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Digital Platforms and Algorithmic Erasure: What Are the Implications?

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Abstract
As technology advances, people of colour often fall victim to algorithm racial bias. This paper focuses on the problem of digital tools that misidentify, fail to recognize, or erase people of colour. On a spectrum, these issues can range from the annoyance of making people of colour invisible during online meetings, to the endangerment of falsely identifying people of colour of crimes that they did not commit. We encountered the former challenge in September 2020, during a faculty Zoom meeting. Our Zoom erasure experience and subsequent Twitter crop experience raised questions for our investigation: why do people of colour experience erasure on zoom and other digital platforms? Is this problem new? What are the outcomes of our experience? How could the problem be fixed? How is it that biases in technology seem to emulate those found in social life? In this paper we aim to raise awareness through sharing our experience and recommending the interrogation of algorithmic tools released for market, the creation of government policy and laws to hold software companies accountable, and the education about biases for IT professionals, educators, and students in the field.

Keywords: algorithmic bias, erasure, racial discrimination, software, technology

Introduction

People of colour have experienced challenges with inaccurate depictions of themselves in pictures since the beginning of photography. Typically, they appear to be very underexposed, looking like they are in a shadow, especially when in the same frame as people with pale skin. This problem has persisted despite significant advances in camera film and, subsequently, in digital sensor technologies in modern cameras. Considering that most digital techniques are built on a foundation of yesterday's analog tools, this challenge has persisted in multiple forms in modern digital contexts.

One of the victims of machine learning algorithm-bias problem is Joy Buolamwini, a graduate student at MIT, who was working on a facial analysis software for her graduate project when she realized that the software she designed did not recognize her own face because she is Black (Buolamwini, 2016). This algorithmic racial bias motivated her to become an activist regarding the issue. Since then, there have been multiple instances involving algorithmic decision-making that have shown bias against people of colour. For example, the City of Detroit police wrongfully arrested Robert Williams, using facial recognition software, and falsely identified him as a shoplifting suspect (Harwell, 2021). Similarly, Johnson (2020) reported on the experiences of students of colour who had difficulties with the *ExamSoft* program they were required to use while they wrote the California Bar Exam. Even in practice tests, students could not get the software to recognize their faces because their skin was dark. Some students of colour resorted to shining bright lights directly at their faces for the duration of the two-day exam, even though it caused some to experience light-induced headaches. According to Johnson, the Electronic Frontier Foundation commented that the use of faulty facial recognition software risks exacerbating the racial inequities already seen in the legal profession. The Deans of fifteen California law schools wrote a letter to the state Supreme Court requesting significant changes in the administration of the exam (Johnson, 2020).

Commenting on how to address these problems, Ruha Benjamin (2019) claimed the issue is not solely how to get bias out of algorithms but, rather, which algorithms should not be used at all due to their unforeseeable consequences. Similarly, Fong (2021) investigated the issue of automating racism and concluded that humans are flawed decision-makers due to our cognitive and social biases which, in turn, shape the development of algorithms and artificial intelligence systems. Likewise, the authors experienced the machine learning algorithm-bias problem in the context of a Zoom meeting that extended to a viral Twitter thread.

Our Experience

In September 2020, at the beginning of the first full semester of emergency remote teaching during the COVID-19 pandemic, the first two authors were in a Friday afternoon meeting together and Ofosuhene, a Black man, asked Madland, a White man, if they could stay after the meeting to discuss challenges Ofosuhene was having with Zoom. In the ensuing conversation, Ofosuhene demonstrated that when he used a virtual background in Zoom, and then moved a little bit away from his camera, his head would disappear from the video feed (Figure 1).

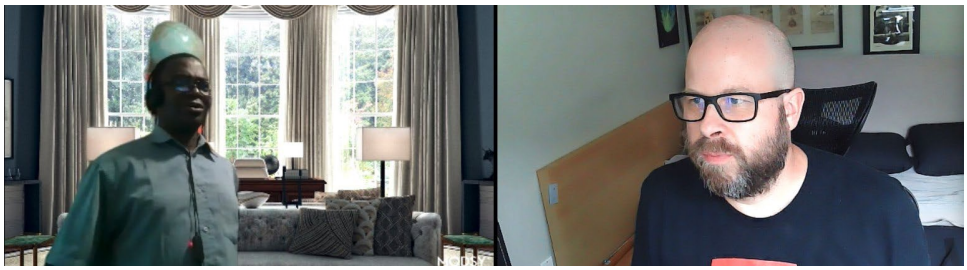
Madland quickly realized that this was happening due to Ofosuhene's dark skin colour. The two discussed possible remedies, including moving closer to the camera (Figure 2), using more powerful front-facing lighting, and upgrading Ofosuhene's camera. Figure 2 also shows an effect of Ofosuhene moving closer to the camera, which showed his face, but it was very underexposed, and it also picked up a light-coloured round globe behind his head.

Figure 1

Screenshot of a Ofosuhene (L) and Madland (R) in a Zoom Meeting.

Figure 2

Screenshot of Ofosuhene Closer to the Camera in a Zoom Meeting



During the conversation, Madland captured screenshots of the video feed showing both authors in horizontally oriented images (Figure 1 and 2), and, with permission, posted the images on Twitter (Madland, 2020a). Shortly thereafter, Madland checked his posts on Twitter and noticed that Twitter's algorithm had cropped the images so that only the right side of the image, with Madland in it, was showing (Figure 3).

This seemed odd, so he flipped one of the images horizontally and uploaded the flipped image (otherwise identical to the first) (Madland, 2020b). The Twitter algorithm then defaulted to the left side of the flipped image, showing only Madland and hiding Ofosuhene (Figure 4). This raised serious concerns about the depth of the challenge facing people of colour where evidence of algorithmic erasure in one platform, Zoom, is duplicated and amplified by algorithmic erasure in another platform, Twitter, which necessitated further investigation.

Outcomes From our Experience

In the week following our experience with Zoom and Twitter, Madland's tweet gained significant traction on Twitter, getting thousands of likes and retweets and spawning similar threads where Twitter users began to experiment with posting pictures that included a high-profile Black person and a high-profile White person in an image separated by blank space, forcing the Twitter

algorithm to choose one part of the image over the other. Many found that the Twitter algorithm defaulted to showing only the White person and hiding the Black person.

Figure 3

Screenshots Posted on Twitter and Algorithmically Cropped, September 18, 2020.

Figure 4

Screenshot of the Flipped Image on Twitter, September 18, 2020.

This exposure on Twitter also led to dozens of national and international media outlets picking up the story. Representatives from both Twitter and Zoom engaged with the thread, and yet

took noticeably different approaches. The representative from Twitter replied to the thread and began troubleshooting, just as many other Twitter users had been doing (Davis, 2020).

Figure 5

Screenshot of the Twitter Post as of October 18, 2022, Showing More of the Original Photo.

Twitter's approach was to accept responsibility and promise action "to making product changes to reduce its reliance on the image cropping algorithm, instead prioritizing user agency" (Yee et al.2021, p.18). The representative from Zoom sent Madland a reply in the thread requesting a meeting with their engineers and marketing professionals (Zoom [@Zoom], 2020). After confirming the problem to them, representatives from Zoom agreed to go back to the drawing board to find out how they can rectify the problem. We subsequently heard through a media contact who had been following the story, that Zoom attributed the problem to a lack of lighting and poor equipment (personal communication). Both authors were also invited to be interviewed for an episode called Are We Automating Racism? on the Vox Media web series "Glad You Asked" (Fong, 2021). Likely the most significant outcome of our experience is that Twitter has reported, both in the original thread and in their public communications, that they have abandoned the cropping algorithm altogether in favour of giving Twitter users the ability to crop their own photos (Clark, 2021; Metz, 2021). This has resulted in the original thread showing more of the original photo, although it is still cropped around the centre of the photo (Figure 5). One final outcome worth noting is that our experience has led to at least one published research article (Shen et al., 2021), which explored the role that everyday Twitter users played in exposing problematic outcomes with the Twitter algorithm.

Recommendations

The recommendations from this study are four-fold:

1. Considering the challenges that people of colour have experienced from most digital tools and algorithms, we agree with Huang (2021) that it is "time for a new lens". The tech-industry must do much more to pursue corporate social responsibility by increasing

transparency to allow researchers and ethicists to interrogate the algorithmic tools they develop for the market.

2. The above recommendation will require stringent government policy guidelines for the tech-industry, backed by laws that will hold software companies accountable.

3. Academics, students, and IT personnel should be aware that there is nothing like tech-neutrality, therefore, no race-neutrality in computer systems, machine learning, and the process of design. Consequently, academic institutions, and educational technologists and instructors should make every effort to promote and provide racially inclusive IT delivery systems and platforms for all users.

4. It is our hope that this paper will also contribute to an ongoing dialogue among academics, media, software companies, and government agencies on how to effectively address challenges related to the use of algorithmic tools in higher education (i.e., in algorithms and machine learning).

Author's Contributions

CM and MO contributed to the conception, design, and analysis of this project, drafted the article, and approved the final version. JA provided valuable analysis and interpretation of the data, critical review of the content and approved the final version.

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The authors do not declare any conflict of interest.

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Zoom [@Zoom]. (2020, September 19). *@colinmadland Hey Colin, we'd like to get to the bottom of this. Would you and your colleague be willing to meet with our virtual background engineers to try to replicate this issue? Please DM us so we can set a time. Thank you!* [Tweet]. Twitter. https://twitter.com/Zoom/status/1307405523667484672