BOOK
Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy

AUTHOR
Cathy O'Neil

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SYNOPSIS [From the publisher]
"We live in the age of the algorithm. Increasingly, the decisions that affect our lives—where we go to school, whether we get a car loan, how much we pay for health insurance—are being made not by humans, but by mathematical models. In theory, this should lead to greater fairness: Everyone is judged according to the same rules, and bias is eliminated.

"But as Cathy O'Neil reveals in this urgent and necessary book, the opposite is true. The models being used today are opaque, unregulated, and uncontestable, even when they're wrong."

"In leaving academia for finance, I carried mathematics from abstract theory into practice. The operations we performed on numbers translated into trillions of dollars sloshing from one account to another. At first I was excited and amazed by working in this new laboratory, the global economy. But in the autumn of 2008, after I'd been there for a bit more than a year, it came crashing down."

"The crash made it all too clear that mathematics, once my refuge, was not only deeply entangled in the world's problems but also fueling many of them."

"The math-powered applications powering the data economy were based on choices made by fallible human beings. Some of these choices were no doubt made with the best intentions. Nevertheless, many of these models encoded human prejudice, misunderstanding, and bias into the software systems that increasingly managed our lives."

"I came up with a name for these harmful kinds of models: Weapons of Math Destruction, or WMDs for short. I'll walk you through an example, pointing out its destructive characteristics along the way."

"This underscores another common feature of WMDs. They tend to punish the poor. This is, in part, because they are engineered to evaluate large numbers of people. They specialize in bulk, and they're cheap. That's part of their appeal."

"But you cannot appeal to a WMD. That's part of their fearsome power. They do not listen. Nor do they bend. They're deaf not only to charm, threats, and cajoling but also to logic—even when there is good reason to question the data that feeds their conclusions."

"To spread the word about WMDs, I launched a blog, MathBabe. My goal was to mobilize fellow mathematicians against the use of sloppy statistics and biased models that created their own toxic feedback loops."

"Ill-conceived mathematical models now micromanage the economy, from advertising to prisons. These WMDs have many of the same characteristics as the value-added model that derailed Sarah Wysocki's career in Washington's public schools. They're opaque, unquestioned, and unaccountable, and they operate at a scale to sort, target, or "optimize" millions of people."

"For many of the businesses running these rogue algorithms, the money pouring in seems to prove that their models are working. Look at it through their eyes and it makes sense. When they're building statistical systems to find customers or manipulate desperate borrowers, growing revenue appears to show that they're on the right track. The software is doing its job. The trouble is that profits end up serving as a stand-in, or proxy, for truth."

"Baseball models are fair, in part, because they're transparent. Everyone has access to the stats and can understand more or less how they're interpreted."

"Baseball also has statistical rigor. Its gurus have an immense data set at hand, almost all of it directly related to the performance of players in the game. Moreover, their data is highly relevant to the outcomes they are trying to predict."

"The folks building WMDs routinely lack data for the behaviors they're most interested in. So they substitute stand-in data, or proxies. They draw statistical correlations between a person's zip code or language patterns and her potential to pay back a loan or handle a job. These correlations are discriminatory, and some of them are illegal."

"Most crucially, that data is constantly pouring in, with new statistics from an average of twelve or thirteen games arriving daily from April to October."

"A model, after all, is nothing more than an abstract representation of some process, be it a baseball game, an oil company's supply chain, a foreign government's actions, or a movie theater's attendance. Whether it's running in a computer program or in our head, the model takes what we know and uses it to predict responses in various situations."

"Models that have a significant impact on our lives, including credit scores and e-scores, should be open and available to the public. Ideally, we could navigate them at the level of an app on our phones. In a tight month, for example, a consumer could use such an app to compare the impact of unpaid phone and electricity bills on her credit score and see how much a lower score would affect her plans to buy a car. The technology already exists. It's only the will we're lacking."

"Data is not going away. Nor are computers—much less mathematics. Predictive models are, increasingly, the tools we will be relying on to run our institutions, deploy our resources, and manage our lives. But as I've tried to show throughout this book, these models are constructed not just from data but from the choices we make about which data to pay attention to—and which to leave out. Those choices are not just about logistics, profits, and efficiency. They are fundamentally moral."