Plagiarism and AI Detection Software and the Future of Academic Integrity

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Abstract

*****“This essay explores the educational impact of generative AI, drawing parallels with challenges posed by the Internet. It examines Plagiarism Detection Software's development and methodology, highlighting its role in maintaining academic integrity. The narrative then delves into the implications of generative AI on education, emphasizing concerns about misinformation and AI detection program limitations. It concludes by proposing solutions such as digital watermarking and underscores the need for educators to adapt pedagogy and academic integrity standards in the face of evolving technology. The overarching theme centers on the necessity of thoughtful integration of generative AI, ushering in a cultural shift in education.” (ChatGPT 2023).

Keywords: Generative AI, Plagiarism Detection Software, Academic Integrity, Digital Watermarking

*****Abstract provided by ChatGPT Open AI, after prompting it to “Write an abstract in 5 sentence for the following paper, ‘

Introduction

With the quick rise in generative Artificial Intelligence (AI), Educators and Administrators once again have to face a disruptive technology that will impact the landscape of education. Much like the introduction of the internet, educational institutions have to scramble and adapt in order to both maintain the integrity of student's work and make sure students are prepared to utilize this new technology. With the large technological breakthroughs, eventually someone develops proper technology and regulations that help people adjust and use technology, like the Internet and AI, responsibly. In regards to the internet, the introduction of Plagiarism Detection Software allowed students to utilize the internet responsibly and freely. Altogether this paper will examine the development and methodology of Plagiarism Detection Software and explore how it shares similarities with the development of Generative AI Detection Software. And ultimately, it will look at how Generative AI will create a cultural shift regarding academic integrity and the expectations of educators.

Intro to Plagiarism Detection Software

Plagiarism software was born in reaction to the introduction of the Internet. Everyone, including students, had access to thousands, and eventually millions, of sources with no way of tracking what students were accessing. According to Chris Anson and Otto Kruse's article, "Plagiarism Detection and Intertextuality Software," educators feared, with reason, that students would copy and paste information from a website and pass it off as their own. On top of this, checking the accuracy of the information and lack of fact-checking impacted the quality of students' work and ill-legitimized students' research.

Due to these issues, Plagiarism Detection Software started becoming widely available. These programs were made to cross reference students' works with other people in their classes,

as well as, cross reference them with online sources. The most popular program today is Turnitin.com. Grammarly, Scribbr, and Google Ed Checker are also used fairly frequently here in the US. Softwares like Turnitin, use this cross referencing to detect similarities and assign specific percentages between these similarities (Turnitin.com, 2023). They simply detect whether or not texts match each other, Anson et al. notes, "[that] the alternative terms 'text-matching software' or 'software supporting plagiarism detection,' would be a better fit." (Anson, et. a.. 2023). Of course it is up to the educator or review board to read and interpret these results. Of course, plagiarism detection programs aren't solely punitive, Anson et al. uses Grammarly as an example of using plagiarism detection as a writing assistant. [Grammarly] "offers a plagiarism checker for writers with a much gentler assumption about the reasons of copying from other papers than the usual plagiarism definitions suggest" (Anson et. al. 2023).

All in all, these programs were incredibly helpful for educators. Firstly they saved them time checking students' work for plagiarism. These programs were made to cross reference students' works between one another, as well as, cross-reference a piece of work with online sources. And secondly, these programs offered quantifiable data regarding similarities. Programs like Turnitin.com gave educators "objective" reports that they could use for justification regarding accusations of plagiarism.

Methodology of Plagiarism Detection Software

Examining how Plagiarism detection softwares works, "A Review on Plagiarism Detection Tools" by Landge, Ramesh, et al. gives an in depth look at types of plagiarism and how it is detected by popular programs. Lange et. al. explains that there are nine types of plagiarism: Copy & Paste, Disguised Plagiarism, Plagiarism by Translation, Shake & Paste, Structural Plagiarism, Mosaic Plagiarism, Metaphorical Plagiarism, Idea Plagiarism, and

Self-Plagiarism. Most of these types of plagiarism aren't word or word replications, rather the writer is stealing the structure, verbage, essence, or idea of another work. This makes text matching fairly complicated.

Landge et al. explains the two types of Detection Methods. First is External Plagiarism Detection which detects a document's contents with external sources that would be publicly available. For this type of method, the software is detecting similarity in regards to grammar, semantics, identifying citation based plagiarism, or translated passages. It also examines certain words or phrases throughout the text that might be present in an external source, (Lange et. al. 2015). The second type of method is the Intrinsic Detection Method which identifies plagiarism among "grammar-semantics hybrid" (paraphrasing), structure, and syntax (Lange et. al. 2015). This type of detection looks more at the bones of a source rather than the content.

AI Plagiarism Detection

As new disruptive technologies hit the market, educational institutions have had to quickly adapt to an ever-changing environment. Generative AI is a type of artificial intelligence technology that can produce various types of content, including text, imagery, audio and synthetic data (Lawton, 2023). Generative AI is able to create unique images and writing samples in a near infinite variety of genres and writing styles. Obviously, this has caused an incredible concern regarding misinformation, security, and, of course, cheating and plagiarism. Educational institutions have turned to plagiarism detection software but unfortunately there are short-comings to the AI detection programs that are being introduced. Regardless, Generative AI will require major adaptations to plagiarism detection in order to have thoughtful AI integration into education.

There are several issues when looking at how anti-plagiarism software tackles detecting generative AI usage in documents that it is assessing. As discussed before the typical model of these programs are to assess similarities between the text in a document and texts found online. This is incredibly different from assessing whether or not text was created by generative AI. Turnitin.com boasts its AI detection software. Turnitin explains, it has to examine if a text seems to be following set syntax and diction patterns. It then makes a judgment call on whether it wants to assign those patterns as AI produced or not (AI Writing Detection Capabilities, 2023). For those using AI detection programs like Turnitin, they receive data that shows the "likelihood" of the text having AI and where in the text the program flagged possible AI composition (AI Writing Detection Capabilities, 2023). Unfortunately, this is incredibly unreliable. Generative AI is meant to mimic human produced writing. In essence, the patterns that are being detected by AI detection programs bear a lot of similarities to legitimate human-produced writing, so much so that it is flagging that legitimate writing and missing writing that was AI generated.

This distrust in technology has caused a lot of problems. Unfortunately, a big concern that isn't typically discussed is how AI Detection software targets non-native English writers. Andrew Myers' article goes into the current practices of AI Detection models and how it is by-in-large in accurately flagging non-native writers' work. Myer's explains, "According to the study, all seven AI detectors unanimously identified 18 of the 91 TOEFL student essays (19%) as AI-generated and a remarkable 89 of the 91 TOEFL essays (97%) were flagged by at least one of the detectors." This is due to the fact that AI Detection models will test for perplexity and sophistication in writing, which typically non-native speakers do not write with and tend to trail behind native writers in that regard (Myers 2023).

Secondly, and of the primary problems, there have been several cases of students being flagged for plagiarizing via AI and having to deal with the repercussions. For instance, Rolling Stones reported on a case at Texas A&M University where several students in the class were accused of using ChatGPT for one of their final assignments. The instructor gave those students an incomplete in the course which would impede some students' ability to graduate. The problem is that the professor copied and pasted students' essays into ChatGPT and asked the AI if it wrote it. While this AI detection "hack" spread around the internet, it was quickly debunked. And luckily, students that were impacted quickly argued against the accusation and were able to appeal and complete a separate assignment as a substitute. (Klee, 2023). These are incredibly high costs for small mistakes the software and professor made. Obviously the professor in this example was not aware of how these AI detectors work and it seriously impacted many students.

Because of this, educators and administrators have to consider how they'll adapt to this current uncertainty. There are several ways forward that might help alleviate this problem. Currently, the most effective route to address this problem is to educate those using this technology on how this program works, how to interpret the data, and what to trust when using it. But looking forward, one tactic that would be helpful is digital watermarking. According to Fortra Digital Guardian, watermarking is when a creator adds a logo or image on a file, document, or image they own to prevent digital theft (Brook 2023). Watermarking can also be done onto the code so that there isn't a visual impedance to a file which is called invisible watermarking. In doing this, AI detection software can look for this digital watermark and flag if it is present. Currently, AI generated work does not have any physical or digital watermark. But considering AI being used for misinformation campaigns, tracking and detecting AI will become a bigger concern than it currently is now. Eventually, this might be something that companies

might choose to include. Or it is more possible that governments or regulatory entities might require companies to digitally watermark AI generated work. Especially targeting generative AI products that are meant for public use.

Academic Integrity: Where to go?

A primary concern that schools will have to grapple with is how they will be adjusting their pedagogy and Academic Integrity standard in a way that reflects a changing world. Like the adoption of the internet, calculators, spell check, etc. educators and administrators need to determine what constitutes legitimate tools and what constitutes cheating/academic dishonesty. Currently, most universities defer AI policies to professors. Georgetown University's Academic Integrity policy reads, " It is, as always, the students' responsibility to be sure that they are following the rules laid out by their professors…If you didn't generate the words yourself, say so by quoting and citing the source; if you generated the words but not the content and ideas, say so by citing the source." (Georgetown 2023). And there are already several ways that educators are avoiding and mitigating students' access to generative AI. But at some point, it becomes a disservice to students who will have to know how to navigate and utilize AI in the future. If the goal is to prepare students, it is imperative that students learn how to succeed with generative AI.

Many educational institutions are running classes for their educators to learn about AI and to develop new ways of integrating Generative AI in the courses. Especially in regards to higher education, students should be trusted that they have an intrinsic desire to learn about their chosen subject but have to know how to use these tools properly. In Margaret Price's piece, "Beyond 'Gotcha!'" she pushes educators to take an honest look at plagiarism and talk about why it occurs. "Our policies can indicate to students that learning to avoid plagiarism is a process of learning conventions and customs, not an instantaneous event. We can then hold students

responsible for their part in learning these conventions" (Price, 2002). In short, if students don't have an in-depth familiarity with AI they are more than likely going to use it inappropriately. And it is the role of educators to help students achieve a high level of proficiency in order to help students excel as well as avoid plagiarizing.

Conclusion

At present, society is in the growing pains of a huge culture shift because of generative AI. Much like our adoption of the Internet, educational institutions will have to make major adjustments. Hopefully soon, there will be new technology that will assist education in adapting. This is important because the introduction of new technology allows students new freedoms and new routes of learning. Plagiarism Detection Software allowed students to use the internet more freely and allowed them the reassurances that work was done honestly and with integrity. In time, this will be a reality with generative AI and it will continue to push education further and afford students more opportunities in the future.'"

References

AI Writing Detection Capabilities. (2023). Turnitin.com. https://www.turnitin.com/products/features/ai-writing-detection#:~:text=Our%20AI%20writing%20detection%20model,someone%20other%20than%20the%20student.

Anson, C.M., Kruse, O. (2023). Plagiarism Detection and Intertextuality Software. In: Kruse, O., et al. Digital Writing Technologies in Higher Education . Springer, Cham. https://doi.org/10.1007/978-3-031-36033-6_15

ChatGPT. (2023). Openai.com. https://chat.openai.com/c/36e5b349-682c-45d4-9786-5e90bd417514

Brook, Chris. What Is Digital Watermarking? (2023). Digital Guardian. https://www.digitalguardian.com/blog/digital-watermarking

Interpreting the Similarity Report. (2023). Turnitin.com. https://help.turnitin.com/feedback-studio/turnitin-website/student/the-similarity-report/interpreting-the-similarity-report.htm

Klee, M. (2023). Texas A&M Professor Wrongly Accuses Class of Cheating With ChatGPT. Rolling Stone; Rolling Stone. https://www.rollingstone.com/culture/culture-features/texas-am-chatgpt-ai-professor-flunks-students-false-claims-1234736601/

Landge, M. B., Naik, R. R., & Mahender, C. N. (2015). A review on plagiarism detection tools. International Journal of Computer Applications, 125(11). https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=11fe048dc955307c2924850ff91e6f223238b3ff

Lawton, G. (2023). What is generative AI? Everything you need to know. Enterprise AI; TechTarget. https://www.techtarget.com/searchenterpriseai/definition/generative-AI#:~:text=Generative%20AI%20is%20a%20type,imagery%2C%20audio%20and%20synthetic%20data.

Myers, A. (2023, May 15). "Ai-detectors biased against Non-Native English writers." Stanford HAI. https://hai.stanford.edu/news/ai-detectors-biased-against-non-native-english-writers

Price, M. (2002). Beyond "Gotcha!": Situating Plagiarism in Policy and Pedagogy. *College Composition and Communication*, *54*(1), 88–115. https://doi.org/10.2307/1512103

III. Standards of Conduct - Georgetown University Honor Council. (2023, September). Georgetown University Honor Council. https://honorcouncil.georgetown.edu/system/policies/standards-of-conduct/