Online Ethics Center
FOR ENGINEERING AND SCIENCE

An Algorithm Discriminates

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Description

A software developer designs a software that screens the resumes of candidates applying for a job at her company. She later discovers that the software may be having a disparate impact on minority communities. She brings the issue up with her boss, who is reluctant to change the software.

Body

Sandra is a software developer for Emporia, a large retailer that has recently experienced high attrition rates in their sales department. Her boss tasks her with designing software that the company can use to screen the qualifications of candidates applying for sales positions. Sandra is supposed to ensure that the software awards a higher recommendation score to applicants who are more likely to stay on the job longer.

Sandra begins by applying a Principal Component Analysis (PCA) to data from the resumes of current and past employees to identify the minimal set of features that best correlate with the length of tenure. Based on this data, Sandra designs her software so that it classifies recruits possessing a high number of these features as

"recommended candidates," and those lacking them as "non-recommended candidates."

One year after implementing Sandra's software, the company's salesperson attrition rate falls by nearly 15%. While analyzing the results, however, Sandra notices that 92% of the new sales employees hired have been white. Concerned that the company may be violating the legal standards for fair access to employment, she tries to figure out why her software is not recommending more applicants from minority groups. After some research, Sandra thinks she has found the underlying cause. The software is only recommending applicants who live in zip codes less than one mile away from Emporia stores. This is because the PCA she applied to employee data identified employee zip codes as the metric best correlated to length of tenure. She infers that this is because employees living in neighborhoods closest to Emporia stores have much shorter commute times, and thus tend to stay on the job longer. These neighborhoods, however, have mostly white, middle-class residents. Black and Latino applicants, who make up about 80% of the candidates applying for sales jobs, tend to live in areas that are further away from Emporia stores. Because their zip codes are located over a mile away from Emporia stores, the software is classifying many of these candidates as "non-recommended candidates."

As a member of the Association for Information Science and Technology (ASIS&T), Sandra feels as though it is her ethical and professional responsibility to make sure that the software she has programmed does not have a disparate impact on minority groups. She presents her findings to Timothy, the head of human resources. She explains that she thinks the company may inadvertently be violating the disparate impact principle of the Civil Rights Act of 1964. This principle prohibits employers from using any employment practices that have unjustified adverse impacts on members of a protected class, such as lower-income persons, minority groups, or women.

"I'm not only worried that the software is excluding well-qualified applicants," says Sandra. "If Emporia continues to use it to screen recruits, I think that the company will risk facing employment discrimination litigation."

Timothy is skeptical about Sandra's claims. "I think it would be a bad idea to change the software in any way," he says. "It has done everything we wanted it to," he continues. "Not only is our retention rate at the lowest it has been in years, but our

sales are up as well. Plus, is it even possible for a computer program to discriminate?"

Timothy thinks that the application test is only using objective criteria to identify the best qualified candidates. Sandra tells him that she thinks that there are more appropriate metrics that the software can use to recommend applicants, but Timothy remains unwilling to modify it in any way that might undo its recent success.

Questions on Ethics and Professionalism

- As the software developer, what are Sandra's ethical responsibilities to those who are applying to the job?
- What are her professional and legal responsibilities as an employee of Emporia?
- What would be a more appropriate metric to use in the software to recommend candidates?
- Does the solution to Emporia's attrition problem necessarily need to be a technical one? What other forms of expertise can the company bring in to analyze why sales employees are leaving their jobs?

Resources

1. Barocas, Solon, and Andrew D. Selbst. "Big Data's Disparate Impact." *California Law Review* 104.3 (2016): 671-732.

Notes

This case/scenario was developed with support of NSF Award #1338205 Ethics of Algorithms (from NSF's EESE program). The full set of the Ethics of Algorithms cases is available at http://ethicsofalgorithms.com/cases.html.

The principal investigators, Kelly Joyce and Kris Unsworth, conducted fieldwork and interviews with computer scientists and engineers to identify the ethical challenges

they face when working with algorithms. Jason Ludwig and Kendall Darfler were research assistants on the project and used the data to develop the case. The research team tested the case in multiple classrooms and revised the case based on instructor and student feedback.

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Resource Type

Case Study / Scenario

Topics

Data Management
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Discipline(s)

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