

Thesis Project Portfolio

Developing Wearable Headband for Enhancing Slow Wave Sleep in Older Adults
(Technical Report)

Bias and Discrimination in Hiring Algorithms
(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

This paper examines the intricate role of machine learning (ML) in shaping biases and discrimination, particularly within hiring practices in the United States. As the wave of artificial intelligence (AI) integration into daily operations for the sake of efficiency gains momentum, numerous companies have leaned towards employing resume screening algorithms. These algorithms are often praised for their potential to trim vast pools of applicants into select groups of highly qualified candidates. However, this technological advancement is not without its shortcomings. The reliance on flawed data collection methods and unrepresentative training datasets has inadvertently led to the embedding of biases, perpetuating discrimination against already marginalized groups.

To lay the groundwork, this paper outlines notable instances where the inadequate or complete failure of bias elimination in ML technologies have culminated in adverse outcomes for individuals, particularly in relation to race and gender. Noteworthy examples such as the COMPAS system's inaccurate predictions of criminal behavior among different racial groups, the disproportional denial of loans to minority applicants by mortgage lenders, and the misidentification of individuals by facial recognition technologies based on race and gender are meticulously examined. These examples serve as a testament to the prevailing issues that shape the topic discussed within this paper.

This research paper studies the application of the Actor Network Theory (ANT) as a lens to dissect the complex network of human and non-human actors (including data, training protocols, use cases, and societal norms) that form contemporary hiring practices. This approach facilitates a detailed analysis of the key actors responsible for shaping the landscape of resume screening algorithms, thereby enabling the identification of bias sources detrimental to specific demographics.

Moreover, the paper explores the historical backdrop of discrimination in conventional hiring methodologies, highlighting studies that expose inherent biases against ethnic minorities and the hasty incorporation of AI into recruitment processes, despite glaring deficiencies. The discussion includes a critical evaluation of Amazon's AI recruitment tool, which exhibited a preference for male candidates over female ones. The lack of rigorous examination of unrepresentative training data has led to the penalization of female applicants, particularly those using less 'masculine' terminology or listing achievements associated with women (for instance, attendance at an all-female institution or involvement in women-centric STEM clubs), reflecting the significant gender imbalances persisting in the tech industry.

Such instances highlight the extensive issue of bias within hiring algorithms, exacerbated by ongoing gender disparities in the tech sphere. By combining ANT with a comprehensive literature review, this paper provides an in-depth analysis of the biases ingrained in ML algorithms that foster discriminatory hiring practices. It argues the necessity for continuous vigilance and scrutiny to guarantee that the adoption of ML in hiring not only streamlines the recruitment process but does so fairly and equitably.

The ultimate aim is to unravel the degree to which ML contributes to or mitigates discrimination within hiring algorithms, thereby igniting further discussion and pinpointing opportunities for improvement in both ML technologies and recruitment strategies. Through this endeavor, the paper advocates for a more inclusive professional landscape, paving the way for a future where diversity is not only recognized but embraced.