The Networked Nature of Algorithmic Discrimination

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YOUR POSITION IN THE NETWORK MATTERS

It's Who You Know

We live in a highly networked world, in which our social connections can operate as both help and hindrance. For some people, "who you know" is the key to getting jobs, or dates, or access to resources; for others, social and familial connections mean contending with excessive surveillance, prejudice, and "guilt by association."

Along with information about who you *know*, technical mechanisms that underlie the "big data" phenomenon—like predictive analytics and recommendation systems—make imputations about who you *are like*, based on your practices and preferences. If two people like Zydeco music and rare birds, they might be more likely to purchase the same products. Similarly, you are more likely to share tastes with your friends than with a random stranger. Marketers can gain tremendous insight from this information. But while this may be useful to find customers or limit the financial risk of insurers, these same mechanisms, left unchecked, can lead to discriminatory practices.

Across the board, we must recognize that we have very little control over how information about us is gathered and used, and that the networked nature of modern life can lead to very different outcomes for different groups of people—despite our aspirations to equal opportunity.

Discrimination by Network?

In the United States, most companies are required to be equal opportunity employers; discrimination on the basis of race, sex, creed, religion, color, and national origin is prohibited. Additional regulations forbid many employers from discriminating based on age, disabilities, genetic information, military history, and sexual orientation. However, there is nothing stopping an employer from discriminating on the basis of personal network. Increasingly, algorithmic means of decision-making provide new mechanisms through which this may occur.

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The social network site LinkedIn is useful for both employers and employees. The latter often use the site to create a public résumé. In doing so, they don't just list their previous work experience, but they also identify who they know and solicit endorsements from these connections. Employers use LinkedIn and other social network sites to determine "cultural fit," including whether or not a candidate knows people already known to the company. This process rewards individuals on the basis of their networks, leading companies to hire people who are more likely to "fit the profile" of
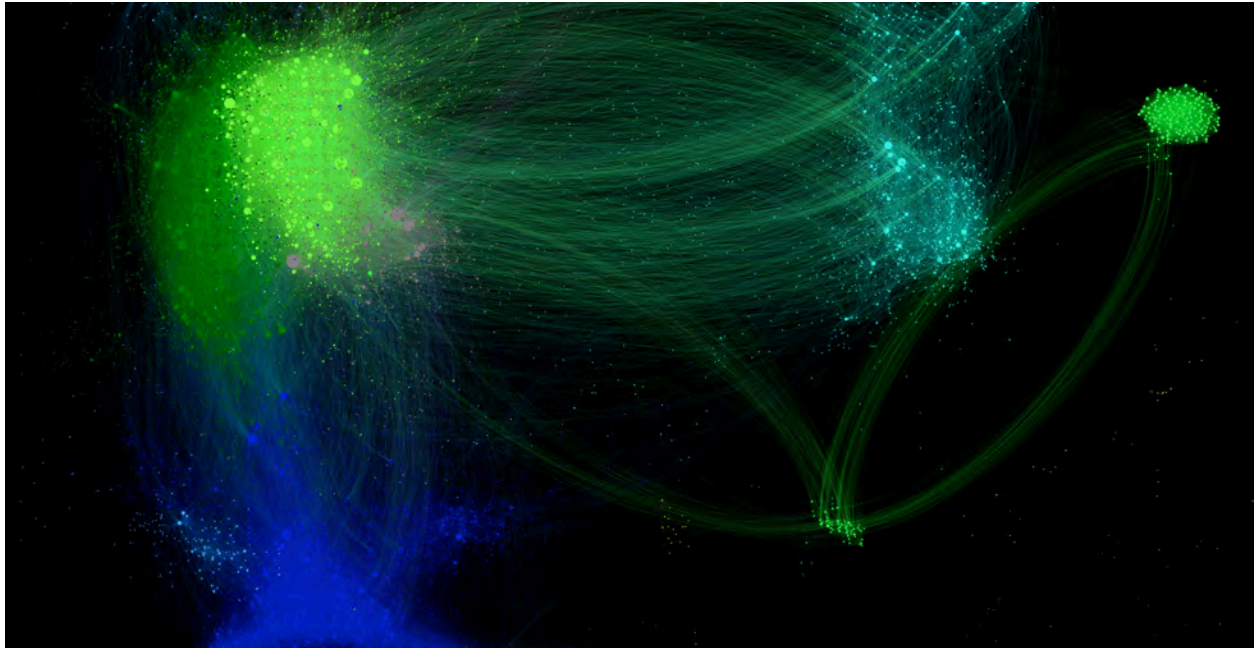
People's networks reveal a lot about who they are through whom they know. The structure of a social network graph may appear innocuous, but these networks are often shaped by race, class, ethnicity, religion, gender, and other protected categories. Networks can easily be discerned from social media. Visualization by [Gilad Lotan](). CC-BY-SA.

their existing employees—to the detriment of people who have historically been excluded from employment opportunities. While hiring on the basis of personal connection is by no means new, it takes on new significance when it becomes automated and occurs at large scale.

What's at stake in employment goes beyond the public articulation of personal contacts. While LinkedIn is a common tool for recruiting and reviewing potential professional employees, fewer companies using it for hiring manual or service labor. For companies who receive thousands of applicants per opening—especially those who are hiring minimum wage or low-skill labor— manually sorting through applications is extremely time consuming. As a result, applicant tracking and screening software is increasingly

used to filter candidates computationally, especially at large enterprises. Don't have the right degree? Rather than getting a second glance because of your experience, you're automatically screened out. Didn't use the right buzzword in your list of skills? Your application will never surface. This creates a new challenge for potential applicants who must learn to game the opaque algorithms that they encounter before a person actually takes a glance at them. Such knowledge is often shared within personal networks, so much so that if you're not properly connected, you might not even know how to play the game. While such systems create ethical dilemmas, it is unclear who should be accountable for the potential discrimination such systems exacerbate.

Applying for a job is increasingly mediated by technology, both explicitly and implicitly. Photo by Richard. CC-BY-SA 2.0.

Solutions

Discussions around privacy and fairness in a data-centric world typically rest on the notion of individual control over information, but our networks reveal a great deal. While American law and much of society may focus on the individual, our identities are entwined with those of others. Algorithms that identify our networks, or predict our behavior based on them, pose new possibilities for discrimination and inequitable treatment.

Networks are at the base of data analytics, yet our social and legal models focus on the individual.

Networks are at the base of how contemporary data analytics work. Yet, our social and legal models focus on individual control over information, individual rights, and individual harm. Discrimination law can no longer be solely regarded as guaranteeing rights for an individual member of a protected class. The notion of a protected class remains a fundamental legal concept, but as individuals increasingly face technologically mediated discrimination based on their positions within networks, it may be incomplete.

In the most visible examples of networked discrimination, it is easy to see inequities along the lines of race and class because these are often proxies for networked position. As a result, we see outcomes that disproportionately affect already marginalized people. And, yet, as these systems get more sophisticated, it becomes increasingly hard to understand what factors are inputted or inferred in complex algorithms that seek to distribute limited resources. This is not simply a matter of transparency; many of those who design or use these systems have little understanding of how algorithmic decisions are made based on the millions of points of data fed into the system.

We must rethink our models of discrimination and our mechanisms of accountability. No longer can we just concern ourselves with immutable characteristics of individuals; we must also attend to the algorithmically produced position of an individual, which, if not acknowledged, will be used to reify contemporary inequities. Racism, sexism, and other forms of bigotry and prejudice are still pervasive in contemporary society, but new technologies have a tendency to obscure the ways in which societal biases are baked into algorithmic decision-making. Not only must such practices be made legible, but we must also develop legal, social, and ethical models that intentionally account for networks, not just groups and individuals.

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Acknowledgments