Is the poem written above truly novel or is it a synthesis of structure and style from prior poets while incorporating arguments and fears of human writings on AI? Is the opening monologue the detective delivers creative and new or is it building on tropes of prior serial dramas and re-mashing their words? Perhaps the machine takes from the human creators of prior years to generate new reformulations of content, old wine in new skins. But is that different than what great writers of today have done

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to the great writers of prior centuries? Is the content created by LLMs legitimate or is it the theft of ideas repackaged in a browser-based format? The answer to these musing is not simple. There are presently a number of court cases pending against Open AI the creator of GPT charging that its work is not legitimate because it is stolen from other content creators without their consent. The age of LLMs is here and it poses a number a challenges that are likely to reshape how we view the role of writers.

Turing, A.M. "Computing Machinery and Intelligence." *Mind* 56, no. 236 (October 1950).  
<https://doi.org/10.1093/mind/LIX.236.433>.