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EDUC 432, Winter 2025
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22 March 2025

Final Project Reflection: Algorithmic Bias in Search Engines, Interactive Essay

My final project was an interactive explorable addressing algorithmic bias in information retrieval systems – this took the form of an interactive essay coded on Python's Streamlit, making the project itself a computational explorable explanation. My interactive essay allowed me to engage deeply with my research interests in AI Ethics and Responsible AI, though this particular essay focused on algorithms that produce bias rather than AI systems specifically. Still, I'm quite proud to have produced something that looks at the disproportionate harms of algorithms on marginalized groups that the systems we use on a daily basis are capable of producing, synthesizing my knowledge into something teachable and deliverable. The work also scratched a journalistic itch to write and publish digestible articles on topics I'm interested in: in the future, I want to revisit this final project, refine it further, and eventually publish it online somewhere like on a personal website; moreover, I'd love to create similar interactive explorables on other topics within AI Ethics and Responsible AI use.

The most significant challenge was the technical implementation: there was so much to code in so little time, and I had little expertise in leveraging Python to create a website with interactive elements. And leveraging AI to assist in coding the implementation wasn't easy either: the AI had difficulty understanding the surrounding context of what existed in my code, even after creating a "project" space and inserting code files. The AI simply couldn't conceptualize the codebase structure. The project's codebase was something I had to create from scratch, from creating the file-folder structure on Git to sourcing the dataset and metadata from Project Gutenberg.

Yet, this is where I felt I thrived the most during the project: leveraging the dichotomy between an AI and a human in the loop to produce something. The AI did the hard work of coding up the interactive essay implementation, while I focused on the educational aspects of the website. I concentrated on what it meant and how it looked like to teach algorithmic bias through information retrieval, considering cognitive load factors and designing engaging learning experiences for users. I verified the accuracy of interactive outputs generated by the AI, ensuring correctness and fairness. This decision of labor was quite effective and made sense given the project complexity that I desired and the time constraints of completing all of this within the academic quarter. The interplay allowed me to reflect on ethical and responsible AI use as well: due to this clear division of labor, I felt ownership over the conceptual work, educational design, and learning objectives.

There are several opportunities for improvement: a more targeted learner profile, a wider variety of interaction types, and user testing. In formulating the explorable, I ideated based on a broad problem that interested me rather than something specific, leading me to a broad learner profile; a more targeted problem lends itself to a more defined learner profile, which would have made for a higher quality explorable. For example, another idea for the final project I had was focusing specifically on how facial recognition algorithms struggle with darker skin tones which would have allowed me to specify people of color as an audience and let me tailor certain interactive experiences for them.

I would have liked to explore a wider variety of interaction types, particularly ones driven by the literature. For example, diving deeper into literature intersecting the learning sciences and cognitive load theory might have provided more effective interactive elements than the ones used in my current explorable.

More importantly, however, would be user testing: I did not ask anyone to user test the interactive website for me, and I'm confident that with my familiarity with the topic and its implementation, I missed the perspective of a novice user. Their feedback would more honestly represent aspects of the interactive essay that work well, that were confusing, and what improvements or new ideas would make a more effective essay. The class demo where we presented to each other and received feedback was particularly helpful, and I would have appreciated more opportunities like that.