

Thesis Portfolio

JobSeekr: A centralized web application for those in the job search
(Technical Report)

Biased Healthcare Algorithms Built Using Discriminatory Medical Data
(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
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In Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

Computer software is the backbone of modern technology, from obvious software used in phone and computer applications, to embedded software in electrical appliances. However, there are many problems within these technologies that go overlooked as we become ever more trusting of them and since today's world is so dependent on computer software, it is extremely important to seek out these problems before they cause more problems in society. In my Computer Science Capstone, I proposed a new web application to intelligently help job seekers keep track of job applications and prepare for interviews, while in my STS portion of my Thesis Portfolio, I researched how algorithms in healthcare are perpetuating systematic discrimination.

The job search is stressful enough as it is and we wanted a solution to mitigate that stress. Surveying students who are currently or were recently looking for jobs, my team and I asked about their application and interview preparation habits. Most students listed around two to three resources to stay organized, as well as over two hours to prepare for technical interviews. Using the survey results, we proposed and designed a web application to apply to jobs and also keeps track of these applications, interviews, and offers. More importantly, the app intelligently recommends practice material to prepare for interviews based on the companies the user applies to. This tool makes it so job seekers will not have to switch between spreadsheets, calendar apps, and resources for interview practice. Rather, all the needed tools will be located on one centralized application, resulting in more organization and a less stressful job search experience.

On the other hand, my STS research focuses on discriminatory healthcare algorithms and how they got to this point. Although not intended too, many modern medical algorithms discriminate based on race, socioeconomic status, and other factors. The reasoning lies in

disparities within the healthcare data that these algorithms are trained on, which is a result of a long history of systematic discrimination and inequities in healthcare. Furthermore, even when these discrepancies are discovered, researchers and developers try to correct biases, often worsening the problem and leaving the root of the problem unsolved. Using the Social Construction of Technology (SCOT), I research why the data is biased and how society's actions have led to the development of biased healthcare algorithms.

Through the completion of both the technical and STS portions of my thesis portfolio, I have come to an important understanding of software development. Software makes crucial tasks simpler and automated, creating a stress-free, organized environment and allowing users to focus on other tasks. However, if software is not implemented properly, it often leads to social inequities and other ethical issues. Software development must be completed with a holistic approach by a diverse group of developers. It is crucial to develop software with all possible outcomes in mind and to ensure that no groups' lives are better at the expense of another's.