

LGST 242/642 Big Data, Big Responsibilities: The Law and Ethics of Business Analytics

Fall 2019 v.2

Overview

A world of ubiquitous data, subject to ever more sophisticated collection, aggregation, analysis, and use, creates massive opportunities for both financial gain and social good. It also creates dangers such as privacy violations and discrimination, as well as simple hubris about the effectiveness of management by algorithm. This course introduces students to the legal, policy, and ethical dimensions of big data, predictive analytics, and related techniques.

<u>Note</u>: This is a fast-evolving subject area. I revise the course every semester to incorporate new developments and new research. Make sure to check Canvas for the most up to date readings.

Instructor

Professor Kevin Werbach

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Course Requirements and Grading

Black Mirror Reactions (20%)

For nine class sessions, I have selected an episode of the dystopian TV series *Black Mirror*, which is available on Netflix. (If you don't have a subscription, you can get a free trial for one month.) In 150-300 words, identify connections between the episode and one or more of the assigned readings. I'm not looking for a particular answer; I want you to reflect on the themes of the class session using the episode as a tool. Your submission should clearly demonstrate that you read and evaluated the materials.

Reactions are due on Canvas <u>the night before</u> the relevant class. The assignments will be graded for completion. Except in rare instances, I will not comment on your submission. Acceptable submissions receive 4 points; half-hearted efforts receive 2 points.

You only need to submit five Reactions. You may choose which five videos to watch and write about. Because of this flexibility, no late submissions will be accepted for the Reactions, except in extraordinary cases of illness or personal emergency.

Algorithmic Accountability Report (40%)

The largest component of your grade is due the weekend following the final class session. You must create a report directed to a specific company or organization. It may be a company discussed in the course, other than Google or Facebook (because they come up so frequently). Or it may be another organization of your choosing.

Your report should do two things:

- 1. Identify significant areas of concern regarding the company's use of big data, business analytics, machine learning, or similar techniques. Describe specific problems that either have occurred, or that may occur in the future. Explain why they did, or are likely to, arise.
- Make concrete recommendations to the company. Explain the rationale and implementation for each recommendation. Your recommendations should include at least one technical mechanism, one reference to a legal or regulatory requirement, and one operational response describing practices the company should adopt.

You may choose the format for your submission. It could be a paper or memo (1500-2500 words), a slide deck, a screencast with audio narration, a video, an animation, a blog post, or another way to frame your analysis. (If you have an idea, feel free to check with me before starting.) Regardless of the format, reports will be graded based on quality of presentation, depth of analysis, persuasiveness, organization, use of course concepts, research beyond course materials, and originality. Your paper should be specific to the company selected, and should illustrate how the course helped you identify problems and solutions.

On-time submissions will receive between 25 and 40 points. Late submissions will be marked down 3 points per day until grades are submitted, after which no further submissions will be accepted. <u>Note</u>: I will be running each report through anti-plagiarism software. Plagiarized work will result in severe consequence, per University of Pennsylvania rules.

Mock Trial (20%)

We will do a mock trial during class #8. The in-class exercise itself is not graded. You must submit a pre-trial prep sheet, worth 5 points, which will be graded for completion, using a similar standard to the Reactions. After the class, you must submit a post-trial reflection, worth 15 points, that discusses how the exercise illustrated themes or concepts from the course. On-time submissions will receive a score between 8 and 15 based on the quality of analysis and integration of course concepts and materials. Late submissions will be marked down one point per day.

Participation (20%)

You will be assessed on the overall quality of your contributions to the course. Attendance is one factor, but not the primary one. I will record attendance and a participation score each day. If you arrive late, it is your responsibility to let me know after class. There is no way to "make up" an unexcused missed class, but active participation other times will counterbalance the occasional absence. I realize students sometimes miss classes for understandable reasons such as recruiting. All class sessions will be video recorded and available to you on Canvas.

I know that some students are less comfortable speaking in class, or may simply not get called on when they attempt to. There are discussion boards on Canvas for each class session. Substantive posts there also count toward the Participation grade. You will receive credit both for comments on class discussions, and for bringing in relevant ideas or materials you encounter outside the class, so long as your contributions display thoughtful engagement. The boards close after the final class session.

Classroom Expectations and Participation

- Please arrive on time. I will start and end the class promptly.
- Sit according to the seating chart, and bring a name tent and display it for each class. (Cards will be provided at the start of the course for undergraduates.)
- Turn off and put away all electronic devices.
- Come prepared to contribute to the class discussion.

This is a discussion-oriented course. I will lecture at times to introduce important concepts, but the heart of most sessions will be conversations. There usually isn't a "right answer," although there are more and less thoughtful contributions. I use a seating chart, and ask you to bring name tents, so that I can learn your names and note your unique perspectives. We have only 14 sessions and I'm teaching two other classes this quarter, so I won't be perfect, but I'll do my best.

This class will observe the MBA Program's policy on student use of electronic devices in the classroom. No phones, tablets, or laptops may be used during the class, even for note-taking, unless specifically authorized for an in-class activity. Violations of the rules will be reflected in the class participation aspect of the course grade. As a technology scholar, I was reluctant to ban devices in my classes. It's my job to create an engaging experience that is worth paying attention to. However, it's also my job to establish a good learning environment. Researchers have found that when students use laptops in class, it decreases their retention *and that of students sitting nearby*. Studies also show that you learn more when taking notes by hand than on a device.

Learning Objectives

Good data-driven decision-making means not just generating solutions, but understanding how to use them. Sophisticated firms in terms of data science expertise have already gotten into trouble over privacy, security, manipulation, and discrimination. Failure to anticipate such issues can result in ethical lapses, public relations disasters, regulatory sanctions, and even legal liability.

My goal is to help you develop the skills to use analytics in a responsible way, while remaining focused on your business objectives. After completion of the course, you should be able to:

- 1. Identify where algorithms depend on human judgments or assumptions.
- **2.** Describe legal rules and regulatory obligations, in the U.S. and elsewhere, that may apply to business analytics.

- **3.** Evaluate claims that applications of analytics raise ethical or public policy concerns.
- **4.** Appreciate the perspectives of multiple actors on controversies about privacy, manipulation, and algorithmic bias.
- 5. Develop thoughtful responses to concerns about the uses of data science.
- **6.** After graduation from Wharton, don't destroy the world, crash the economy, go to jail, or all of the above. *(Money-back guarantee not available.)*

Syllabus

Unless otherwise noted, hyperlinks are provided below to online versions of all the readings. Where there are questions listed, be prepared to address them in class discussion.

Class	Assignments
August 27	Read
THE PROMISE AND THE PERIL How might data science change the relationships among firms, customers, employees, other firms, and governments? What are some of the legal or ethical concerns that may arise?	 Jacob LaReviere et al, <u>Where Predictive Analytics Is Having the Biggest Impact</u>, Harvard Business Review, May 25, 2016 What are the main business value propositions for analytics and big data? Will Oremus, <u>Move Fast and Break Trust</u>, Slate, March 7, 2017 What do the issues with Google's smart speaker and Uber's autonomous driving system have in common? Drew Harwell, <u>Wanted: The 'Perfect Babysitter.' Must Pass Al Scan for Respect and Attitude</u>, Washington Post, Nov. 23, 2018 What are possible problems with the Predictim service? Graham Ruddick, <u>Admiral to Price Car Insurance Based on Facebook Posts</u>, The Guardian, Nov. 1, 2016 Would you feel comfortable using the Admiral system for
	your car insurance?
August 29 ALGORITHMIC	Black Mirror: Entire History of You (series 1 episode 3) *Reaction paper may cover first session readings
DECISIONMAKING	Read
Algorithms rely on human	
decisions about how data are collected, analyzed, and used. Failure to appreciate this can lead to problems.	 Pedro Domingos, <u>A Few Useful Things to Know about Machine Learning</u>, Communications of the ACM, October 2012 What are the ways that machine learning requires human judgement or intervention?

September 3 ACCURACY The first step to responsible use of analytics is to appreciate limitations of its methods. Algorithmic decision-making is powerful, but not always effective or robust to changes.	 Zeynep Tufekci, <u>The Real Bias Built In at Facebook</u>, N.Y. Times, May 19, 2016 Why was Facebook criticized for its Trending Topics? Why does Tufekci say that algorithms are not neutral? What does that even mean? If algorithms are inherently biased, does that undermine the value of analytics in business? Zeynep Tufekci, <u>YouTube</u>, the Great Radicalizer, N.Y. Times, March 10, 2018 Why does YouTube push users to extreme content? Should Google do something about it? Can it? Black Mirror: Be Right Back (Series 2 episode 1) Read Gary Marcus & Ernest Davis, <u>8 (No. 91) Problems with Big Data</u> , N.Y. Times, April 6, 2014 What are some of the common themes in the authors' list of problems? David Lazer et al, <u>The Parable of Google Flu</u>, Science, March 14, 2014 Why was Google Flu Trends so accurate initially, and not subsequently? Should the failure of Google Flu make us skeptical about business analytics?
September 5	Black Mirror: Hang the DJ (Series 4 episode 4)
TRANSPARENCY How well can we assess exactly what algorithms are doing, and why?	 <u>Read</u> <u>Houston Federation of Teachers v. Houston Ind. School</u> <u>District</u> (S.D. Texas, May 4, 2017) - <i>edited version</i> On what legal basis did the teachers challenge the value added measures system? Who won the case, and why?

	 Jenna Burrell, How the Machine 'Thinks': Understanding Opacity in Machine Learning Algorithms, Big Data & Society, January-June, 2016 Why is it difficult to identify the bases for recommendations generated by machine learning? Cliff Kuang, Can A.I. Be Taught to Explain Itself?, New York Times, November 21, 2017 Can "explainable AI" techniques address the dangers of analytics? Elizabeth Holm, In Defense of the Black Box, Science, April 5, 2019 Under what circumstances are "black box" decisions acceptable, or even desirable? Does the author address the concerns about non- transparency raised by the other articles? Julia Powles, New York City's Bold, Flawed Attempt to Make Algorithms Accountable, New Yorker, December 20, 2017 Would the proposed New York algorithmic disclosure mandate be beneficial? Should there be similar disclosure when users are private companies or individuals?
September 10 RISK AND RESPONSIBILITY Algorithmic systems may produce unintended results, which in some cases cause harm. Who should be held liable? How can organizations using analytics manage those risks?	 <u>Black Mirror</u>: Hated in the Nation (Series 3 episode 6) <u>Read</u> Andrew Smith, <u>Franken-Algorithms: The Deadly Consequences of Unpredictable Code</u>, The Guardian, August 30, 2014. Was Uber irresponsible in putting an autonomous vehicle on a public road? How do business incentives and engineering standards each contribute to the dangers of algorithmic systems? National Transportation Safety Board, <u>Preliminary Report</u>, May 24, 2018 Based on these findings, who if anyone should be held responsible for the death of Elaine Herzberg, the pedestrian struck by the Uber self-driving car? How could the risk of future accidents be mitigated? Karen Hao, <u>When Algorithms Mess Up</u>, the Nearest Human Gets the Blame, MIT Technology Review, May 28, 2019

Does the Propublica report demonstrate unfair outcomes from the use of the COMPAS system for sentencing? What might explain the racial variations the researchers found? September 17 <u>Read</u>
Julia Angwin et al, <u>Machine Dias</u> , Fibrublica, May 25, 2010
September 12Black Mirror: Men Against Fire (Season 3, Episode 5)FAIRNESS The use of analytics has the potential both to counteract and to reinforce systematic biases. But what exactly does it mean for an algorithmic system to be "fair"?ReadAlex Miller, Want Less-Biased Decisions? Use Algorithms,

DISCRIMINATION When are differential effects of analytics tantamount to illegitimate or illegal discrimination?	 Aaron Klein, <u>Credit Denial in the Age of Al</u>, Brookings.com, April 11, 2019 How can algorithms potentially create legally actionable discrimination in credit decisions? <u>Ricci v. DeStefano</u>, 557 U.S. 557 (2009) – <i>edited version</i> How did the New Haven fire department respond when it found that white candidates did better on its promotion test? How did the court rule on the legal challenge to the fire department's actions, and why? <u>Texas Dept. of Housing and Community Affairs v. Inclusive Communities Project</u> (2015) – <i>edited version</i> How does the court respond to statistical evidence that low-income housing tax credits are offered primarily in non-white areas, arguably worsening segregation? Andrew Selbst, A. New HUD Rule Would Effectively Encourage Discrimination by Algorithm, Slate, August 19, 2019 How would the proposed rule affect claims of algorithmic discrimination? Russell Brandom, <u>Facebook Has Been Charged With Housing Discrimination by the US Government</u>, The Verge, March 28, 2019 If the Trump Administration believes it should be harder to bring a claim for algorithmic discrimination, why is it suing Facebook?
September 19 BUSINESS ANALYTICS ON TRIAL Based on a "ripped from the headlines" episode of a TV drama, we'll act out a realistic scenario of alleged algorithmic discrimination	Watch the "Good Wife" <u>video segment</u> on the Canvas site. Prepare to assume your pre-assigned role in a mock trial.
September 24 MANIPULATION	Black Mirror: Shut Up and Dance (Series 3, Episode 3) Read

To what extent does analysis itself influence behavior? And what are the limits on using analytics not merely to understand and predict customer actions, but to shape them?	 Zeynep Tufekci, <u>Algorithmic Harms Beyond Facebook and</u> <u>Google: Emergent Challenges of Computational Agency</u>, Journal on Telecom. and High-Tech Law (2015), pp. 203-209 Why was Facebook's emotional contagion study controversial? What is "algorithmic gatekeeping"? Why does Tufekci believe it is a concern? danah boyd, <u>Untangling Research and Practice: What</u> <u>Facebook's "Emotional Contagion" Study Teaches Us</u>, Research Ethics (2016) Why does boyd advocate an approach to ethics "that does not differentiate between corporate and research practices"? Yoree Koh and Jessica Kuronen, <u>How Tech Giants Get You to Click This (and Not That</u>), Wall Street Journal, May 31, 2019 What is the difference between illegitimate "dark patterns" and ordinary interactive design techniques to maximize clicks? Helen Coffey, <u>Airlines Face Crack Down on Use of</u> <u>"Exploitative" Algorithm That Splits Up Families on Flights</u>, The Independent, November 19, 2018 Is it right to describe the airline practice in question an "exploitative algorithm"?
September 26	Black Mirror: 15 Million Merits
MARKET POWER Should we be concerned about algorithmic monopolies or other anti-competitive practices?	 <u>Read</u> Jerry Useem, <u>How Online Shopping Makes Suckers of Us All</u>, Atlantic Monthly, May 2017 Do you find algorithmic pricing practices troubling? Ryan Calo, <u>Digital Market Manipulation</u>, 82 George Washington Law Review 995 (2014), pp. 1003-1012, 1020-24 How do online intermediaries, in Calo's account, engage in forms of manipulation? Maurice Stucke, <u>Here Are All the Reasons It's a Bad Idea to Let a Few Tech Companies Monopolize Our Data</u>, Harvard Business Review, March 27, 2018

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	 Should there be more aggressive antitrust enforcement against companies exploiting analytics for market power?
	 Arwa Mahdawi, <u>Is Your Friend Getting a Cheaper Uber Fare</u> <u>Than You Are?</u>, The Guardian, April 13, 2018 In what circumstances might it be troubling if they are?
October 1	Black Mirror: Arkangel (Series 4 episode 2)
DATA COLLECTION AND AGGREGATION Are there limits on how data should be collected, used, and shared?	 Read Solon Barocas and Helen Nissenbaum, <u>Big Data's End Run Around Procedural Privacy Protections</u>, Communications of the ACM (November 2014) Why do the authors believe that transparency and consent are insufficient? Gina Kolata, <u>Your Data Were 'Anonymized'? These Scientists Can Still Identify You</u>, New York Times, July 23, 2019 How does de-anonymization work? Kashmir Hill and Surya Mattu, <u>How a Company You've Never Heard of Sends You Letters about Your Medical Condition</u>, Gizmodo, June 19, 2017 How can Acurian obtain seemingly private medical information? The White House, <u>Big Data: Seizing Opportunities</u>, <u>Preserving Yalues</u> (2014), pp. 15-21 What are the key elements of US privacy law? Do you think the U.S. legal framework is effective in general? Will it be effective for the novel challenges of big data and business analytics?
	 Izaak Crook, <u>How GDPR Will Affect Data Science</u>, Dataconomy.com, April 13, 2018 How will the European General Data Protection Regulation affect the way companies use analytics?
October 3 PERILS OF PREDICTION If sensitive attributes can be inferred from other data, does	 Charles Duhigg, <u>How Companies Learn Your Secrets</u>, N.Y. Times Magazine, Feb. 16, 2012 How does Target analyze customer data to make inferences about customers? In your opinion, is the Target system an intrusion on privacy? Why or why not?

it even make sense to talk about privacy any more?	 Do Target's actions violate any legal rules? Do Target's actions violate any ethical norms? Should Target do anything differently? Michal Kosinski et al, <u>Private Traits and Attributes are</u> <u>Predictable from Digital Records of Human Behavior</u>, Proceedings of the National Academy of Sciences, April 9, 2013 What kinds of information can be predicted based on Facebook Likes? What could possibly go wrong? Jeffrey Mervis, <u>Can a Set of Equations Keep U.S. Census Data</u> <u>Private</u>?, Science, January 4, 2019 What is differential privacy, and why is the US Census Bureau using it? Khari Johnson, <u>How Federated Learning Could Shape the</u> <u>Future of Al in a Privacy-Obsessed World</u>, Venturebeat, August 9, 2019 What is federated learning, and how could it address privacy concerns around analytics?
October 8 THE SCORED SOCIETY China's Social Credit System is the most ambitious effort to make algorithmic decision- making ubiquitous in society. Is it concerning, and is it all that different from algorithmic scoring systems elsewhere?	Black Mirror: Nosedive (series 3 episode 1)ReadMara Hvistendahl, Inside China's Vast Experiment in Social Ranking, Wired, Dec. 14, 2017• What are the major elements of China's system?Christopher Mims, The Secret Trust Scores Companies Use to Judge Us All, Wall Street Journal, April 6, 2019• How are these trust scores similar to, and different than, the social credit scores in China?Kate Crawford and Jason Schultz, Big Data and Due Process: Toward a Framework to Redress Predictive Privacy Harms, 55 Boston College Law Review pp. 93-99, 121-28 (2014)• Can legal mechanisms rein in problematic use of algorithmic scoring systems?
October 15	Read:

ALGORITHMIC ACCOUNTABILITY How can firms best respond to the challenges we've discussed in the course?	 Principled Artificial Intelligence: A Map of Ethical and Rights- Based Approaches, July 4, 2019 draft Does seeing all these different AI ethics frameworks compared make you feel better or works about the prospects for solutions?
	 Bethan Cantrell, et al, <u>Industry Needs to Embrace Data Ethics:</u> <u>How It Could Be Done</u> (2016) What do you think of Microsoft's data ethics principles?
	 Darrell West, <u>The Role of Corporations in Addressing Al's</u> <u>Ethical Dilemmas</u>, Brookings, September 13, 2018 Which of West's recommendations are relevant to companies other than the big technology platforms like Google and Facebook?
	 <u>Algorithmic Accountability Act of 2019</u> (Senate bill) What would this law require? How effective would it be in addressing the concerns we've discussed in the class?

Instructor Bio

Professor Kevin Werbach is an expert on legal, business, and policy implications of emerging technologies such as broadband, big data, gamification, and blockchain. He served on the Obama Administration's Presidential Transition Team, founded the Supernova Group (a technology conference and consulting firm), helped develop the U.S. government's approach to internet policy during the Clinton Administration, and created one of the most successful massive open online courses, with roughly 500,000 enrollments. His books include *For the Win: How Game Thinking Can Revolutionize Your Business* and *The Blockchain and the New Architecture of Trust.* In 2010, he was named Wharton's first-ever "Iron Prof".