

How Accessibility in Computer Interfaces Affect Society
(STS Paper)

A Thesis
In STS 4500
Presented to
The Faculty of the
School of Engineering and Applied Science
University of Virginia
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Science

By
Joseph Moretto
February 5, 2023

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

ADVISORS

Daniel Graham, Computer Science

Bryn E. Seabrook, PhD, Department of Engineering and Society

Executive Summary

Relations between papers

The following portfolio contains two projects. The first is a technical paper that explores ethical concerns as image generation AI technology becomes more powerful, and the second is an STS research paper that discusses how accessibility in computers has influenced society. While not completely linked, part of the STS paper references the usage of AI as a type accessibility, allowing technical tasks to be accessible. The STS paper and technical paper both mention the possible dangers of powerful tools becoming accessible. The motivation for the technical paper came from usage and discourse of AI image generation, I found the many different perspectives and ramifications of AI to be interesting. Interest in the STS topic came from learning of technological determinism and social construction, seeing computers ingrained into society enabled by accessible interfaces, and wondering how it all fits together.

Capstone Summary

As AI image generation advances its capabilities bring ethical concerns over plagiarism and potential for misuse. AI image generation can potentially negatively affect artists and the image generation can be misused to for misinformation. Using current AI to detect plagiarism and fake images, those technologies could adapt to detect AI image generation. Even if AI image can be detected there are still problems as the definition of plagiarism with AI are not clear. Also, even if images can be identified as fake, the images may be viewed where they are not

analyzed. The ethical issues with AI are wicked problems which make it difficult to impossible to solve. It is not expected to come to a complete solution, but rather explain why this a wicked problem and represent the varying viewpoints in ethical issues with AI image generation. Future laws may be passed on intellectual property related to AI image generation which will provide legal precedence to the issue.

STS Summary

Computer usage exists in most facets of modern life across the globe, with accessibility enabling these tools to be as widespread as they are. However, computers were not always as accessible in both form and function. How has accessibility in computer interfaces affect society and how does societal needs influence accessibility development? The STS framework technological determinism applied to this discussion indicates that the development of computers drove changes in society. Social construction on the other hand indicates that societal needs drove the development of computers and their accessibility features. The development of computers was available to only a select few individuals with money and skills to utilize computers, but advancements made logistically and user accessible. Accessibility features have been developed focusing on people with disabilities, but those features have affected a greater audience than originally targeted. Subtitles were developed for deaf communities, but became used for foreign language subbing and general use. Accessibility in computers in widely accepted as being a force for positive change, but accessibility to powerful tools is the exception. Cyber tools have made it a much lower bar of entry for people to commit attacks with. The research finds that a combination of both social and technological determinism is correct. Computers changed parts of society while at the same time societal needs driving the development of computers in an interconnected and continuous relationship.

Concluding Reflection

Both projects provide deeper context for each other allowing a level of understanding for both that would not be present individually. The STS paper provides a broader context which informs the research paper on how computers and society is interconnected. The context from the STS paper gave a deeper understanding to research and analyze the technical topic. The research paper provided insight to the part of the STS paper that dealt with the possible dangers of accessibility. A part of the STS paper warns that very powerful tools made accessible may have consequences and the research paper went into detail about specific tools with AI are having ethical concerns.

Table of Contents

Socio-technical Synthesis

AI Image Generation: Advances and Ethical Concerns

How Accessibility in Computer Interfaces Affect Society

Prospectus