2019-12

DISCLOSIVE SEARCH ETHICS: ILLUMINATING THE GATEKEEPERS OF KNOWLEDGE

Vogelsong, Benjamin; Nelson, Rebecca L.

Monterey, CA; Naval Postgraduate School

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

DISCLOSIVE SEARCH ETHICS: ILLUMINATING THE GATEKEEPERS OF KNOWLEDGE

by

Benjamin Vogelsong and Rebecca L. Nelson

December 2019

Thesis Advisor:	Bradley J. Strawser
Second Reader:	Timothy C. Warren

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE	*Form Approved OMB No. 0704-0188*

1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** December 2019	**3. REPORT TYPE AND DATES COVERED** Master's thesis

4. TITLE AND SUBTITLE
DISCLOSIVE SEARCH ETHICS: ILLUMINATING THE GATEKEEPERS OF KNOWLEDGE

5. FUNDING NUMBERS

6. AUTHOR(S) Benjamin Vogelsong and Rebecca L. Nelson

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey, CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
N/A

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release. Distribution is unlimited.

12b. DISTRIBUTION CODE
A

13. ABSTRACT (maximum 200 words)

Search engines connect people to information, from current events to dark secrets. Integral in the navigation of so many people's daily lives, search engines hold immense power and influence; yet, the process is opaque with little public accountability. Given search engines' ubiquity of use, and the perception that they are a public service, the profit model of selling user data raises unique ethical concerns. This paper identifies these ethical concerns and proposes guiding theories for how ethical internet search should work in democratic societies. We apply a disclosive computer ethics model to internet search, evaluating the concerns against principles of justice, freedom, privacy, and democracy, and then considering how ethical theories could be applied through laws and regulation, societal norms, market forces, and technological architecture. We argue that current governance approaches are insufficient to address these concerns. Our research shows these concerns are especially troubling given the surprising lack of transparency for something so universal and integral for the navigation of daily life. Search engine companies have become the gatekeepers of knowledge, yet innovations in technology outpace public awareness of the inherent ethical concerns and resulting social implications of how these companies operate.

14. SUBJECT TERMS algorithms, algorithmic bias, disclosive ethics, distributive justice, epistemic justice, ethics, internet search, search, search engines, policy, regulation	**15. NUMBER OF PAGES** 107
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release. Distribution is unlimited.

DISCLOSIVE SEARCH ETHICS: ILLUMINATING THE GATEKEEPERS OF KNOWLEDGE

Benjamin Vogelsong
Major, United States Army
BA, Virginia Tech, 2005
MA, American Military University, 2016

Rebecca L. Nelson
Major, United States Army
BA, Alaska Pacific University, 2011

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN INFORMATION STRATEGY AND POLITICAL WARFARE

from the

NAVAL POSTGRADUATE SCHOOL
December 2019

Approved by: Bradley J. Strawser
Advisor

Timothy C. Warren
Second Reader

Kalev I. Sepp
Chair, Department of Defense Analysis

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

Search engines connect people to information, from current events to dark secrets. Integral in the navigation of so many people's daily lives, search engines hold immense power and influence; yet, the process is opaque with little public accountability. Given search engines' ubiquity of use, and the perception that they are a public service, the profit model of selling user data raises unique ethical concerns. This paper identifies these ethical concerns and proposes guiding theories for how ethical internet search should work in democratic societies. We apply a disclosive computer ethics model to internet search, evaluating the concerns against principles of justice, freedom, privacy, and democracy, and then considering how ethical theories could be applied through laws and regulation, societal norms, market forces, and technological architecture. We argue that current governance approaches are insufficient to address these concerns. Our research shows these concerns are especially troubling given the surprising lack of transparency for something so universal and integral for the navigation of daily life. Search engine companies have become the gatekeepers of knowledge, yet innovations in technology outpace public awareness of the inherent ethical concerns and resulting social implications of how these companies operate.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I. INTRODUCTION

Search engines are increasingly the doorway through which people access the nearly infinite world of knowledge, making them the world's most powerful information gatekeepers. There are inherent conflicts of interest in the interdependence between profit-driven search engines, the content and ads competing for visibility, and the often irrational and fickle public's attention. As an integral part of so many people's navigation of daily life, the power and influence of search companies are immense; yet, there is little public accountability. This concern is amplified for companies such as Google who wield a virtual monopoly in the search industry. Given search engines' ubiquity, essential functions, and the perception that they are a public service, the profit model of selling user data raises unique ethical concerns. As such, democratic societies need a code of ethics to address internet search.

The function of using internet search engines presents unique ethical challenges. After examining the literature, it is apparent that the ethical principles used in the governance of existing public services are insufficient for the governance of search engines and the current model of private sector, self-regulation is insufficient to ensure ethical conduct in search engines. If public sector, government policy and oversight is needed to ensure ethical conduct in search engines, then what ethical principles should be practically applied? Furthermore, as companies that operate search engines as a service share many similarities with public utilities, the premises of our argument stem from the presumption that search engines are functionally a public service with respect to the ethical considerations of the provided search services.

Our thesis is broadly focused on understanding the ethical concerns associated with the widespread use of search engines with the goal of identifying guiding ethical theories of how internet search should work in democratic societies. In doing so, we examine what makes search engines so influential, what are the stakes associated with their governance, what ethical theories may apply, and how should these ethics be applied through formal or informal controls.

In examining these questions, we identify guiding ethical principles that should be used to govern how internet search companies develop and use search engines. We evaluate those principles against a framework based on concepts of freedom, justice, and happiness, as a set societal values typically associated with democratic societies. We do this by applying Phillip Brey's Disclosive Computer Ethics Model. The Brey model is a process of measuring a technology's opaque or hidden consequences against the foundational moral values of justice, freedom, privacy, and democracy.[1]

This process begins with disclosing the ethical issues that may not be apparent, then with considering those issues according to ethical theories, and finally, by considering how those ethical theories could be applied. When applying the model, we examine how search companies have codified ethics and values in their policies, how government has attempted to codify values in laws and regulation, and how the informal constraints of societal norms, market forces, and technological architecture, referred to as *code*, have served to enforce or undermine these values.[2]

The role of search engines can be understood in several ways, including from the perspective of the searcher, that of the search provider, and that of content creators and advertisers, and each raises its own ethical questions. This study examines the ethical issues involved through the above perspectives. We analyze the ethical frameworks as applied to search algorithms by their usefulness in respecting human rights, truth, and doing the least harm and the most good.

After identifying public and private sector policies and ethical principles relevant to search engine technology, we apply Phillip Brey's model of Disclosive Computer Ethics, which is a process of disclosing hidden issues, engaging ethical theories to investigate these issues, and translating these findings into real world applications.[3] Our analysis is structured using Brey's four foundational moral principles of justice, democracy, freedom/

---

[1] Philip Brey, "Disclosive Computer Ethics," *ACM SIGCAS Computers and Society* 30, no. 4 (December 1, 2000): 10–16. https://doi.org/10.1145/572260.572264.

[2] Lawrence Lessig, *Code, Version 2.0* (New York: Basic Books, 2006), 123.

[3] Brey, 14.

autonomy, and privacy.[4] Our ethical analysis incorporates a broad range of theories, with emphasis on those specifically relevant to search engines, such as distributive and epistemic justice theory, and frameworks such as consequentialism, and social contract theory. Our research uses these principles and frameworks to consider the ethics of search engines from four primary perspectives: the individual searcher, the world of knowledge, and governance by both the public and private sectors.

[4] Brey, 14.

THIS PAGE INTENTIONALLY LEFT BLANK

II. BACKGROUND

In considering the application of ethical theory to search engines, we examined various means of promoting ethical conduct. One of the more practical methods we examined is that of Lawrence Lessig, who proposes that behavior in cyberspace is shaped through four primary constraints: laws, societal norms, markets, and code.[5] Our research examined how these forces exert influence or could be leveraged differently in service to the moral principles at stake with the widespread use of search engines. Of Lessig's methods, we gave special attention to the law, in governmental legislation and court rulings, as well as private corporate policy. This area is perhaps the most concrete and transparent of the four forces and is currently a battleground over conflicting interests.

In this chapter, we address several relevant and fundamental concepts related to search engines and the function of internet search. These concepts include an explanation of what is meant by internet search, why internet search should be governed as a public service, a review of governance concepts that are relevant to internet search, and a brief introduction to a number of ethical principles and how those principles are relevant to internet search.

A. WHAT IS SEARCH?

The internet search process is the process of finding information that answers specific search inquiries and involves using an interface that interacts with a search engine, typically query-based, in finding and organizing information found on the internet, matching information to the individual inquiry, then presenting that information. Throughout this paper, we will use *search* as a term of art to refer to this process. Halavais provides a concise definition of search, useful for the purposes of this research, as "an information retrieval system that allows for keyword searches of distributed digital text."[6] Without delving into the complex and technical description of how the search function

[5] Lessig, *Code, Version 2.0*, 123.

[6] Alexander Halavais, *Search Engine Society*, Oxford: Polity Press, 2008, 5.

operates, "the user-interface portion of the search process is quite straightforward and can be summarized in terms of two steps: (1) a user enters search term/phrase or 'keyword' in a 'search box'; and (2) the search engine returns a list of relevant Web 'pages' that typically include hyperlinks to the pages listed."[7]

While search engines are perhaps the most commonly used tools for finding information on the internet, the process is far from transparent. This lack of transparency is in part due to the proprietary nature of the algorithms that are used in a given search engine, and also due to the technical complexity of the process of finding, organizing, and displaying content.

Google did not invent the search engine, but the improvements it made were more revolutionary than the creation of early tools like WebCrawler and Alta Vista. Larry Page and Sergey Brin founded the company as Stanford doctoral candidates in 1998 and their crucial innovation was essentially to crowd source authoritativeness.[8] At the time, existing search engines returned results based on the frequency of a searched term on a webpage; this meant often the top result would be a page of jokes or an unrelated page embedded with loads of popular search terms in order to game the system. Google overcame this by ranking results by the frequency that a web page was referenced by other sites. The page with the most others linking to it was more likely to be a true authority, and therefore, the best result for that search. Naturally, this system too can be gamed, and a sort of arms race / partnership evolved between websites trying to jump ahead in search rankings, and Google's continuous tweaks to its algorithms.

The second revolutionary breakthrough for Google occurred in 2000, when it began using the process of A/B testing to determine user preferences.[9] Users sometimes notice they are seeing the same news story twice with different headlines, indicating they may

---

[7] Herman Tavani, "Search Engines and Ethics," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Fall 2016 (Metaphysics Research Lab, Stanford University, 2016), https://plato.stanford.edu/archives/fall2016/entries/ethics-search/.

[8] Seth Stephens-Davidowitz, *Everybody Lies: Big Data, New Data, and What the Internet Can Tell Us about Who We Really Are*. 1st ed. (New York, NY: Dey St, an imprint of William Morrow, 2017): 60–62.

[9] Stephens-Davidowitz, 209–211.

have been a subject in an A/B test. This process is simply presenting two versions of an ad, graphic, or text to different people randomly, and seeing which version gets more clicks. This sort of test is often done in social science experiments, but Google has unprecedented scale and freedom.[10] The company began constant testing of everything from shades of blue to webpage layout. However, the real power of this testing was seized by political campaigns in 2012, when President Obama's campaign estimated they raised an additional 60 million dollars with a single A/B slogan test.[11] While far from perfect, this cheap, constant testing of preferences allows advertisers or others seeking viewers to break down our self-regulation and take influence beyond the level of focus groups and guess work to unprecedented levels of efficiency.

B. SEARCH AS A PUBLIC SERVICE

> In some ways, the internet has gone the way of all communications mediums past. After a few decades of unbridled expansion, the web has fallen under control of a few giant corporations that are essentially too big to fail, or at least too big to fail without taking down vast portions of global business with them.[12]

Americans often see privatization as a potential cure-all for government inefficiencies, such as the prison system, but conflicts of interest can lead to violations of the public trust. While search engines have always been run by private companies, their function and scope has evolved into a role many would classify as a public service or utility.[13] Shore suggests that some public services can be effectively run privately if they are subject to regulation and oversight, and if they consider the means and needs of the consumers.[14]

---

[10] Stephens-Davidowitz, 209–211.

[11] Stephens-Davidowitz, 211–214.

[12] P. W. Singer, and Emerson T. Brooking, *Likewar: the Weaponization of Social Media* (Boston: Houghton Mifflin Harcourt, 2018), 52.

[13] Safiya Noble, "Algorithms of Oppression." Seaside, California, November 28, 2018.

[14] Zachary Shore, *Blunder: Why Smart People Make Bad Decisions* (New York: Bloomsbury, 2009), 116.

This kind of regulation and oversight is likely to cut into profits. Assuming regulation to protect the public interest includes restricting the ways search companies profit from selling users' personal data, what then would be the incentive to provide the service and ensure quality? The example of public utilities presents several options. Some are paid through a subscription or billing, which can be optional (phone) or mandatory (911), and flat fee (trash) or consumption-based (water). Other services are funded entirely through local and/or federal taxes. This may appear to be an unpromising option, but the importance of search to public life could conceivably fit into America's principle of using the commonwealth for the common good.

This principle was revived by Theodore Roosevelt in 1910 as he condemned corporate trusts and the concentration of wealth and power, and his concerns sound familiar today. "Corporate expenditures for political purposes, and especially such expenditures by public-service corporations, have supplied one of the principal sources of corruption in our political affairs… the way out lies, not in attempting to prevent [trusts and monopolies], but in completely controlling them in the interest of the public welfare."[15] Recognizing the structural and ideological barriers to enacting these changes, he could only appeal to Americans' higher ideals; "those who oppose reform will do well to remember that ruin in its worst form is inevitable if our national life brings us nothing better than swollen fortunes for the few and the triumph in both politics and business of a sordid and selfish materialism."[16]

The public-private dichotomy is not the only way to classify the options. Goodman and Loveman suggest that "there is a third perspective: the issue is not simply whether ownership is private or public. Rather, the key question is under what conditions will managers be more likely to act in the public's interest."[17] This argument points out that

---

[15] Theodore Roosevelt, "New Nationalism." presented at the Dedication of John Brown Memorial Park, Osawatomie, Kansas, August 31, 1910. http://teachingamericanhistory.org/library/document/new-nationalism-speech.

[16] Roosevelt.

[17] John B. Goodman and Gary W. Loveman, "Does Privatization Serve the Public Interest?." *Harvard Business Review*, November 1, 1991, https://hbr.org/1991/11/does-privatization-serve-the-public-interest.

both public and private managers of services may act in the public's interest, or go against it; the deciding factors are what actions are incentivized and whether managers can be held publicly accountable.[18] They also conclude that privatization is more likely to serve the public interest in fields that are more competitive. Therefore, our analysis of privately managed search will include the question of how competitive the field actually is. We will also use this concept of "pragmatic privatization" to consider mechanisms of accountability and incentives appropriate for the private provision of a public good.

C. METHODS OF GOVERNANCE

Policy and regulation are often considered the same thing, especially regarding public policy, which is commonly understood as the "system of laws and regulatory measures" governments and their representatives use regarding a given issue.[19] It is important to note the relationship between laws and regulations and the differences in meaning associated with *regulation*.[20] On one hand, regulation refers to systems put in place to influence behavior, such as nudging or other forms of manipulation.[21] More commonly, however, regulation refers to "policy rules enacted by 'regulators,' in the sense of administrative bodies endowed with regulatory or decisional competences by a legislator."[22] Black describes regulation as "the sustained and focused attempt to alter the behaviour of others according to defined standards or purposes with the intention of

---

[18] Goodman and Loveman.

[19] Dean G Kilpatrick, "Definitions of Public Policy and the Law," *National Violence Against Women Prevention Research Center*, Medical University of South Carolina, https://mainweb-v.musc.edu/vawprevention/policy/definition.shtml.

[20] Mireille Hildebrandt, "Algorithmic Regulation and the Rule of Law," *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* 376, no. 2128 (September 13, 2018): 2–4, https://doi.org/10.1098/rsta.2017.0355.

[21] Hildebrandt, 4–5.

[22] Hildebrandt, 4–5.

producing a broadly identified outcome or outcomes, which may involve mechanisms of standard-setting, information gathering and behaviour modification."[23]

The defined standards or purposes are set forth through policy, which can be described as a set of principles that address societal values and serve as a framework for implementation of rules. In the case of public policy these rules are typically found in regulations and laws. Whereas in private policy, these rules often explain company values or manifest as legally binding contracts, especially with terms of service. While both private and public policies are certainly shaped by existing societal values and norms, one significant distinction is that a primary function of public policy is to safeguard social welfare.[24] While private regulation is often formed in the context of existing public policies and regulations, in the context of emerging technology, such as internet search, private regulation is often formed independently from existing regulation, and at best, only loosely guided by existing policies that might not account for emerging technology.

Perritt asserts that private regulation of the internet holds significant advantages over public regulation, specifically that private regulation "more fully realizes the ideals of liberal democracy than traditional government," that private entities "are more effective than public institutions in determining and applying norms of those affected by their application," and that traditional public institutions cannot be effective in regulating [the internet]"[25] Cafaggi and Renda support this assertion, suggesting that many forms of private governance seek desirable societal goals, although they admit that there are other cases where private interest do not align with public interests, and in some cases "fail to protect democratic values."[26]

---

[23] J. Black, "Critical Reflections on Regulation," *Australian Journal of Legal Philosophy*, no. 27 (2002): 1–35. http://www.austlii.edu.au/au/journals/AUJlLegPhil/2002/1.pdf, quoted in Hildebrandt, "Algorithmic Regulation and the Rule of Law," 4–5.

[24] Fabrizio Cafaggi and Andrea Renda, "Public and Private Regulation: Mapping the Labyrinth," *The Dovenschmidt Quarterly*, no. 1 (2012): 16.

[25] Henry H. Perritt, Jr. "Towards a Hybrid Regulatory Scheme for the Internet." *University of Chicago Legal Forum* 2001 (January 1, 2001): 215–613.

[26] Cafaggi and Renda, "Public and Private Regulation," 17–18; Perritt, "Towards a Hybrid Regulatory Scheme for the Internet," 221.

Balkin describes how governments are increasingly holding tech companies liable for content on their platforms, because they are easier to identify than countless anonymous end users and because they have technical capability superior to state regulators.[27] This pattern has led to the evolution of private governance of public spaces online, as "these companies learned that they had to govern—that is, promulgate and enforce the values and norms that their communities stood for."[28] As platforms for social media and *search* determine community standards, appropriate speech and enforcement mechanisms, they developed vast bureaucracies, "which are effectively governance structures."[29]

While public policies for *search* are surprisingly absent, it is not surprising that growing distrust over the underlying intentions of governmental regulation of *search* as well as a perceived inability to effectively regulate something as complex as *search* have led public policymakers to rely on private governance and regulation over public regulation approaches.[30] Despite this, there is increasing public demand for some sort of policy to address the ethical concerns of *search*.[31]

In such cases where regulation is either difficult or impossible, public policy often serves to codify societal values and bring attention to concerns without going so far as to implement regulation or other legal restrictions. As such, regulation acts as the extension and application of policy, in that it generally provides specific rules and instructions for the implementation of policy. In general, regulation can be categorized as being private, public, or some form of public, private hybrid. The distinction between approaches is both obvious and noteworthy as there are different advantages and disadvantages and different inherent responsibilities for the entities involved.

---

[27] Jack M. Balkin, "Free Speech Is A Triangle." *Columbia Law Review* 118, no. 7 (2018), 2011–2056. https://www-jstor-org.libproxy.nps.edu/stable/26524953.

[28] Balkin, 2012.

[29] Balkin, 2012.

[30] Cafaggi and Renda, "Public and Private Regulation," 16.

[31] Surveys conducted by spreadprivacy.com find that 60% of Americans believe the right to privacy should be included in their state and federal constitutions. 80% support a national privacy law protecting them from corporate data misuse, and 83% believe individuals or government agencies should be able to sue companies for violations of privacy rights. "Privacy Research," DuckDuckGo Blog, June 18, 2019, https://spreadprivacy.com/tag/research/.

While the development of specific regulations applicable to *search* is beyond the scope of our research, understanding the relationship between policy and regulation and how the underlying ethical principles found in policy manifest into regulation is relevant to identifying and developing an appropriate and practical ethical framework for *search*.

D. PREDOMINANT ETHICAL THEORIES

For ethical guidelines to be comprehensive, they must be internalized by the people using and controlling services, and codified in policies. This is an ongoing and difficult effort considering the global nature of the internet and the explosive rate of innovation. Moor notes that emerging technologies tend to create two kinds of vacuums: a policy gap regarding normative rules and policies; and vacuums regarding conceptual frameworks that allow us to understand the issues at hand.[32] He uses this distinction to reason that the conceptual "muddle" must first be clearly resolved, after which the policy gap can be assessed to determine whether existing policy can be applied or extended.[33] Creating new policies without first addressing the conceptual gap would result in inadequate or even counterproductive policies.

With this in mind, we examined a broad range of traditional and emerging ethical concepts and theories with emphasis on those specifically relevant to *search*. From this perspective, we reviewed consequentialism and deontological ethics to determine their relevancy in search.[34] In terms of governance, relevant policies often included elements of both consequentialism and deontology, an apparent attempt to balance maximizing the

---

[32] James Moor, "Reason, Relativity, and Responsibility in Computer Ethics," in *Readings in CyberEthics*, ed. Richard Spinello and Herman Tavani (Sudbury, MA: Jones and Bartlett, 2001): 36–50.

[33] Moor, 36–60.

[34] While there are several modern philosophical approaches that seek to connect "empirical and interpretive social science to normative claims of truth, morality and justice," for emerging issues in modern societies, relevant to the societal implications of *search*, most do not lend to a meaningful evaluation framework. Claudio Corradetti, "Frankfurt School and Critical Theory" *The Internet Encyclopedia of Philosophy*," accessed August 26, 2019, https://www.iep.utm.edu/frankfur/; James Bohman, "Critical Theory," *The Stanford Encyclopedia of Philosophy* (Fall 2016), edited by Edward N. Zalta, https://plato.stanford.edu/archives/fall2016/entries/critical-theory/.

good and protecting rights, which is a simple description of the distinction between the two ethical theories.

Consequentialist theories assert that normative ethical principles are entirely contingent on the consequences of a given act or coincident to a relevant feature of said act.[35] Perhaps most well-known, classic utilitarianism is a form of consequentialism that asserts an act is only morally right if it produces "the greatest happiness for the greatest number."[36] With this in mind, utilitarianism is focused entirely on the consequences of an action in terms maximizing the greatest good, or utility, and is not concerned so much with the moral implications of the actions, going so far as to deny any moral relevance of anything other than the consequences.[37]

Even with its apparent simplicity, consequentialism presents a number of difficult problems in determining what exactly is meant by good, an epistemic problem regarding how anyone could measure overall utility and thus what is right, and how such consequentialist approaches interact with non-consequentialist ideas of justice and liberty.[38] A common criticism of utilitarianism, in governance and in general, is that it allows for and even requires injustices if that would maximize the overall welfare, which is often seen disproportionately affecting minority populations.[39] Despite such criticism, utilitarian-based frameworks are often found in modern governance that tend to focus on maximizing the overall welfare, as the good, in a society.[40] It is not surprising that governance based on this type of *welfarist* consequentialism tends to struggle in balancing

---

[35] Walter Sinnott-Armstrong, "Consequentialism," May 20, 2003, https://plato.stanford.edu/archives/fall2016/entries/consequentialism/#WhaCon.

[36] Sinnott-Armstrong.

[37] Sinnott-Armstrong.

[38] Sinnott-Armstrong.

[39] Jan-Erik Lane, *The Public Sector: Concepts, Models, and Approaches*, 3rd ed. (London: SAGE, 2000): 270–271; Julian Lamont, and Christi Favor, "Distributive Justice," *The Stanford Encyclopedia of Philosophy* (Winter 2017), edited by Edward N. Zalta, https://plato.stanford.edu/archives/win2017/entries/justice-distributive/.

[40] Lamont and Favor.

societal welfare against individual liberties, equality, and other stated rights—all of which are seen to have no inherent moral qualities.[41]

Mill famously addressed this very concern in discussing liberal principles, in stating "the only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others."[42] This concept, whereby restricting individual liberties. can only be ethically based on the prevention of harm is referred to as the *Harm principle*.[43] The Harm principle is commonly used in criminal law, and is often a foundational principle in public policy and regulation.[44] There are however problems with application of this principle in search, primarily stemming from legal exemptions found in many democratic societies.

A notable exception to the application of the Harm principle in policy and regulation is in the area of free speech, which carries significant weight within the context of search. While free speech and freedom of expression are considered essential societal values of liberal democracies such as the United States, whose governments offer wide protections to what is considered a right, application of the Harm principle places limits on what speech the government will protect and in some cases what speech is restricted. Some scholars argue that speech should never be prohibited due to the difficulty in identifying harm through speech alone.[45] In terms of *search*, there are two main concerns for governance that involve potential harm from the organizing and presentation of information, and from the content of information.

---

[41] Lamont and Favor.

[42] John Stuart Mill, *On Liberty* (Auckland, New Zealand: The Floating Press, 1909), 126–158.

[43] David Brink, "Mill's Moral and Political Philosophy," *The Stanford Encyclopedia of Philosophy* (Winter 2018), edited by Edward N. Zalta, https://plato.stanford.edu/archives/win2018/entries/mill-moral-political/.

[44] Nina Persak, *Criminalising Harmful Conduct: The Harm Principle, Its Limits and Continental Counterparts*, 1st ed. (New York, NY: Springer New York, 2007), 72–76, 135–139; Rebecca L. Brown, "The Harm Principle and Free Speech," *Southern California Law Review* 89, no. 5 (July 1, 2016), 953–955.

[45] Sunstein argues the harm principle alone is not enough to warrant restrictions on speech, while acknowledging that some speech is in fact harmful. Cass Sunstein, "Democracy and the Problem of Free Speech." *Publishing Research Quarterly* 11, no. 4 (December 1995): 58–72.

Deontological ethics refer to normative theories concerning what actions are morally prescribed, or rather what should be done, and are typically based on some set of rules or duties.[46] Deontology is a non-consequentialist approach to ethics that does not base morality purely on the subsequent effects of an action but instead observes actions as having a moral quality in themselves, based on the reasoning behind those choices and actions.[47]

Contractarian deontological theories are often used in governance and center around principles that people would accept as a social contract.[48] Often referred to as social contract theories, these approaches share the idea that there is some normative property inherent in the social contract that enables individual consent to collectively enforced agreements.[49] Contractarian frameworks do not focus on measures of utility but instead on the those principles that enable social contracts, often through concepts of justice and fairness, which are essential to acceptance of distributive justice systems whereby individual liberty is balanced against equality.[50]

Other approaches rely on the principles of democracy and focus concepts of legitimacy based on protection, productivity and majority consent.[51] The crucial point to these approaches is the idea of rational consent. Modern political theories on governance, as well as many governments, are based on social contract theories that focus less on duties and more on principles of justice that are needed to administer the various institutions of a

---

[46] Larry Alexander and Michael Moore, "Deontological Ethics," *The Stanford Encyclopedia of Philosophy* (Winter 2016), edited by Edward N. Zalta, https://plato.stanford.edu/archives/win2016/entries/ethics-deontological/.

[47] Alexander and Moore.

[48] Alexander and Moore.

[49] Fred D'Agostino, Gerald Gaus, and John Thrasher, "Contemporary Approaches to the Social Contract," *The Stanford Encyclopedia of Philosophy* (Spring 2019), edited by Edward N. Zalta, https://plato.stanford.edu/archives/spr2019/entries/contractarianism-contemporary/; Deborah Baumgold, *Contract Theory in Historical Context Essays on Grotius, Hobbes, and Locke* (Leiden: Brill, 2010).

[50] Immanuel Kant, *Grounding for the Metaphysics of Morals*; with, *On a Supposed Right to Lie Because of Philanthropic Concerns*, trans., James W Ellington, 3rd ed. (Indianapolis: Hackett Pub. Co., 1993); Lane, The Public Sector, 271.

[51] Lane, 271–272.

society.[52] Like consequentialist theories, deontological ethics also struggle with balancing duties and rights to determine whether or not an action is moral.

The tension between these ethical theories has a parallel in ideas about the nature of truth. Subjectivism, or alethic relativism, argues truth is not the same for all, as truth is constructed differently through individual contexts and interpretations.[53] Realism counters that the world exists independently of our interpretations; our thoughts and claims about the world are therefore objectively true or false.[54] Lakoff and Johnson suggest that, while these two schools of thought share a desire to understand the world and make valid contributions toward that end, they are both limited by being too absolute.[55] They propose a theory of "experientialist" truth that acknowledges real things exist independently of our interpretations, and these constrain the possible subjective interpretations.[56] Meaning is not objectively structured or subjectively unstructured in this theory, but partially structured by direct experience or indirect "metaphorical" experience.[57] For example, the statement, "the fog is in front of the mountain" seems objective and verifiable, yet the fog's location is relative to human perspective, and "fog" and "mountain" are defined inseparably from human experience.[58] Lakoff and Johnson's theory attempts to reconcile the subjectivist understanding of the internal with the objectivist understanding of the external, allowing each to compensate for the limitations of the other. Their experientialist

---

[52] Celeste Friend, "Social Contract Theory," *The Internet Encyclopedia of Philosophy*," accessed August 28, 2019, https://www.iep.utm.edu/soc-cont/#H2.

[53] Lakoff, George., and Mark Johnson. *Metaphors We Live by*. Chicago: University of Chicago Press, 1980, 225; Baghramian, Maria and J. Adam Carter. "Relativism." *The Stanford Encyclopedia of Philosophy* (Winter 2019), edited by Edward N. Zalta. https://plato.stanford.edu/archives/win2019/entries/relativism/.

[54] Glanzberg, Michael, "Truth," *The Stanford Encyclopedia of Philosophy* (Fall 2018), edited by Edward N. Zalta. https://plato.stanford.edu/archives/fall2018/entries/truth/.

[55] Lakoff and Johnson, *Metaphors We Live by*, 193.

[56] Lakoff and Johnson, 179.

[57] Lakoff and Johnson, 225.

[58] Lakoff and Johnson, 179.

account of truth considers a statement true “in a given situation when our understanding of the statement fits our understanding of the situation closely enough for our purposes.”[59]

[59] Lakoff and Johnson, 179.

THIS PAGE INTENTIONALLY LEFT BLANK

III. COMPUTER ETHICS

Computer ethics, later called information ethics, was first developed in the 1940s by Norbert Wiener to describe the social and ethical implications of computers and the internet.[60] This new branch of ethics addressed ethical issues in terms of existing theories and methods. In cases where those might be insufficient, this approach suggested applying principles of freedom, equality, and benevolence.[61] Nearly half a century later, computer ethics began incorporating professional ethical codes for software and computer development and use, separate from issues that arise from using simply using computer technology, with a focus on professional responsibility and the global nature of computer ethics.[62]

There is debate among cyber ethicists about the degree to which the digital age presents new and unique moral questions. Some say traditional ethical frameworks apply no differently online than offline, while others argue they are not sufficient to cover new technologies. Deborah Johnson reconciles these sides by acknowledging that, while human activity mediated by computers has new features, it is not a new category of human behavior.[63] In her analogy, internet ethics are a new species, but in the same genus as traditional issues. Existing ethical frameworks may be applied, but only by scrutinizing the character of the technology's effect on behavior and considering the ways it is similar and different from offline behavior. Johnson advises that this process allows ethical concerns to be addressed through internalizing norms of acceptable behavior, rather than merely looking for a technological or policy fix for immorality.[64]

---

[60] Terrell Bynum, "Computer and Information Ethics," *The Stanford Encyclopedia of Philosophy* (Summer 2018), edited by Edward N. Zalta, https://plato.stanford.edu/archives/sum2018/entries/ethics-computer/.

[61] Bynum.

[62] Bynum.

[63] Deborah Johnson, "Ethics On-Line," in *Readings in CyberEthics*, ed. Richard Spinello and Herman Tavani (Sudbury, MA: Jones and Bartlett, 2001), 26–35.

[64] Johnson, 26–35.

Johnson suggests that experts disagree on this issue based on their personal vantage point. Those approaching internet ethics from a technology field tend to overemphasize the unique aspects of computers, networks, and algorithms. Others coming from an ethics approach tend to focus on universal human values and behaviors.[65]

In this section, we examine how *search* could present a unique type of ethical dilemma, similar but crucially different from a traditional information catalog, and what the consequences could be. Johnson identifies three unique facets that make online interaction ethically distinct from offline: scope, anonymity, and reproducibility.[66] James Moor adds to this by arguing that computers are different from other technology because they are not designed for a single use.[67] Norms and laws can be more easily applied to a tool with a clearly defined use, such as a printing press, but a computer is a tool for nearly infinite purposes. We consider these, and others that distinguish search engines in particular.

A. SEARCH ENGINE ETHICS

Within the branch of computer ethics, search engine ethics is relatively new and as such there are to date comparatively few academic publications focused on the ethical implications of *search*. Despite this, there are several common concerns related to accountability, bias, democracy, and transparency that can be found in the literature.[68]

One relatively new ethical implication related to *search* is that of corporate accountability and moral responsibility. The information environment that shapes the social construction of reality is increasingly controlled by private corporations. And these private, for-profit companies are the new gate keepers of public information, with a business model of advertising and personal data collection, absent an effective accountability mechanism, in a field without competition or transparency.

---

[65] Johnson, 26–35.

[66] Johnson, 26–35.

[67] Moor, "Reason, Relativity, and Responsibility in Computer Ethics." 36–60.

[68] Tavani, "Search Engines and Ethics," 26–35.

The most profitable content on these sites, that which garners the most consumer attention, is the most extreme, divisive, and often violent.[69] The influence on public thinking and behavior is multiplied by the lack of transparency. Young adults today have had access to internet search engines from the time they learned to read, taking for granted that answers to complex questions are instantly available and independent of context.[70] Most users do not distinguish between paid and unpaid content, and extremists often "game the system" by manipulating search algorithms.[71] This intentional manipulation is mirrored by the perhaps unintentional rise of fake and extremist content given the advantage conferred by the algorithmic incentive structure. These conditions combined provide adversaries with an opportunity to conduct extremely effective, large-scale influence operations, turning the valued principles of free speech and free markets into weapons. Studies have shown that individuals initially accept a proposition as true and then afterward confirm or deny the initial assumption of truth through separate cognitive processes.[72] Processes of invisible influence can become patterns that constitute content bias, consistently promoting one side in political conflicts.[73] Bias in search algorithms as well as traditional media can be evaluated by identifying these framing patterns that regularly prime the audience to favor one side over the other.

> The consolidating question, then, is whether the agenda setting and framing content of texts and their priming effects on audiences fall into persistent, politically relevant patterns. Powerful players devote massive resources to advancing their interests precisely by imposing such patterns on mediated

---

69 Safiya Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: New York University Press, 2018), 116–117.

70 Noble, Safiya. "Algorithms of Oppression." Seaside, Califonia, November 28, 2018.

71 Noble, *Algorithms of Oppression*, 46–50.

72 E.W. Asp, and D. Tranel, "False Tagging Theory: Toward a Unitary Account of Prefrontal Cortex Function," in D. T. Stuss and R. T. Knight, eds. *Principles of Frontal Lobe Function* (New York, NY: Oxford University Press), 387–389; Daniel T. Gilbert, Douglas S. Krull, and Patrick S. Malone, "Unbelieving the Unbelievable: Some Problems in the Rejection of False Information." *Journal of Personality and Social Psychology* 59, no. 4 (October 1990): 601–613.

73 Entman, Robert M. "Framing Bias: Media in the Distribution of Power." *Journal of Communication* 57, no. 1 (March 2007): 164.

> communications. To the extent we reveal and explain them, we illuminate the classic questions of politics: who gets what, when, and how.[74]

The sheer quantity of sensory information in our environment would overwhelm us without a way to filter and make sense of it all. Our perceptual and cognitive systems depend on shortcuts and blind spots to help us process the most useful information and filter out the rest. While these biases are most apparent in their mistakes and shortcomings, they are also highly successful (and necessary) in navigating the constant onslaught of input. These processes function subconsciously, which obscures their effects and leads us to believe our version of reality is the only correct one. Even when aware of perceptual and cognitive biases, it can be difficult to reconcile different or conflicting interpretations of events. Why do individuals or groups perceive the same event in vastly divergent ways? Individual cognitive bias, interacting with the influence of society and group identity explain how an almost imperceptible subconscious frame can tap into a much larger thought pattern.

Search results present just such a seemingly innocuous frame, belying the depth and scale of influence they exert through simply categorizing and ranking information. Categories operate through highlighting and exclusion, to change meanings, often radically. Most significantly, categories allow the "creation and remolding of public beliefs about the causes of particular outcomes, thereby justifying some actions and building opposition to others".[75] This is often seen in the extension of war as a metaphor, illuminating the way prejudice operates in categorizing people with language like "enemy" or "target." Additionally, Edelman also points out how easily a problem categorized as "military" precludes consideration of possible civilian solutions.[76] Categories, like metaphors, can be especially powerful when they are seen to be self-evident or inherently accurate, rather than merely one of many possible interpretations of reality.

---

[74] Entman, 164.

[75] Murray Edelman, "Contestable Categories and Public Opinion." *Political Communication* 10, no. 3 (January 1, 1993): 232. https://doi.org/10.1080/10584609.1993.9962981.

[76] Edelman, 235.

The imperfect, constructed nature of categories is illuminated by Rosch and Mervis in their exploration of prototypes and family resemblances.[77] Their studies find that categories are not rigidly defined by criterial features, but instead are intuited based on a nuanced degree of resemblance to the prototypical member of the category.[78] For example, a robin is a more prototypical member of the bird category, while a penguin or ostrich are further from the prototype. This is not based only on conformity to a checklist of attributes but is often rooted in culturally informed norms and standards. This is especially true for more abstract or subjective categories, or when there are blurred lines and overlap between groups. Children learn categorization by testing labels for utility; they are developed to serve a practical purpose, not to describe objective reality.[79] This allows for intentional manipulation of truth through categorization. As Lakoff and Johnson describe, "whether a statement is true depends on whether the category employed in the statement fits and this in turn varies with human purposes and other aspects of context."[80] Edelman argues that these human purposes exert themselves most detrimentally in political discourse, where "the choice of categories is typically driven by ideology and prejudice rather than by rigorous analysis or the aspiration to solve social problems."[81]

While algorithms and advertisers are widely blamed for many of the ethical concerns related to search, research indicates that information seekers undervalue the impact of bias on themselves, overvalue the impact of bias on others, and prefer

---

[77] Elanor Rosch and Carolyn Mervis, "Family Resemblances," *Cognitive Psychology* 7, no. 4 (October 1975): 573–605.

[78] Rosch and Mervis, 573–605.

[79] David Berreby, *Us and Them: The Science of Identity* (Chicago, IL: Chicago University Press, 2008), 67.

[80] Lakoff and Johnson, *Metaphors We Live by*, 165.

[81] Edelman, "Contestable Categories and Public Opinion," 232.

information that confirms their own prejudices over accurate and true information.[82] As algorithm-driven platforms have exacerbated the effects of cognitive biases that interfere with reasoning, such bias underlies the search process regardless of potential bias in the algorithmic systems.[83]

B. DISCLOSIVE ETHICS

While many scholars have proposed methods to address the challenges presented in computer ethics, particularly relevant to our concerns with search is Philip Brey's "disclosive computer ethics." This approach calls for the moral deciphering of embedded values and norms, and includes issues that are not yet recognized as morally problematic.[84] Brey specifically notes the perceived moral neutrality of search engines, which belies the power they and other technologies wield to "coerce individuals to behave in certain ways, may provide opportunities and constraints, may affect cultural belief systems, and may require certain background conditions for them to function properly."[85] Far from being neutral, these technologies have both moral and political properties, and should be morally evaluated as elements of social structure, independently from an individual's use of them.[86]

Brey proposes that these hidden moral issues be addressed by disclosive analysis that first makes the embedded values or biases visible, and then evaluates them according to foundational moral principles. A distilled list of principles derived from consequentialist, deontological, and rights-based theories can serve as a means to apply theory to practice. These moral principles constitute "*prima facie* duties that are always in force but may

---

[82] Bertin Martens, Luis Aguiar, Estrella Gomez-Herrera, and Frank Mueller-Langer, "The Digital Transformation of News Media and The Rise of Disinformation and Fake News," *European Commission, Joint Research Centre Digital Economy Working Paper* (2018-02), 43; Mathew Gentzkow, Jesse Shapiro, and Daniel Stone, *Media Bias in the Marketplace: Theory* (Cambridge, MA: National Bureau of Economic Research, February 2014), 25; S. Jang and Joon K. Kim, "Third Person Effects of Fake News: Fake News Regulation and Media Literacy, Interventions," *Computers and Human Behavior* 80 (2018): 295–302.

[83] Martens, Aguiar, Gomez-Herrera, and Mueller-Langer, 44.

[84] Brey, "Disclosive Computer Ethics," 10–11.

[85] Brey, 11.

[86] Brey, 11.

conflict on occasion."[87] There are numerous proposed foundational ethical principles for governing technology that could be considered here. One foundational example is Spinello's four principles of autonomy, nonmaleficence, beneficence, and justice, proposed in his theory of computer ethics.[88] Brey's four key values of justice, autonomy/freedom, democracy, and privacy closely resemble Spinello's and other proposed ethical principles.[89] Because Brey is specifically addressing the ethics of invisible or opaque bias and manipulation, we will use his proposed principles for our analysis.

Brey acknowledges that any proposed list of principles will spark controversy, but whatever they are, they must serve an analysis at multiple levels.[90] These levels are first, the disclosure level, which analyzes a technology according to a moral value.[91] Second, the theoretical level develops and refines moral theory according to emerging challenges posed by new technology.[92] Third, the application level involves moral deliberation on which theory to apply to an issue and how.[93] This multilevel process requires multidisciplinary expertise, from philosophers, computer scientists, and social scientists.[94]

---

[87] Richard A. Spinello, *Cyberethics: Morality and Law in Cyberspace*, 5th ed. (Burlington, MA: Jones & Bartlett Learning, 2014), 23.

[88] Spinello, 23–25.

[89] Spinello, 23–25; Brey, "Disclosive Computer Ethics," 14.

[90] Brey, 15.

[91] Brey, 15.

[92] Brey, 15.

[93] Brey, 15.

[94] Brey, 15.

THIS PAGE INTENTIONALLY LEFT BLANK

IV. DISCLOSED ISSUES

In this chapter, we begin the first step of our analysis by identifying the underlying ethical issues of *search* and categorizing disclosed issues as they pertain to personalization, judgment, and scale.[95] Disclosure of search engine ethical issues is both especially difficult and important because of the hidden nature of algorithmic workings. Secrecy is an essential element to the business model and has so far trumped efforts to scrutinize the values at work in these proprietary systems. Therefore, a core question to be answered is whether the need for transparency should outweigh the need for profit and innovation, and if so, how much transparency is needed. In order to answer this question, we will focus on ethical concerns that are related to the current lack of transparency in search engines.

Pasquale's analysis of the demonstrated and potential issues with search engines concludes that overarching concerns are trust and transparency. He establishes that *search* has supplanted traditional media in influencing our thoughts and behavior, even rebuilding our social world. However, "their dominance is so complete, and their technology so complex, that they have escaped pressures for transparency and accountability that kept traditional media answerable to the public."[96] Transparency, rather than a discreet issue in itself, is an omnipresent factor in all other concerns. Whatever moral risks and choices the users of search face, only with transparency are they able to reflect their values in their actions. If a company is violating norms or regulations, transparency will allow them to be accountable.

The issues that exemplify the need for transparency fall into several categories. First, there is the personalization of results, delivering both sponsored and organic results specific to the user. This could be a feature desired by the searcher but could also have harmful implications when not used transparently such as creating a filtered information bubble plugged with unmarked paid content. Second, we will examine the issue of opaque

---

95 Frank Pasquale, *The Black Box Society: The Secret Algorithms That Control Money and Information* (Cambridge: Harvard University Press, 2015), 61.

96 Pasquale, 61.

judgment on what content should be censored and how content is ranked. These judgments are often made by purportedly neutral algorithms, and there is some public information about censorship standards, but these enormously consequential decisions are largely taking place out of the public eye. Third, the universality of Google means that it is more than simply an index system, but a kingmaker and gatekeeper, determining everything from personal reputations to business success. This unique degree of power requires a new evaluation of accountability and responsibility.

In the following sections, we disclose several underlying ethical issues of *search* and broadly categorize those issues as they pertain to personalization, judgment, and scale. The disclosed issues we identify are: reinforcing bias and polarization, collecting and exploiting personal data, government surveillance, lack of consent and voluntary disclosure, algorithmic bias, objectivity and neutrality, search engine optimization, stifling competition, accountability, universality, permanency and the right to be forgotten, the Internet of Things and non-public internet devices, and complexity.

A. PERSONALIZATION

Personalized *search* differs from contextual *search* in that its results are greatly influenced by the personal information of the searcher. While contextual *search* typically considers a searcher's language, geographic location, and the specific search query, personalized *search* accounts for the specific searcher's past *search* activity, social connections, purchase history, frequency of site visitation, and other information unique to that searcher.[97] In the absence of transparency in exactly how *search* personalization works, some researches have speculated that it might rely primarily on the data of other users, with the search engine collecting personal information to construct a database of

[97] Google, "Some Thoughts on Personalization," Inside Search (blog), accessed September 5, 2019, https://search.googleblog.com/2011/11/some-thoughts-on-personalization.html.

statistical profiles for reference, to infer personalized results based on aggregate searcher information.[98]

Google and other proponents of personalized *search* suggest that more individual user information allows the search engine to provide more specific and relevant results.[99] Some scholars refute this in suggesting the benefits of such specific results are marginal at best given the concerns over transparency and the limited understanding of the potential social and political issues related to personalized *search*.[100] This system of personalizing results differs from the targeting strategy of segmentation, which groups users by a set of broad traits such as location, demographics, or preferences.[101] While this distinction is important to marketers of targeted ads, the filter bubble effect on the audience results from both.

1. Issue: Reinforcing Bias and Polarization

Advertisers use online behavior data to target potential consumers, but even ostensibly unbiased search results are often tailored for an individual's location and past behavior. This "filter bubble" could harm principles of democracy by reinforcing biases and deepening lines of segregation and polarization between communities. Google has claimed that it does not personalize results in this way, due to the risk of losing users' trust, and because the practice did not demonstrably improve user satisfaction.[102] However, research comparing search results for identical keywords shows that people are, in fact,

---

98 Martin Feuz, Matthew Fuller, and Felix Stalder, "Personal Web Searching in the Age of Semantic Capitalism: Diagnosing the Mechanisms of Personalisation," *First Monday* 16, no. 2 (February 1, 2011), https://doi.org/10.5210/fm.v16i2.3344.

99 Theo Rohle, "Desperately Seeking the Consumer: Personalized Search Engines and the Commercial Exploitation of User Data," *First Monday* 12, no. 9 (September 3, 2007), https://doi.org/10.5210/fm.v12i9.2008.

100 Feuz, Fuller, and Stalder, "Personal Web Searching in the Age of Semantic Capitalism."

101 "The Dialog between Data, Segmentation and Personalization and Its Impact on Customer Experience," Dynamic Yield (blog), April 13, 2015, https://www.dynamicyield.com/blog/segmentation-is-not-personalization/.

102 "Measuring the Filter Bubble: How Google Is Influencing What You Click," DuckDuckGo Blog, December 4, 2018, https://spreadprivacy.com/google-filter-bubble-study/.

still receiving personalized Google search results.[103] These experiments found significant variation of results, even when searchers were logged out of Google and using anonymous "incognito" mode.[104] This example of filter bubbling may contribute to user satisfaction through more relevant results, but the user is not aware of the filtering and editorializing at work.

Without transparency and choice, users have no idea how their results differ from their neighbors and what information may be missing. This is especially concerning in areas that affect political behavior, and when considered in aggregate. Another consequence of the filter bubble is how search inquiries may lead to increasingly extreme ideas.[105] This tendency toward polarization and bias reinforcement is a gaping vulnerability to exploitation by adversaries who may benefit from increasing social fracturing and distrust in the United States, as seen in Russian interference in the 2016 election.

2. Issue: Collecting and Exploiting Personal Data

Search behavior and personal data can predict not just benign information and ad preferences, but also weaknesses that can be exploited. Third-party companies have been documented as buying personal data profiles for vulnerable demographics, such as the elderly, poor, or depressed, and targeting those groups with scams or other exploitative marketing.[106] As a form of surveillance, personalized *search* provides the commercial sector an advantage in behavioral marketing.[107] Certain behavioral indicators like porn, gambling, drug or alcohol use can make people valuable targets for results that appeal to

---

103 "Measuring the Filter Bubble."

104 "Measuring the Filter Bubble."

105 The case of Dylann Roof provides an example of this, where he used Google search to understand Trayvon Martin's death and interracial violence, then continued through a resulting succession of white supremacist sites, eventually deciding to murder members of a black church in Charleston, SC. "What Happened When Dylann Roof Asked Google For Information About Race?," NPR.org, accessed October 10, 2019, https://www.npr.org/sections/thetwo-way/2017/01/10/508363607/what-happened-when-dylann-roof-asked-google-for-information-about-race

106 Pasquale, *The Black Box Society*, 79.

107 Rohle, "Desperately Seeking the Consumer."

those urges and addictions; however, when these indicators are exploited by governments, the stakes may be significantly higher.[108]

Search data is not just valuable for advertising, but also for political campaigns. Campaigns or foreign influence operations can use personal data to identify potential supporters to target with persuasion or mobilization efforts.[109] Demographic data can be augmented and refined by using predictive correlates to online behavior, including *search*, especially for online political outreach. Hersch identifies an additional political use of personal data: discrimination in provision of government services.[110] As campaigns compile increasingly granular and accurate profiles of voters for microtargeting, these profiles and segmentations can be used to determine which constituents' concerns get attention or are ignored. Citizens contacting their representatives usually are asked for personally identifying information, which can then be referenced in a voter database to assess their individual value to the lawmaker in terms of a future reelection.[111] This creates a political market, turning every voter into "a stock with its own fluctuating price. And each campaign must decide if and how to invest in us. If we merit the investment, then they decide not only what information to feed us but also how much and how to deliver it."[112] This value calculation has always been a preoccupation of politicians, but the availability of personal data and online behavior allows them to allows them to analyze individuals rather than demographic groups, and on an unprecedented scale.

Studies of search data have revealed that users frequently use search for questions too private to ask another person, at times even typing, not questions at all, but confessions

---

[108] Before pulling services from China, Yahoo provided the Chinese government with search related personal information that was later used to jail Chinese citizens. Gary Dann, and Neil Haddow, "Just Doing Business or Doing Just Business: Google, Microsoft, Yahoo! and the Business of Censoring China's Internet," Journal of Business Ethics 79, no. 3 (May 2008): 219, 229–230.

[109] Hersch's conclusion that politicians do not make significant use of these commercial data may be incomplete, however, as he did not analyze Republican campaigns or the 2016 election, and only used information volunteered by the campaigns and their data aggregators. Eitan D. Hersh, *Hacking the Electorate: How Campaigns Perceive Voters* (Cambridge: Cambridge University Press, 2015), 200–203.

[110] Hersh, 200–203.

[111] Hersh, 203.

[112] O'Neil, *Weapons of Math Destruction*, 192.

into the search bar.[113] Stephens-Davidowitz found that Google search data provides a more honest reflection of human sentiment and behavior than people are willing to admit in surveys.[114] This discrepancy illustrates the extent to which people consider their search behavior to be private; they willingly reveal personal information they do not disclose to surveys conducted by strangers or even automated systems. This expectation of privacy has no doubt contributed to more people finding help with personal or taboo problems they would not bring up to an acquaintance, such as depression, drug abuse, domestic violence, health conditions, and others. Violation of that privacy, either real or imagined, would likely impact the online behavior of such users, if they believe their behavior is monitored.

3. Issue: Government Surveillance

While many search companies state their services are not used to gather information for surveillance purposes, there are concerns that this is occurring, especially in countries where the government has significant control over internet search companies.[115] Google's aborted project for the Chinese government would have associated every search with an individual phone number, allowing the government to identify individuals attempting to access information considered subversive or critical.[116] In the United States, it is unclear how much user data tech firms share with the government, as their statements walk the line between protecting privacy and supporting law enforcement and national security.[117] However, direct cooperation is often unnecessary with the rise of data brokers, companies

---

[113] Stephens-Davidowitz, *Everybody Lies*, 4.

[114] Stephens-Davidowitz, 109

[115] Google, "AI at Google: Our Principles," Accessed 7 August 2019, https://www.blog.google/technology/ai/ai-principles/; Dann and Haddow, "Just Doing Business or Doing Just Business," 226; Internet Society of China "ISC Members," Accessed 6 August 2019, http://www.isc.org.cn/english/Member/listinfo-15319.html.

[116] Ryan Gallagher, "Google Plans to Launch Censored Search Engine in China, Leaked Documents Reveal," *The Intercept* (blog), August 1, 2018, https://theintercept.com/2018/08/01/google-china-search-engine-censorship/.

[117] Natasha Tiku, "Jeff Bezos Says Tech Companies Should Work With the Pentagon," Wired, October 15, 2018, https://www.wired.com/story/amazons-jeff-bezos-says-tech-companies-should-work-with-the-pentagon/.

who exist to buy personal data from tech companies and sell it to buyers that include government agencies, both foreign and domestic.[118]

4. Issue: Lack of Consent and Voluntary Disclosure

In many cases, data collection and personalization are not apparent. Even when a searcher is aware that they are disclosing their personal information, they rarely have a choice in how that information will be used.[119] Some studies indicate that online users are more likely to disclose personal information when there is perceived benefit or provided service and no immediate cost.[120] Though services that collect personal information claim to provide privacy policy disclosure and free choice to users, Nissenbaum evaluates these as misleading claims, considering the necessity of some online services, the lack of true choice, and the burden of technical complexity.[121]

In this section, we identified personalization issues of reinforcing bias and polarization, collecting and exploiting personal data, government surveillance, and lack of consent and voluntary disclosure. In the next section we will identify issues related to judgment.

B. JUDGMENT

Judgments embedded into *search* determine how content is ranked and what content is presented as a search result for a given search query. As these judgments are often embedded in algorithmic systems, there is a presumption of neutrality and objectivity.

---

[118] Algorithms: How Companies' Decisions About Data and Content Impact Consumers:, Hearing before the Energy and Commerce Committee, Subcommittee on Digital Commerce and Consumer Protection, Senate, 115th Cong., 1st sess., November 29, 2017.

[119] Nathan Newman, "Search, Antitrust, and the Economics of the Control of User Data," *Yale Journal on Regulation* 31, no. 2 (June 22, 2014): 401–54.

[120] Bettina Berendt, Oliver Günther, and Sarah Spiekermann, "Privacy in E-Commerce: Stated Preferences vs. Actual Behavior," *Communications of the ACM* 48, no. 4 (April 1, 2005): 101–106, https://doi.org/10.1145/1053291.1053295.e-come; Nathan Newman, "The Costs of Lost Privacy: Consumer Harm and Rising Economic Inequality In The Age Of Google," *William Mitchell Law* Review, no. 40 (January 1, 2014): 6.

[121] Helen Nissenbaum, "A Contextual Approach to Privacy Online," *Daedalus* 140, no. 4 (October 2011), 35, https://doi.org/10.1162/DAED_a_00113.

However, these judgments are not transparent, limiting understanding of decisions about content, which given the ubiquity of search engines, may have enormously consequential implications.

The impact of *search* on judgment can be seen most acutely in the public sector in the form of distorted perceptions of important and consequential issues in "politics, science, and medicine," often based on false information that otherwise ranks high enough to present as a search result.[122] Such cases include the growing belief that vaccinations can lead to autism, increased denial of climate change, increased domestic radicalization, increased social instability, and declining confidence in political systems, such as elections, the rule of law, and judicial processes.[123]

1. Issue: Algorithmic Bias

While search engines are often considered unbiased in that they rely on computer algorithms over inherently biased human decision making, the algorithms have encoded biases related to editorial judgments made by search engine companies impacting what data they collect and how that data is presented in search results.[124]

Before completing a keyword search, search engines find and organize websites and their information. Search engines find websites through a process called web crawling, that searches for new and updated websites to add to a massive database known as an index. They organize information through a process called indexing, in which the websites and contained information collected from web crawling is processed into the index and associated with meta-data that can be used later to quickly reference information based on

[122] D.J. Flynn, B. Nyhan, and J. Reifler, "The Nature and Origins of Misperceptions: Understanding False and Unsupported Beliefs About Politics," *Advances in Political Psychology*, no. 38 (2017): 127–150.

[123] Flynn, Nyhan, and Reifler, 127–150.

[124] Eric Goldman, "Search Engine Bias and the Demise of Search Engine Utopianism," *Yale J. L. & Tech* 188 (2006): 123, https://digitalcommons.law.scu.edu/facpubs/76

keyword searches. Web crawling and indexing methods directly impact the result from a given search query, leading to potential coverage bias.[125]

Search engines may omit websites or information contained on those sites when web crawling and indexing. While this is often the case with large files or websites that do not conform to a format the search engine can easily crawl, omissions may be intended for undisclosed reasons.[126] Search engines may omit or misrepresent websites when indexing provided meta-data (title-tags, meta-tags, and meta descriptions) that do not align with search engine standards, or if third party descriptors cause a website to be described in a way inconsistent with the source website.[127]

Algorithmic ranking systems make editorial judgments on what factors to include and how those factors are weighed. Search engines routinely adjust algorithmic systems to alter results for various reasons, based on requests from websites and governments, or to block offensive results. While search engines may provide notice when results are adjusted, in most cases, changes are quietly made purportedly to optimize results.[128] Search engines may also be structurally biased to favor their own services and products over their competitors.[129] While this bias seems clear, the lack of transparency in the details of search engine algorithms make assessments of bias difficult though not impossible.[130]

Safiya Noble has documented numerous examples of so called "glitches" in Google's algorithm that returned racist and otherwise offensive search results, autocomplete suggestions, facial recognition, image tags, and location tags.[131] She argues that through *search*, "we have automated human decision making," including our worst

---

[125] Liwen Vaughan and Mike Thelwall, "Search Engine Coverage Bias: Evidence and Possible Causes." *Information Processing and Management* 40, no. 4 (2004): 693–707.

[126] Goldman, "Search Engine Bias and the Demise of Search Engine Utopianism," 123.

[127] Goldman, 123.

[128] Goldman, 123.

[129] Joshua G Hazan, "Stop Being Evil: A Proposal for Unbiased Google Search," *Michigan Law Review* 111 (n.d.): 796.

[130] Goldman, "Search Engine Bias and the Demise of Search Engine Utopianism," 123.

[131] Noble, *Algorithms of Oppression*. 181.

impulses, and then disavowed responsibility.[132] She emphasizes the unavoidable transfer of human bias into code, and suggests the homogeneity of coders reinforces certain assumptions and worldview.[133] However, some scholars suggest that technological advances have made this type of structural bias moot, as the transition from a "one-size-fits-all," context based searches towards personalized searches significantly diminishes the impact of preferences written into search algorithms.[134]

2. Issue: Objectivity and Neutrality

There is a presumption of neutrality and objectivity in how search engines assess search queries and deliver search results, yet this may not be the case due to inherent bias the influence of advertising, and other undisclosed content selection decisions.[135] Advertisers compensate search engines that promote their products and services, which in many cases, is the search engine's business model. This relationship between advertisers and search engine companies likely influences what search results are shown, as search engines sponsor websites that pay them.[136] Google's founders foresaw this issue and, before company policy changed to embrace the advertising business model, wrote, "the goals of the advertising business model do not always correspond to providing quality search to users.... we expect that advertising funded search engines will be inherently biased towards the advertisers and away from the needs of the consumers."[137]

Search results are often directly manipulated by search engine companies when there are concerns over the results. In the case of Google, search results are constantly monitored for quality and relevance in part through machine learning, but also through

---

[132] Noble, 181.

[133] Noble, 181.

[134] Goldman, "Search Engine Bias and the Demise of Search Engine Utopianism," 130.

[135] Oren Bracha and Frank Pasquale, "Federal Search Commission? Access, Fairness, And Accountability in The Law of Search," *Cornell Law Review*, no. 93 (September 1, 2008): 1178.

[136] Bracha and Pasquale, 1170.

[137] Sergey Brin and Lawrence Page, "The Anatomy of a Large-Scale Hypertextual Web Search Engine," 2007, http://infolab.stanford.edu/~backrub/google.html.

human evaluations of specific search requests against the resulting websites, using a set of guidelines specific to each search engine.[138] While Google denies that it fixes individual search results when there are concerns over those results, it acknowledges that it uses human search rater evaluations to implement changes, although it is unclear if those changes are made to the index or the search algorithm.[139]

Judgment is a necessary function of a service that sorts and ranks resources, but the consolidation of this power in the hands of a few is a reason for concern. The role of a free press in democracy is similar in that it ensures a diversity of information remains available to all citizens. The journalistic judgment over what content to include and how to frame it is an immensely influential power, and democracy is threatened by centralized or autocratic control over this function. In terms of search, "users for whom certain information is suppressed do not even know that they do not know the information."[140] As in the provision of news, searchable information is subject to the judgments of its governing editor or algorithm. Baker et al. suggest the democratic value of egalitarian self-determination should apply to the public sphere, which is structured by media corporations.[141] They identify the danger that media concentration can pose to a democracy where the editorial judgments of only a few decision makers are available.[142]

Judgment on what content is deserving of visibility and what should be prohibited raises censorship and first amendment questions. When speech is regulated by government, through legislation and legal decisions, the process is relatively democratic, meaning transparent, representative, and accountable to the will of the people. When these judgments are made by secret algorithms or corporations, much of this public input is

---

[138] Google, "How Search Works," accessed August 20, 2019, https://www.google.com/search/howsearchworks/.

[139] Danny Sullivan, "How We Keep Search Relevant And Useful," *Google, The Keyword* (blog), July 15, 2019, https://www.blog.google/products/search/how-we-keep-google-search-relevant-and-useful/.

[140] Bracha and Pasquale, "Federal Search Commission?," 1178.

[141] C. Edwin Baker, W. Lance Bennett, and Robert M. Entman, *Media Concentration and Democracy: Why Ownership Matters* (Cambridge, United Kingdom: Cambridge University Press, 2006), 7, http://ebookcentral.proquest.com/lib/ebook-nps/detail.action?docID=281758.

[142] Baker, Bennett, and Entman, *Media Concentration and Democracy*, 7.

absent. This has led to several recent free speech controversies, including the European Union's "right to be forgotten" which allows individuals to demand certain content about them be excluded from search results.[143] A related concern is the magnitude of fake news and misinformation proliferating both on social media and other digital platforms such as search, and the consequent response of the tech industry to mitigate the problem without causing a larger censorship issue. On the business and advertising side of speech, several internet companies have chosen to cut ties or outright block hate group sites following violent incidents in Charlottesville and El Paso.[144]

While these publicized restrictions on speech appear to be in response to public demand and in the spirit of the first amendment, they raise questions as to what other censorship judgments may occur. Google's work on a censorship-based search engine for the Chinese government provoked criticism for apparent complicity in repression of essential freedom.[145] U.S. lawmakers have questioned whether political bias has actively censored conservative ideas online, which Google has attempted to refute by demonstrating comparable rankings for both Democrats and Republicans.[146]

3. Issue: Misinformation

Misinformation commonly refers to information that is wrong or misleading so as to produce a factual belief, meaning a belief that is held to be true, that is false or contradicts available information and not understood as being an opinion or an interpretation after

---

[143] Balkin, "Free Speech Is a Triangle," 2013.

[144] Kerry Flynn, "After Charlottesville, Tech Companies Are Forced to Take Action against Hate Speech," Yahoo News, August 16, 2017, https://news.yahoo.com/charlottesville-tech-companies-forced-action-213554799.html; Michelle Quinn, "After Mass Shootings, Tech Industry Shuns 8chan," Voice of America, August 6, 2019, https://www.voanews.com/silicon-valley-technology/after-mass-shootings-tech-industry-shuns-8chan.

[145] Gallagher, "Google Plans to Launch Censored Search Engine in China, Leaked Documents Reveal."

[146] *Google and Censorship through Search Engines: Hearing before Judiciary Subcommittee on The Constitution*, Senate, 116th Cong., 1st sess., July 16, 2019, https://www.judiciary.senate.gov/meetings/google-and-censorship-though-search-engines.

consideration of the given information.[147] The occurrence of misinformation is not new to modern society, however, advances in information technologies, such as *search*, have led to an increase in the scale, speed, and penetration of misinformation.[148] In the context of *search*, the implications are global and increasingly supported by algorithm-driven platforms.[149] The resulting impact from the coordinated use of misinformation is unprecedented in terms of exposure to fake and extremist content as well as foreign disinformation and distortion campaigns that threaten the integrity of democratic political processes and values. When implemented at such a large scale, misinformation has the potential to shape political and societal decisions that may not be in society's best interests.[150] The effects of misinformation can be seen in the public sector in the form of distorted perceptions of important and consequential issues in politics, science, and medicine, that have led to the growing belief that vaccinations can lead to autism, increased denial of climate change, increased domestic radicalization, increased social instability, and declining confidence in political systems, such as elections, the rule of law, and judicial processes.[151]

Producers of misinformation exploit human susceptibility to narratives and societal reliance on search as a primary source of credible information.[152] Young adults today have had access to internet search engines from the time they learned to read, taking for granted

---

147 OED Online, *Oxford University Press (*December 2018), http://www.oed.com.libproxy.nps.edu/view/Entry/119699; Flynn, Nyhan, and Reifler, "The Nature and Origins of Misperceptions," 127–150; Paul Resnick, Aviv Ovadya, and Garlin Gilchrist, "Iffy Quotient: A Platform Health Metric for Misinformation," *Center for Social Media Responsibility, University of Michigan School of Information* (October 10, 2018), 2.

148 Martens, Aguiar, Gomez-Herrera, and Mueller-Langer, "The Digital Transformation of News Media and The Rise of Disinformation and Fake News," 47.

149 Martens, Aguiar, Gomez-Herrera, and Mueller-Langer, 47; Thomas J. Holt, "Exploring the Intersections of Technology, Crime, and Terror." *Terrorism and Political Violence* 24, no. 2 (April 1, 2012): 337–338.

150 Stephan Lewandowsky, Ullrich Ecker, Colleen Seifert, Norbert Schwarz, and John Cook, "Misinformation and Its Correction: Continued Influence and Successful Debiasing," *Psychological Science in the Public Interest,* 13, no. 3 (December 1, 2012): 107.

151 Flynn, Nyhan, and Reifler, "The Nature and Origins of Misperceptions," 127–150.

152 Kristen Purcell, Joanna Brenner, and Lee Rainie, "Search Engine Use 2012," *Pew Internet and American Life Project* (March 9, 2012): 3–10.

that answers to complex questions are instantly available and independent of context. The massive volume of information available has led people to read with less scrutiny when processing information, by skimming information in this way, it has become more difficult to distinguish between verifiably false stories and fact-based stories.[153]

Search engines can be an especially powerful vehicle for misinformation. Though they are sometimes considered less of a risk than social media because users can see many results and choose the best, in practice users do not cross check answers to their questions. However, Google recognizes that users do not want a research tool but an easy, "one true answer."[154] This easy answer is presented in a separate, highlighted box at the top of the results page, or read aloud from the Google Home smart speaker device. In this way, Google has removed the context of other results and discouraged additional review. While many queries lend themselves to "one true answer," others are more complicated or prone to misinformation.[155]

In this section, we identified judgment issues of algorithmic bias, objectivity and neutrality, and misinformation. In the next section, we will identify issues related to scale.

C. SCALE

Search engines, like other algorithm and machine-learning based services, improve with scale, reinforcing growth and success. With more users generating data, results improve, leading to more popularity and even more inputs. This has subverted the standard Silicon Valley narrative that innovative and disruptive entrepreneurs are constantly on the brink of overturning the established order. In search and other tech innovations, private industry has expanded power to set policy and eliminate competition.

---

153 Brian Southwell, Emily Thorson, and Laura Sheble, "The Persistence and Peril of Misinformation," *American Scientist* 105, no. 6 (November 1, 2017): 372.

154 Adrianne Jeffries, "Why Does Google Think Obama Is Planning a Coup d'etat?," *The Outline*, accessed September 18, 2019, https://theoutline.com/post/1192/google-s-featured-snippets-are-worse-than-fake-news.

155 Jeffries.

1. Issue: Stifling Competition

Companies like Google and Amazon have reached a level of scale and control that allows them to maintain dominance, reinforcing their position, and cutting off potential competitors.[156] Search engines are also necessary for content creators to reach audiences, giving search the advantage in profiting from those connections while writers, artists, and musicians lose revenue and power.[157]

2. Issue: Accountability

This degree of power more easily resists efforts to enforce accountability and is the reason search companies are facing anti-trust challenges from some governments as well as lawsuits from frustrated competitors. Often, the very people who should be agents of accountability are thwarted by the power that comes from scale. The technical complexity of algorithms exceeds the comprehension of most lawmakers, causing them to rely on the expertise of the industry they are attempting to regulate. Additionally, the large-scale predictive profiling of citizens has become an essential tool for elected officials' reelection campaigns, adding a conflict of interest to the effort to hold companies accountable.[158]

3. Issue: Universality

Another aspect to the issue of scale is the universality of search engines' scope. No longer simply a directory or index of websites, steadily more of the world of people, places, things, and ideas is defined by search companies. The opaque process of how humanity's knowledge is being tagged and ranked is a cause for concern that there should be more transparency to the public and experts. Pasquale cites Google's project to scan millions of books to create greater public access to knowledge, but with potential shortcomings. Without transparency, library scientists or the public are unable to challenge controversial

---

156 Pasquale, *The Black Box Society*, 90–91.

157 Pasquale, 96.

158 Hersch, *Hacking the Electorate*, 212.

categorizations or rankings, and control over copyrighted material could shift to Google and away from the authors.[159]

4. Issue: Permanency and the Right to Be Forgotten

When using a search engine to find information on a specific person, "scattered moments of their life are presented mechanistically, with a significance distorted by lack of context, building a detailed but selective profile;" this presents ethical concerns over what rights an individual may have over information about themselves.[160] Commonly referred to as the "right to be forgotten," this issue goes beyond the balancing of privacy and free speech as in many cases web content may reference an individual without their consent yet potentially benefit society, especially in cases of politics or public safety.[161]

5. Issue: The Internet of Things and Non-public Internet Devices

In addition to indexing websites, search engines are increasingly identifying and adding information on internet connected devices into their indexes and working on ways to incorporate this data into search.[162] These networked devices, often referred to as the Internet of Things, are functionally different from content producing websites, yet these devices produce significant amounts of information that search engines can incorporate into their algorithmic systems. The benefits are apparent when considering how a search engine might use data from an internet-connected weather monitoring device to provide real-time information to answer a question about local weather, yet there are concerns related to other private devices, such as those used in a smart home, that have a signature

---

159 Pasquale, *The Black Box Society*, 88.

160 Julia Powles and Enrique Chaparro, "How Google Determined Our Right to Be Forgotten," *The Guardian*, February 18, 2015, sec. Technology, https://www.theguardian.com/technology/2015/feb/18/the-right-be-forgotten-google-search.

161 Powles and Chaparro, "How Google Determined Our Right to Be Forgotten"; Cécile de Terwangne, "The Right to Be Forgotten and the Informational Autonomy in the Digital Environment," *Joint Research Centre Institute for the Protection and the Security of the Citizen*, 2013.

162 D. Zhang, L. T. Yang, and H. Huang, "Searching in Internet of Things: Vision and Challenges," in 2011 *IEEE Ninth International Symposium on Parallel and Distributed Processing with Applications* (2011): 201–6, https://doi.org/10.1109/ISPA.2011.53; Nguyen Khoi Tran, et. al., "Internet of Things Search Engine," *Communications of the ACM* 62 no. 7 (July 2019): 66–73.

but may not use the same meta-data that a website would use to keep content private. To date, most research on the intersection of the Internet of Things and *search* focuses on practical implementation with a notable absence regarding the ethical implications.

6. Issue: Complexity

Complexity of *search*, specifically in terms of the algorithmic systems and processes used in search technologies is another serious issue. Wolfram claims these systems are becoming increasingly more complex due to the incorporation of advances in artificial intelligence and machine learning, which is driving technologies to become less "human-understandable."[163] The major implication of this complexity is that any such artificial intelligence driven technology system that is not human-understandable will inherently become more difficult, if not impossible, to govern.[164]

In this section, we identified scale issues of stifling competition, accountability, universality, permanency and the right to be forgotten, the Internet of Things, and complexity, completing the first step of our analysis where we disclosed hidden ethical within *search.* Our list was by no means exhaustive and excluded several relevant issues that were beyond the scope of our research. In the next chapter, we will begin step two of our analysis and examine these disclosed issues against ethical principles of privacy, justice, freedom, and democracy from consequentialist and deontological perspectives.

---

[163] *Optimizing for Engagement: Understanding the Use of Persuasive Technology on Internet Platforms*: Hearing before the Subcommittee on Communications, Technology, Innovation, and the Internet, Senate, 116th Cong., 1st sess., June 25, 2019, 2.

[164] S., 2.

THIS PAGE INTENTIONALLY LEFT BLANK

V. ETHICAL PRINCIPLES

In the previous chapter, we completed the first step of our analysis and disclosed the underlying ethical issues of *search* in terms of personalization, judgment, and scale. In this chapter, we begin the second step of our analysis and examine the disclosed issues from step one through Brey's ethical principles of privacy, justice, freedom, and democracy, taking into account consequentialist and deontological ethical theories.

In defining moral principles, Brey argues that a loosely defined principle is a more useful starting point for initially recognizing and disclosing issues.[165] A more advanced, theory-driven definition could contain presuppositions and constraints that may impede a neutral observation of search engines. Admittedly, even a very basic definition of a moral principle will not be free from assumptions and controversy, but it is still a more effective tool for identifying potential moral problems that deserve further scrutiny. Therefore, we will proceed with somewhat generic definitions of the moral principles and then develop them more specifically in our theoretical analysis of the issues. We will examine how Brey's ethical principles apply to search using the ethical theories we have previously summarized, according to where they best fit the issues.

A. PRIVACY

The United Nations Universal Declaration of Human Rights lists privacy in Article 12, asserting, "No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks."[166] Privacy is a top concern as search engines collect and sell users' personal data to deliver tailored results and advertising. Brey notes that digital privacy is connected to the idea of autonomy, but

---

[165] Brey, "Disclosive Computer Ethics," 12–13.

[166] United Nations, "Universal Declaration of Human Rights," December 10, 1948, https://www.un.org/en/universal-declaration-human-rights.

is distinct and significant enough in this context to be considered a separate principle.[167] He defines it as "the freedom granted to individuals to control their exposure to others."[168] There are two forms of privacy to be considered: relational and informational. Relational privacy concerns the right to be free from unwanted observation and interference, through control over one's self and environment in interactions with others.[169] Informational privacy concerns users' control over their personal data and content they generate.[170]

1. Issues: Personalization

Privacy issues with *search* can be grouped into two directional categories: a searcher's personal information and their search behavior. For some search engines, collecting search data is essential for delivering personalized, relevant results to users, and to enable targeted advertising and sponsored results. Different users may have different preferences for how much data they are willing to share to receive this increased personalization. Search companies may have concerns that greater user privacy controls could significantly affect advertising revenue and their ability to invest in innovative research and development.

Collection and use of personal information and search behavior in personalized search raises concerns over a searcher's privacy rights.[171] The implication is that searchers might be exploited and harmed by having their personal information collected when they use a search engine. Such personal information can be quite valuable to organizations. Marketing and political campaigns both use personal information to better target individuals to buy products or support political movements. On the other hand, the searcher may benefit from greater access to information on a product that best fits their needs or on a political campaign that may better represent their political beliefs.

---

[167] Brey, "Disclosive Computer Ethics," 14.

[168] Brey, 14.

[169] Brey, 15.

[170] Brey, 15.

[171] Rohle, "Desperately Seeking the Consumer."

From a consequentialist perspective, the ethics of collecting personal information depend on the benefit or harm caused by the process. The benefits of personalized search are that consumers can find the most relevant products and information quickly. This can extend beyond individual convenience to contribute to the greater societal well-being. We see this with personalized messages to disparate groups such as farmers, hunters, parents, and scientists to support environmental protections by making the issue relevant to their specific interests.

From a deontological perspective, collection of personal data for targeting may violate privacy rights. There are nuances and context to digital privacy that can seem to blur traditional distinctions between public, personal, and private information, such as the practice of "anonymizing" collected data to analyze patterns without retaining personally identifiable information. The right to privacy in the offline world varies based on expectations that are specific to context; shopping, banking, or working, church, city hall, or the clinic all have different contextual expectations of privacy.[172] *Search* and personalization are able to track a person's activity, at least to the extent of queries and destinations, through multiple contexts that used to exist as physically separate. The right to informational privacy is, in a way, an extension of the right of control over one's person, and should be prioritized over any commercial interests in profiting from this data. This right should be protected in context-specific ways, ideally under the control of the users themselves. The benefits of personalization might still be achieved while preserving privacy rights by using limited public information and allowing constituents to opt-in to communications and categorizations.

2. Issues: Judgment

Like other judgments, those about privacy and data sharing are usually opaque without a way to verify that they are being made in the public's best interest. Privacy, while a right, is not always an absolute good, and judgments about the merits and limits should be open for public discourse. On the negative side of privacy, criminals can exploit

[172] Nissenbaum, "A Contextual Approach to Privacy Online," 42–43.

anonymity to escape detection, and the public sphere can be weakened by free riders and anti-social behavior. Communitarianism argues that some form of identity and credentials are needed to preserve necessary relationships; "in a society of strangers, trust and the means to establish normative status and moral reputation are of paramount importance."[173] In discussing privacy as it stems from conceptions of the self, van den Hoven suggests the liberal unencumbered individual as an autonomous moral agent is inaccurate as it ignores the web of relationships and interactions that inextricably enmesh every person.[174]

Van den Hoven adds that not only is privacy not a true moral right, but that there is nothing inherently desirable about privacy for its own sake.[175] The communitarian argument is that the community benefits from everyone acting openly, which allows the establishment of trust, reputation, and accountability. The concerns of privacy advocates are really consequential; they are more interested in protection from exploitation and harm resulting from use of personal data than the abstract right itself.[176] He argues that these protections, desired by both liberals and communitarians, can be provided without over-protecting personal information to the point that anonymity degrades the online public sphere.[177]

The decision of what personal data to share and for what purpose should ideally be in the hands of the user. When this option is offered, it is often not a true choice because the terms are obscurely listed or the "choice is all or nothing" for a necessary service.[178] For individuals to be truly able to make judgments about their own data, these transactions and contracts would need to be clear and non-coercive. In the current climate of non-transparent data collection, the instinctual response is to push for as much privacy as

---

[173] Jeroen van den Hoven, "Privacy and the Varieties of Informational Wrongdoing," in *Readings in Cyberethics*, ed. Richard A. Spinello and Herman T. Tavani (Boston: Jones and Bartlett, 2001), 432.

[174] Van den Hoven, 433.

[175] Van den Hoven, 433.

[176] Van den Hoven, 433.

[177] Van den Hoven, 433.

[178] Nissenbaum, "A Contextual Approach to Privacy Online," 35.

possible, while in a more transparent public debate, judgment on the right balance of privacy and anonymity for various contexts could be made through an open democratic process.

3. Issues: Scale

Conceptions of personal privacy from the pre-computer era have undergone a major shift as a consequence of technological advancements in speed, quantity, and duration of data collection and processing.[179] This shift requires the acknowledgement that separate pieces of personal data may not warrant privacy concerns, but when these data are combined or aggregated, they can be extremely revealing and possibly constitute an invasion of privacy.[180] The scale of personal data collection is what enables predictive algorithms to provide services such as search suggestions or identify precursor searches to criminal activity.

Consequentialism would question whether successful instances of content suggestion, crime prevention, and security outweigh the negative effects of false positives and constant surveillance. It is difficult to estimate the potential costs and benefits, especially since they would predominately be preventative and unobserved. Just the awareness that their behavior is being observed and analyzed can change the way people express themselves and act online. A non-consequentialist response would dismiss this attempt to predict the positive and negative effects and argue that even if no one is harmed by the large-scale collection of personal data, they are still wronged by the violation of their privacy.

One aspect of the theory of information privacy is that of control: that the ability to exercise control over the flow and use of one's personal data is an essential condition to the maintaining privacy.[181] In the context of scale, this control is utterly lost in the opaque and complex shuffling of data between collectors, aggregators, purchasers, and end-user.

---

[179] Richard A. Spinello and Herman T. Tavani, eds., *Readings in Cyberethics* (Boston: Jones and Bartlett Publishers, 2001), 343.

[180] Spinello and Tavani, 342.

[181] Spinello and Tavani, 340–341.

Even if the personal information is used for purely benign purposes, an individual can hardly claim to have privacy if they have no knowledge or control over where their information is going and how it is used.

This section considered the ethical principle of privacy as it applies to the issues of personalization, judgment, and scale. The next section will examine the same issues through the ethical principle of justice.

B. JUSTICE

Brey broadly defines justice as the principle that "the distribution of social goods in society should not unfairly disadvantage some members or advantage others."[182] The social goods he refers to are the primary social goods such as rights, liberties, wealth, power, opportunities, and bases for self-respect.[183] Disclosive studies of justice in computer systems question how these systems may affect the distribution of primary social goods in unfair ways. Brey notes that particular systems affect different social goods in various ways, but he chooses to focus specifically on the goods of power, freedom, job opportunities, and social status.[184] This study will consider those as well as goods that are more central to search engines, such as information, truth, and influence.

1. Issues: Personalization

The central issue of personalization and justice is the potential to unequally and unjustly distribute information. While personalized results may be appropriate for queries where the results are inherently preference-based or subjective in nature, they may not be appropriate for queries that appear to have an objectively true or best answer. The principles of justice, equality, and truth dictate that, in these cases, the user should not be served the answer that best fits their preferences, but the answer that best answers the query, which is the same for everyone. Not only does personalizing objective answers reinforce biases and limit users' exposure to new ideas, but the very concept undermines the value

[182] Brey, "Disclosive Computer Ethics," 14.

[183] Brey, 14.

[184] Brey, 14.

of truth. Search engines field questions on the mundane, but also on complicated, nuanced societal controversies. People may have individual interpretations of these issues, but subjective truths should be constrained within the bounds of objective reality. Personalized results can provide information that best serves the users' needs but should not exceed these bounds of reality. Doing so would create filter bubbles of falsity and erode the shared understanding of the world that is the basis for civil and democratic discourse. Young adults today have never been without search engines and are accustomed to instant answers to complex questions without having to consult various experts and books.[185] If society accepts the exclusion of information based on predicted clicks, it is endorsing unequal access to information. It would be impossible to give every idea equal visibility to every person, but the necessary filtering could be based on the merits of the results themselves rather than the user's history and predicted preferences.

2. Issues: Judgment

Search algorithms' opaque judgments of information are well suited to the theories of epistemic injustice and distributive justice. As the working definition notes, "justice" necessitates the fair distribution of primary social goods, which leads this analysis to look to distributive justice for theoretical guidance. Additionally, since the central good distributed through *search* is information or knowledge, Fricker's theory of epistemic injustice provides an even more specific lens for analysis.

Information, knowledge, and education can be thought of as "epistemic goods" subject to the rules of distributive fairness just like physical goods. This understanding implies social agents getting or not getting their fair share of these goods. However, this characterization may obscure the purely epistemic injustices that threaten someone "in their capacity as a knower."[186] Fricker distinguishes two forms of this type of injustice: testimonial injustice, which occurs when a speaker is not considered credible because of

---

[185] Noble, *Algorithms of Oppression*, 52–55.

[186] Miranda Fricker, *Epistemic Injustice: Power and the Ethics of Knowing* (New York, NY: Oxford University Press, 2007), vii.

an identity prejudice, and hermeneutical injustice, which occurs when someone cannot adequately understand or communicate their experience because of a gap in society's collective conceptual and language resources.[187]

These two forms of epistemic injustice provide an additional perspective on the ethics of *search*. Search engines exert control over the hermeneutical resources available to society. Someone searching for language or context to process a social experience has access to more information than in earlier times thanks to the internet and search functions. However, that access is also controlled by gatekeepers that may intentionally or accidentally repress the relevant hermeneutical resources. The algorithms that determine access have the potential to create a feedback loop that pushes marginalized groups further into the shadows.

3. Issues: Scale

The scale of companies like Google allows them to share and aggregate so much personal data that new predictive capabilities are emerging that exhibit great promise as well as grave threats to due process. If users know their searches are monitored, they may choose not to seek out help for taboo concerns such as mental and physical illness, domestic violence, or addiction, fearing their search record could be used against them. From the opposing perspective, there could be a moral cost to not using search data to prevent harm. Google data has been used to correlate search behavior with criminal activity, specifically suicide and violence against Muslims. Evaluation of this potential moral obligation should consider examples of individuals being harmed by these predictive algorithms. Search data may contribute to predicting statistical likelihood of certain actions, but statistics should not override individual rights.

Scale also raises issues of distributive justice. Walzer argues that specific goods become dominant not because they have inherent value but because their value is determined by the societal context.[188] In our society, personal data, and increasingly search

---

[187] Fricker, vii.

[188] Michael Walzer, *Spheres of Justice: A Defense of Pluralism and Equality*, (New York: Basic Books, 2010), 10.

data, has become the dominant currency, creating a ruling class that controls it and uses it to exert power through that domination. When a good is dominant, like search data, it allows the "individuals who have it, because they have it, [to] command a wide range of other goods."[189] To preserve equality and fairness against tyranny, he argues, the spheres should be kept relatively autonomous, with distribution of social goods in one sphere independent of wealth in a different sphere.[190] This theory of justice implies that the scale and universality of search data directly opposes the autonomy of spheres, and instead encourages snowballing inequality and concentration of wealth.

This section considered the issues of personalization, judgment, and scale through the ethical principle of justice. The next section will examine the same issues through the principle of freedom and autonomy.

C. FREEDOM AND AUTONOMY

Autonomy can be thought of as self-governance, or the ability to formulate a life plan and carry out choices and actions to achieve it.[191] Brey considers autonomy a fundamental prerequisite to human flourishing and moral equality.[192] For people to have autonomy, they must have essential individual freedoms that allow them to construct lives according to their own values and needs, rather than those of society or government.[193] In addition to the autonomy of individuals, Brey also considers national or organizational autonomy, in the sense of sovereignty and independence, to be a foundational moral principle.[194]

The United Nations Universal Declaration of Human Rights addresses informational freedom in Article 19, stating "Everyone has the right to freedom of opinion

---

189 Walzer, 10.

190 Walzer, 20.

191 Brey, "Disclosive Computer Ethics," 14.

192 Brey, 14.

193 Brey, 14.

194 Brey, 14.

and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers."[195] Disclosive ethics concerning freedom and autonomy is concerned with "how computer systems may constrain their users and may help install dependencies" on computer systems or the people who control them.[196] Especially relevant to search engines is disclosive inquiry into constraints on freedom of information and the "freedom of individuals to acquire, possess, or distribute certain sorts of information."[197]

1. Issues: Personalization

Search engines have enabled freedom in many ways, opening up worlds of knowledge and information without requiring payment, expertise, or effort. The freedom to access information online is largely dependent upon the decisions of search engines, which impose limitations through the practice of personalization. This is not necessarily an egregious restriction, but it has the potential to target individuals in ways that undermine their freedom and autonomy. In the worst examples, companies that use personal data to circumvent rational decision-making with exploitative ads targeting vulnerable people are treating those people as mere means, violating deontological ethics. They are also violating ethics from a consequentialist perspective; by profiting from fear, insecurity, mental illness, or addiction, they are exacerbating suffering for a very limited gain. Even in cases where no harm is caused by personalization, arguments against the practice can be made on grounds of equal access to information, free from data-based discrimination.

2. Issues: Judgment

Content selection is a central characteristic of search engines, simplifying judgments on what information to access in an overwhelming deluge of information accessible on the internet. Regardless of whether *search* is personalized or context-based,

---

[195] United Nations, "Universal Declaration of Human Rights."

[196] Brey, "Disclosive Computer Ethics," 14.

[197] Brey, 14.

the influence of advertisement revenue on what search results are provided to a user presents "unacceptable consequences in terms of content selection for users."[198] The influence of advertisement on search engine companies in non-transparent ways exploits cognitive biases and influences a user's ability to judge information.

In deontological terms, this practice is ethically questionable in several ways, by violating individual rights and treating users as a means to gain advertisement revenue. From this perspective, the harm is related to the violation of the searcher's rights even if no other harm is present or if the process is in fact beneficial to the searcher. From a consequentialist perspective, this practice may be less questionable and may not require the process to be transparent, if the results are ultimately best for the user, but it is more likely that the outcomes of such influence on content selection is exploitive in the ways previously mentioned.[199] Still, for any consequentialist determination to be made regarding the ethics surrounding content selection, there must be a clear definition of what exactly is meant by the *good* in *search*; for instance, preference-based consequentialism will likely find this practice ethical if it is giving users what makes them happy, while a utilitarianism of rights approach, as seen in Mill's *On Liberty*, might find this practice unethical because it circumvents rights related to freedom of choice.[200]

Free speech is a fundamental right, but one whose scope and limitations are under continuous debate. The free speech issues disclosed for *search* are not new or unique, but the debate has gained new prospects due to consequences of large-scale harmful speech or censorship, and the unaccountable "black box" where the debate is being adjudicated. Balkin suggests that one underlying barrier to clarifying the issues of speech regulation is the outdated dualistic model of nation states regulating speakers, from individuals to mass media.[201] He conceives of a new digital era model as a triangle with internet infrastructure

---

198 S., *Optimizing for Engagement*, 2.

199 Google adjusted its algorithms for searching about how to commit suicide by providing information on how to seek help instead. "Google Trying To Help Suicidal Searchers," Search Engine Land, April 5, 2010, https://searchengineland.com/google-trying-to-help-suicidal-searchers-39389.

200 Mill, *On Liberty*, 126–158.

201 Balkin, "Free Speech Is a Triangle," 2015.

forming the third player, serving as both a *de facto* regulator and now the primary target for government regulation.[202] This triangular interaction is useful in examining the rights and responsibilities speakers, search engines, and government have to each other in decisions about free speech.

3. Issues: Scale

The issue of scale acts as a magnifier of other issues by increasing their reach and speed, as well as creating new issues. Scale uniquely limits the freedom of competitors or less popular voices to reach audiences, as one company's decisions can impact what millions of users can access. The principle of a free market, with protections against monopolies and other anti-competitive practices, is foundational to the U.S. economy. The principle can be considered ethical in that it serves the function of ensuring fairness and accountability in the market. The negative effects of scale on this freedom impact both the potential business competitors, the freedom of content creators to interact with their audience, and the freedom of users to choose from a variety of service providers.

Scale can also act as a form of censorship in the sense that an overwhelming amount of dubious information returned as search results can keep large numbers of people from finding the truth, or the information they want. This form of censorship implies a lower degree of responsibility on the part of users and puts a greater burden on the search engine. There could be a moral duty of citizens to overcome challenges like this in pursuit of the truth, but that may not always be a realistic expectation.

D. DEMOCRACY

Democracy, generally understood to mean governance by the people, is the founding principle of the United States. This principle overlaps with the values of autonomy and justice, but is foundational in and of itself, and is directly impacted by the practices of technology. Normative theories of democracy include the premises of egalitarianism as well as self-determination; this view values democracy "as an end, not

[202] Balkin, 2015–2016.

merely a means, because it embodies these values of equality and autonomy."[203] Brey defines this principle in computer ethics as concerning the potential of technologies to redistribute "political power in societies or organizations such that a gain or loss in democratic content is implied."[204] This is especially relevant as political power has increasingly become determined by ownership and control over information and communication platforms.[205] Search engines are a crucial means of controlling and communicating information for political purposes.

1. Issues: Personalization

Personalized "filter bubbles" harm searchers by violating principles of democracy by reinforcing biases and deepening lines of segregation and polarization between communities in ways that undermine democratic institutions. The ethical implications for democracy of politicians collecting, sorting, and targeting constituents using personal data are that equal inclusion and representation are more efficiently circumvented. Hersh describes how, "The data environment will affect a campaign's perceptions, the perceptions will affect their strategies, and the strategies will affect which voters are mobilized into the political process."[206] The process of political targeting uses generalizations to mobilize and persuade that reinforce divisions and stereotypes for racial, socioeconomic, and other groups.

The U.S. House of Representatives Ethics Manual states that a member's responsibility "is to all his constituents equally and should be pursued with diligence irrespective of political or other considerations."[207] Unscrupulous politicians have always found ways to reward supporters and punish or neglect their opposition, but the individual profiling enabled by social media and search data has the potential to take discrimination

---

[203] Baker, Bennett, and Entman, *Media Concentration and Democracy*, 6

[204] Brey, "Disclosive Computer Ethics," 14.

[205] Brey, 14.

[206] Hersh, *Hacking the Electorate*, 129.

[207] *Advisory Opinion No. 1*, House, Committee on Standards of Official Conduct, 91st Cong. 2nd sess., 1970, quoted in U.S. Congress. House of Representatives, *House Ethics Manual*, 110th Cong. 2nd sess., 2008, 151.

and disenfranchisement to a new level. If politicians are able to score voters on how valuable they are to election campaigns, this would undermine the democratic process and leave politicians accountable only to a core coalition of supporters. Concerns expressed by voters outside the coalition could be ignored without risk to reelection prospects. Under the principle of democracy, elected representatives must serve all constituents, not merely the ones calculated to be necessary for reelection.

2. Issues: Judgment

In terms of democracy, censorship based on undisclosed standards that lie outside of the public eye should give pause for concern, as such censorship risks influencing the public's judgment by limiting available information, or worse, providing false or misleading information. An unacceptable consequence of censorship is that democratic principles are undermined when truth is obscured by private power over what information is available to the public for decision-making.[208] This includes variations of "truth" that reflect individual experiences and may not agree with the dominant narrative. It is not surprising that most deontological perspectives find that censorship violates intellectual freedom, regardless of whether the effects are beneficial; by contrast, consequentialist approaches are less uniform as some scholars allow for censorship in cases where there are no rights violations.[209]

3. Issues: Scale

Walzer's theory of distributive justice across spheres applies to democracy as well as the principle of justice. He argues that freedom and equality, key features of democracy, are threatened when success in one area determines access to goods in other areas.[210]

---

[208] S., *Optimizing for Engagement*, 2; Bracha and Pasquale, "Federal Search Commission? Access, Fairness, And Accountability in The Law of Search,"1171-1173.

[209] David van Mill, "Freedom of Speech," *The Stanford Encyclopedia of Philosophy* (Summer 2018), edited by Edward N. Zalta, https://plato.stanford.edu/archives/sum2018/entries/freedom-speech/; David V. Ward, "Philosophical Issues in Censorship and Intellectual Freedom," *Library Trends*, (Summer/Fall 1990): 83–91.

[210] Walzer, *Spheres of Justice*, 20.

Concrete examples include voting contingent upon land ownership or healthcare contingent upon employment; recent digital examples include product prices based on past purchases, and political engagement based on social networks Walzer proposes that because of the tendency of monopolistic dominance toward tyranny, "no social good x should be distributed to men and women who possess some other good y merely because they possess y and without regard to the meaning of x."[211] This principle blocks the conversion of one good into a second unconnected good, preventing a tyrant from establishing control over numerous realms of society. Walzer calls this complex equality, in that it allows some people to be more successful within a single sphere while allowing others to become successful in other spheres.[212] To translate this idea to search engines, success in *search* should not be itself the basis for dominating politics and commerce, and one's algorithmic reputation or score in one sphere should not disqualify or limit opportunities in another online sphere.

In terms of large-scale data collection, the patterns of *search* that can act as correlates for identity and behavior are of interest to advertisers as well as law enforcement. This has raised questions of Fourth Amendment protections and whether, even in public, one has a reasonable expectation of privacy. In confirming limits on technology-enabled public surveillance and monitoring, Supreme Court Justice Sotomayor noted that unlimited data monitoring of "any person whom the government, in its unfettered discretion, chooses to track—may alter the relationship between citizen and government in a way that is inimical to democratic society."[213]

In this chapter, we examined the disclosed issues from step one against the Brey model's ethical principles of privacy, justice, freedom, and democracy. In each case, we evaluated the issues from the perspective of consequentialist and deontological ethical theories. In the next chapter, we will begin step three of our analysis and evaluate several approaches to address issues related to *search*.

---

211 Walzer, 20.

212 Walzer, 19.

213 Andrew G. Ferguson, *The Rise of Big Data Policing: Surveillance, Race, and the Future of Law Enforcement* (New York: New York University Press, 2017), 100.

THIS PAGE INTENTIONALLY LEFT BLANK

VI. APPLICATION

In the previous chapter, we completed the second step of our analysis by examining the disclosed issues from step one against the ethical principles of the Brey model. In this chapter, we begin step three of our analysis and evaluate approaches to address the disclosed issues from step one. We broadly categorize approaches by their method of implementation through laws, norms, markets, or code and evaluate these against Brey's principles from step two.

The ethical principles explored above can be realized in numerous types of practical applications. Society imposes its values through codifying laws and regulations, as well as through informally shaping behavior. Lawrence Lessig identifies four modalities of control through which behavior is influenced.[214] Both in cyberspace and the real world, behavior is regulated by these four forces: laws, which constrain through the threat of punishment; norms, which constrain through stigma; markets, which constrain through availability and pricing; and code, which constrains through physical or digital burdens or access.[215] These four modalities are distinct, but they interact in ways that can reinforce or undermine the others.[216] In considering the application of disclosive *search* ethics, we will consider the existing and potential ways search-related behavior is regulated by each of these four constraints.

A. LAWS

Given the global nature of the internet, applying laws to enforce ethical principles presents significant challenges, especially in terms of enforcement. Search companies must navigate inconsistent and changing privacy and censorship laws worldwide. Wolfram suggests that the increasing complexity of search technologies makes their behavior difficult to predict prior to implementation, such that rules of behavior may not be enough

[214] Lessig, *Code, Version 2.0*, 122–123.

[215] Lessig, 124.

[216] Lessig, 125.

to ensure ethical results.[217] One solution relies on private enforcement of public law and through government delegation to make and apply rules that are in line with enforceable public policy, and rely on oversight from public institutions.[218] Grewlich proposes that any technology-related laws and regulations should account for how globalization is transforming sovereignty when combining public and private approaches.[219] He suggests a cooperative self-regulation system where statutory public oversight governs independent, private regulatory entities that have the power to enforce compliance.[220] This makes a majority of the implementation of ethical principles the responsibility of private organizations and requires laws and resources to ensure that public oversight is possible.

1. Privacy

In his assessment of privacy protections, Pasquale concludes that collection of personal data has reached a tipping point that would now be nearly impossible to restrict.[221] Even if it were possible, comprehensive restrictions on large scale collection of data no longer protect privacy rights, as aggregation can accurately deduce personally identifiable information typically not allowed to be collected, such as a person's "gender identity, ethnicity, political persuasion, etc."[222] Instead, Pasquale recommends focusing on how data can be used and shared after the inevitable collection occurs.[223] These regulations could be versions of existing privacy law, such as HIPAA and regulations against private data use for discriminatory practices, that ensure segmentation of data, preventing companies from aggregating financial, health, commercial, and other categories of data in a way that creates identifiable or predictive profiling. However, an approach that

---

[217] S., *Optimizing for Engagement*, 7.

[218] Perritt, "Towards a Hybrid Regulatory Scheme for the Internet," 321–322

[219] Klaus W. Grewlich, "Good Governance in the Age of Cyberspace," *Info* 1, no. 3 (June 1, 1999): 264–270.

[220] Grewlich, "Good Governance in the Age of Cyberspace," 264–270.

[221] Pasquale, *The Black Box Society*, 147.

[222] S., *Optimizing for Engagement*, 6.

[223] Pasquale, *The Black Box Society*, 147–148.

is overly restrictive of aggregation would severely limit machine learning and prediction technology.

The California Consumer Privacy Act is a model of consumer privacy protection that privacy advocates are seeking to strengthen and expand beyond California.[224] The rights guaranteed by the Act include free disclosure of what personal data has been and will be collected on you, who is collecting and buying your data, from what site and for what purpose; refusing sale of your data without retaliation, suing companies who fail to protect your collected data; mandatory opt-in consent for data on children under 16; and the right to delete data you have posted.[225]

Additionally, a 2014 ruling by the Court of Justice of the European Union established the Right to be Forgotten. This rule, and the following EU General Data Protection Regulation attempt to give individual users greater control over their identity and private data. The right to be forgotten delegates responsibility to search engines for removing unwanted identity-related web links.[226] Similarly, the recently enacted NetzDG law in Germany requires social media companies to more quickly and effectively remove hate speech from their platforms.[227] Balkin notes that in these examples, the government is tasking private tech companies to develop the tools and bureaucracy to adjudicate online rights and determine privacy and free speech protections.[228]

2. Justice

A monopolistic search engine could function unjustly by preventing competitor businesses or dissenting ideas from reaching the public's awareness. This could be addressed by creating a neutral third party to review ranking practices. This would not

---

[224] This act will take effect on January 1, 2020. Californians for Consumer Privacy. "About the California Consumer Privacy Act." accessed September 5, 2019, https://www.caprivacy.org/about.

[225] Californians for Consumer Privacy. "About the California Consumer Privacy Act."

[226] European Commission, "Factsheet on the 'Right to Be Forgotten' Ruling," accessed October 25, 2019, https://www.inforights.im/media/1186/cl_eu_commission_factsheet_right_to_be-forgotten.pdf.

[227] Balkin, "Free Speech Is a Triangle,"2021.

[228] Balkin, 2021.

require the proprietary algorithms to be fully revealed, only that an expert body serving the public interest have access to review for fairness. Pasquale compares this concept with the oversight of another ranking service, credit rating agencies.[229] When these agencies change their methods of calculating ratings, the U.S. Securities and Exchange Commission requires that the changes are explained publicly and applied equally across the board.[230]

A neutral arbiter in this role would prevent and remedy intentionally unjust ranking practices; however, epistemic injustices are often unintentional but no less problematic. Fricker describes how groups are hermeneutically marginalized in society's collective understanding due to material disadvantages like high barriers to entry, and through identity prejudices like low credibility estimates.[231] Both of these mechanisms are self-reinforcing and inherent in the business of ranking and indexing information. Fricker argues that hermeneutical justice as a virtue should be ingrained in how we hear and judge information, requiring an intentional effort to demarginalize voices outside the mainstream.[232] Noble's analysis of search bias concludes that tech companies could provide a more just service by increasing diversity in their workforce, including social and library scientists in developing and validating algorithms.[233]

Bracha and Pasquale assert that regulation in some form is needed to address search engine bias and protect searchers from manipulation and exploitation.[234] They claim existing legal cases and law support classifying *search* as public utility, specifically a common carrier responsible for fair distribution of public services.[235] This would allow

---

229 Pasquale, *The Black Box Society*, 162.

230 Pasquale, 162.

231 Fricker, *Epistemic Injustice*, 154.

232 Fricker, 171.

233 Noble, *Algorithms of Oppression*, 163.

234 Bracha and Pasquale, "Federal Search Commission?," 1206–1209.

235 Bracha and Pasquale, 1206–1209.

for formation of a regulatory body that focuses on protecting users from harm and oversight of search engine companies.[236]

3. Freedom and Autonomy

Balkin's analysis of government control of free speech and censorship distinguishes "old school" regulation focused on individuals, from "new school" regulation, in which governments hold the digital platform responsible for its users' speech.[237] This trend results in issues of collateral censorship and digital prior restraint, in which platforms are incentivized to over-restrict potentially controversial content to avoid fines and punishment, but without due process or transparency. Balkin recommends adopting free speech protections like the Manila Principles, a 2015 global civil society set of guidelines for addressing online speech.[238] These principles include protecting platforms from liability for third-party content; setting necessity and proportionality standards for removing or restricting content; requiring judicial authority for content removal or restriction; and maintaining transparency and accountability throughout the process.[239] Balkin considers these or similar protections the obligations of curational due process.[240]

Newman suggests that issues related to the use and exploitation of personal information could be addressed by reducing search companies' control of user data.[241] Noting that many search companies, and specifically Google, have a number of different services that collect and use user's personal information, Newman suggests that taking an anti-trust approach to break these conglomerates would reduce the exploitive harm and

---

[236] While suggesting the creation of a federal search commission, Bracha and Pasquale do not offer any details as to what such a commission would look like or how search would be practically regulated. Bracha and Pasquale, 1206–1209.

[237] Balkin, "Free Speech Is a Triangle," 2014.

[238] Balkin, 2045.

[239] Manila Principles, "The Manila Principles on Intermediary Liability Background Paper," May 30, 2015, https://www.eff.org/files/2015/07/08/manila_principles_background_paper.pdf

[240] Balkin, "Free Speech Is a Triangle," 2045.

[241] Newman, "Search, Antitrust, and the Economics of the Control of User Data," 1–43

increase the value of user's information and privacy.[242] Such a practice is arguably ethical so long as there is a clear indication of harm and that breaking a monopoly or monopoly-like entity is in the public interests.[243]

4. Democracy

The concern that *search* and other data could be used by political operatives to undermine democracy warrants preemptive legislative protections. However, as Hersch points out, the reliance of politicians on this data to gain a campaign advantage creates a conflict of interest that could impede efforts to reform data use laws.[244] He proposes a transparency requirement for campaign databases similar to the Fair Credit Reporting Act for credit scores, that would allow citizens to see their political profile and how it is used.[245] Like similar proposals for privacy protections, voters could have some degree of control over how they are classified and what preferences for political campaign contact.

In discussing standards for politicians targeting groups of constituents, Hersch sees an example in the Franking Commission, which has regulated the content and frequency of Congressional mailings to the public since the country's founding.[246] An oversight organization like the Franking Commission could ensure transparency in data collection and use, and could review each type of record and intended use individually, requiring justification that serves the public interest and democratic values.[247] However, to be

---

[242] Newman, 19–20.

[243] Demarco argues that monopolies themselves are not intrinsically unethical, but that they do set the conditions for unethical behavior. C. W. DeMarco, "Knee Deep in Technique: The Ethics of Monopoly Capital," J*ournal of Business Ethics* 31, no. 2 (May 2001): 160–161; While dated, Reed's article on the ethics of monopolies remains relevant in contemporary anti-trust cases, in part for its focus on the application of principles. Homer Blosser Reed, "The Morals of Monopoly and Competition," *International Journal of Ethics* 26, no. 2 (January 1916): 280–281.

[244] Hersh, *Hacking the Electorate*, 212.

[245] Hersh, 212.

[246] U.S. Congress. House of Representatives, Committee on House Administration "What Is the Frank?" Accessed September 4, 2019. https://cha.house.gov/franking-commission/what-frank.

[247] Hersh, *Hacking the Electorate*, 212.

successful, this type of commission would have to overcome the current conflicts of interest and lack of technical expertise plaguing many elected representatives.

The United States is seemingly unable to effectively address misinformation despite the considerable increase in public demand to address this issue.[248] First Amendment constitutional protections against government censorship, reliance on lumbering bureaucratic institutions, and a lack of national-level policy inhibit the current approach, resulting in sluggish and arguably ineffective responses. While governments and private organizations are coordinating efforts to counter misinformation, their objectives are not always in line, as governments tend to have societal goals and private organizations tend to center on increasing revenue.[249] When addressing misinformation through laws, governments must address how to do so without the use of censorship and without violating free speech rights.

B. NORMS

Lessig defines constraining social norms, as "imposed not through the organized or centralized actions of a state, but through the many slight and sometimes forceful sanctions that members of a community impose on each other."[250] He distinguishes norms from mere habits or patterns of behavior; rather, norms involve "socially salient" behavior, which determine whether a person is considered normal.[251] Social sanctions for abnormal behavior can range from criticism to ostracism.[252] Lessig notes that while these constraints are usually informal and unwritten, they constitute the majority of constraints on

---

[248] U.S. Department of Homeland Security, "Countering Misinformation, Rumors, and False Information on Social Media Before, During, and After Disasters and Emergencies," *Social Media Working Group for Emergency Services and Disaster Management and DHS S&T First Responders Group* (March 2017), 3.

[249] U.S. Department of Homeland Security, 5–6; Martens, Aguiar, Gomez-Herrera, and Mueller-Langer, "The Digital Transformation of News Media and The Rise of Disinformation and Fake News,"47.

[250] Lessig, *Code, Version 2.0*, 340.

[251] Lessig, 340.

[252] Lessig, 341.

behavior.[253] The power of norms in interpersonal interactions appears to be weaker in governing online behavior. As Johnson, observes, anonymity is often the natural or sought after state in cyberspace, making identification difficult or impossible.[254] This limits the ability for norms to impose real-world sanctions for online behavior, but there are other possibilities for sanctions within the context of anonymous interactions, or shifting public opinion of acceptable levels of transparency.

Baumrin and Freedman describe the importance of norms in the enforcing the ethical responsibilities of the classical professions.[255] They assert that professions are unique in their elevated social value through the provision of a vital service, in being motivated not by self-interest but by quality and serving the public interest, and in their self-enforcement of compliance with ethical standards.[256] These norms are expected of the professions of law, medicine, and clergy, but could be used to evaluate ethical conduct of search algorithm designers, based on the vital importance of their service to the public interest. Like other types of norms, professional codes of ethics are often at least partially backed up with the force of law, but also by self-policing professional boards.

1. Privacy

The continued popularity of platforms that track users' activity indicates that "creepy is a price worth paying for relevance" and convenience.[257] There is a limit to the level of "creepy" intrusion that the public will tolerate, however. This was demonstrated by the public outcry over revelations that Cambridge Analytica harvested data from up to

---

253 Lessig, 341.

254 Johnson, "Ethics On-Line," 29.

255 Bernard Baumrin and Benjamin Freedman, eds., *Moral Responsibility and the Professions* (Haven Publications, 1983), 15.

256 Baumrin and Freedman, 15–18.

257 Scott Galloway, *The Four: The Hidden DNA of Amazon, Apple, Facebook, and Google*, First Portfolio/Penguin trade paperback edition (New York, New York: Portfolio/Penguin, 2018), 163.

87 million Facebook users for the purpose of influencing U.S. and U.K. voters.[258] Such data firms can create psychological profiles of groups and individuals that allow highly specific, behaviorally micro-targeted messages that appeal to very personal emotional vulnerabilities.[259] Public dissatisfaction for this practice is evident in the number of users who subsequently changed privacy settings, took a break from the platform, or even deleted the app.[260] *Search* is a potentially even more revelatory data set, considering the perception that searches are private, the tendency to confess or seek advice on personal subject areas, and the ability to cross-reference searches with click paths, location, email, and other data. User behavior appears to reveal that some sacrifice of data privacy is tolerable, for the purpose of transparent commercial advertising, but that opaque psychological manipulation is unacceptable.

2. Justice

Norms play an essential role in defining and ensuring justice. Though classical economists predict rational actors will behave selfishly to maximize their own benefit in the absence of punishment, behavioral experiments show the social norms of equality and cooperation often override selfishness.[261] The social benefits of behaving justly, and the shame associated with unjust behavior are powerful incentives in rational calculations of cost and benefit.[262] This makes norms of justice a particularly important area to focus application of ethics. This can be done through educating and persuading the public about algorithmic injustices and by setting standards for tech professionals. O'Neil does this in her examination of how opaque and ill-conceived algorithms are reinforcing injustice,

---

[258] Andrew Perrin, "Americans Are Changing Their Relationship with Facebook," *Pew Research Center* (blog), September 5, 2018, https://www.pewresearch.org/fact-tank/2018/09/05/americans-are-changing-their-relationship-with-facebook/.

[259] Galloway, *The Four*, 105.

[260] Perrin, "Americans Are Changing Their Relationship with Facebook."

[261] Cass R. Sunstein, *Free Markets and Social Justice* (New York: Oxford University Press, Incorporated, 1999), 51, http://ebookcentral.proquest.com/lib/ebook-nps/detail.action?docID=431310.

[262] Sunstein, *Free Markets and Social Justice*, 51.

calling for greater public accountability and oversight.[263] Balkin notes that search engines claim to serve the greater good, by using their "special technological expertise to promote public-spirited goals like access to knowledge, freedom of expression, and community building."[264] This commitment to values implies an obligation to abide by professional and public-regarding norms, which they also "invoke to justify their decisions to organize search-engine results, to curate public discourse, and to enforce (or sometimes refrain from enforcing) civility norms."[265]

O'Neil describes how after the 2008 market crash, two financial engineers, Emanuel Derman and Paul Wilmott, wrote a Hippocratic Oath for data scientists, capturing the ideals of classical professional ethics:

> *~ I will remember that I didn't make the world, and it doesn't satisfy my equations.*
>
> *~ Though I will use models boldly to estimate value, I will not be overly impressed by mathematics.*
>
> *~ I will never sacrifice reality for elegance without explaining why I have done so.*
>
> *~ Nor will I give the people who use my model false comfort about its accuracy. Instead, I will make explicit its assumptions and oversights.*
>
> *~ I understand that my work may have enormous effects on society and the economy, many of them beyond my comprehension.*[266]

She congratulates this attempt to capture and internalize the ethical responsibility of data engineers as a necessary cultural shift but believes this is not a solution in itself. A self-imposed oath may constrain the scrupulous, but the stakes for society demand the force of law to enforce ethical behavior.[267]

---

[263] O'Neil, *Weapons of Math Destruction*, 203.

[264] Balkin, "Free Speech Is a Triangle," 2042.

[265] Balkin, 2042.

[266] O'Neil, *Weapons of Math Destruction*, 206.

[267] O'Neil, 206.

3. Freedom and Autonomy

Thaler and Sunstein theorize that "libertarian paternalism" can provide a middle way between rigid regulation and an unfettered free market. "The sheer complexity of modern life and the astounding pace of technological and global change undermines arguments for rigid mandates or dogmatic laissez-faire."[268] They suggest incorporating design "nudges" that set conditions for consumers to make better decisions without limiting their freedom to choose.[269] This is often achieved by intentionally setting defaults and opt-in/out selections to make rational and beneficial choices easier. They point out that there is no such thing as neutral design; every design feature exerts influence.[270] While designers may attempt to neutralize the influence of their choices through randomness, unconscious nudges are always present.[271]

Nudges are a form of influence, and Thaler and Sunstein recommend guidelines to keep them from becoming a means of harmful manipulation. They should be implemented by experts who understand the effects and can predict the best outcomes. There should be full public transparency, and restrictions preventing conflicts of interest, as in politicians designing their own ballots.[272] The Golden Rule applies in prescribing nudges that the target audience would accept as most likely to help and least likely to inflict harm.[273] Additionally, they assess that there are some situations that put people at a psychological disadvantage and can benefit most from implementing a nudge. These situations involve decisions that "are difficult and rare, for which they do not get prompt feedback, and when they have trouble translating aspects of the situation into terms that they can easily

---

[268] Richard H. Thaler and Cass R. Sunstein, *Nudge: Improving Decisions about Health, Wealth, and Happiness*, Rev. and expanded ed (New York: Penguin Books, 2009), 256.

[269] Thaler and Sunstein, 3.

[270] Thaler and Sunstein, 3

[271] Thaler and Sunstein, 12.

[272] Thaler and Sunstein, 251.

[273] Thaler and Sunstein, 74.

understand."[274] Finally, transparent nudges are needed when free markets "give companies a strong incentive to cater to and profit from human frailties, rather than try to eradicate them or minimize their effects."[275]

4. Democracy

As democracy is maintained by an informed and active citizenry, norms of critical thinking in using *search* should be instilled in the public in addition to applying norms to search businesses. The enormous number of users and frequency of searches mean individual actions collectively are shaping the information environment that defines our democracy and our lives. Therefore, there is a collective imperative to act responsibly online, and for each citizen to do their part to ward against misinformation.

The strongest defense against new forms of misinformation may be the lowest tech solution. Many schools are investing in digital literacy programs, to prepare students to think critically about everything they find online, but there is disagreement about what type of digital literacy is actually effective.[276] Early programs focused on a checklist approach to evaluating a website or post, identifying the source and date, looking for red flags internal to the page.[277] This evaluation within the site is called reading "vertically" and has been shown to be ineffective in identifying false and misleading information, as checklist features can easily be manipulated.[278] Researchers instead recommend reading "laterally," or crosschecking information across multiple sites, confirming credibility externally rather than internally.[279]

---

[274] Thaler and Sunstein, 74.

[275] Thaler and Sunstein, 74.

[276] Sam Wineburg and Sarah McGrew, "Lateral Reading: Reading Less and Learning More When Evaluating Digital Information," *SSRN Scholarly Paper* (Rochester, NY: Social Science Research Network, October 6, 2017), 3.

[277] Wineburg and McGrew, "Lateral Reading," 44.

[278] Wineburg and McGrew, 44.

[279] Wineburg and McGrew, 23–24.

C. MARKETS

Lessig defines markets as a constraint that regulates through price.[280] Price is simply a signal of resources transferred between people, or an obligation incurred for receipt of a benefit. Lessig notes that this exchange or incursion happens simultaneously, unlike in other constraints which generally ensue after the benefit is received.[281] This immediacy could mean that markets provide a more responsive or agile constraint than that of norms or laws. However, Lessig emphasizes that markets cannot exist outside an elaborate context of norms and laws that themselves constrain market behavior.[282] Despite the contingent and dependent nature of markets, they maintain a distinct form of regulation and control.

Some scholars are confident that the market and technological advancements will solve the ethical issues in *search*, dismissing attempts at regulation as unnecessary.[283] For markets to respond to pressure on any of the identified ethical concerns, consumers must have adequate information and adequate choice. These conditions of "transparency and choice," or "notice and consent" have generally failed in internet-based markets.[284] Advocates of regulation point out that consumers are not given full information and choice; this deficiency inhibits the possibility of market forces reflecting the desires and values of the public.[285] Similarly, choice falls short due to the monopolistic domination of the market, and the general attitude of "take it or leave it," an unappealing and ultimately false choice between sacrificing privacy or refusing service altogether.[286] Optimists see hope in the growing public awareness and concern over privacy and data sharing, driven by journalists, activists, and entrepreneurs developing alternatives.

---

280 Lessig, *Code, Version 2.0*, 341.

281 Lessig, 341.

282 Lessig, 341.

283 Bracha and Pasquale, "Federal Search Commission?," 1179.

284 Nissenbaum, "A Contextual Approach to Privacy Online," 35.

285 Nissenbaum, 35.

286 Nissenbaum, 35.

1. Privacy

DuckDuckGo is an example of a search engine that has succeeded as a privacy-based alternative to more intrusive services. Holly Gaal describes five design problems that lead to degradation of privacy: Users do not know they're being tracked, privacy controls are hard to find, destination websites have poor privacy practices, location data is private but necessary for some services, and web privacy is complex and overwhelming.[287] DuckDuckGo's mission statement reflects its ethical imperative to incorporate solutions to these problems into their services as well as their organizational culture. They use nudges such as privacy default settings, user control over when to share or delete private data, transparent access to information about trackers and data status. Additionally, they provide educational videos and articles, conduct privacy research, and invest in privacy advocacy and legislation.[288]

There are numerous other private search engines gaining attention in this growing market. Other highly ranked companies include Startpage, SearX, SwissCows, and Qwant.[289] Many of these use Google or Bing data but distinguish their services through added privacy.[290] Additionally, many are based in European countries that are considered more favorable jurisdictions for privacy protection than the United States.[291] Some make money from affiliation with advertisers using non-tracked anonymized data, and some, like SwissCows, do not track or record any data whatsoever, leaving them reliant on donations from supporters and privacy advocates.[292]

---

[287] Gaal, Holly,"Ethical, by Design," DuckDuckGo Blog, January 22, 2019, https://spreadprivacy.com/ethical-by-design/.

[288] "Privacy Research," DuckDuckGo Blog, accessed August 21, 2019, https://spreadprivacy.com/tag/research/.

[289] Sven Taylor, "13 Best Private Search Engines for 2019," *Restore Privacy*, May 9, 2019, https://restoreprivacy.com/private-search-engine/.

[290] Taylor, "13 Best Private Search Engines for 2019."

[291] Taylor.

[292] Taylor.

2. Justice

Advocates of free market solutions to injustice argue that discriminatory practices hurt businesses enough that the market will correct itself, but Sunstein concludes that competitive pressure is not enough to eliminate discrimination and injustice.[293] Not only are unjust practices obscured behind a veil of complexity and intellectual property, but Sunstein describes how discrimination can be profitable, putting firms who actively fight discrimination at a disadvantage.[294] A particularly relevant form of this advantageous discrimination is what he calls "statistically or economically rational discrimination."[295] Historically, pervasive and profitable discrimination in areas of hiring, housing, and lending have demonstrated the need for measures beyond the market to ensure a level playing field. The examples of algorithmic discrimination previously described demonstrate that this gap is also present in the search market.

3. Freedom and Autonomy

Wolfram suggests an approach to ethical *search* that gives searchers, a "choice about who to trust, and to let the final results they see not necessarily be completely determined" by the search service provider.[296] This would separate the systems that provide final ranking and the systems that constrain content, typically those that use personal data to deliver personalized content, and enable user choice and transparency in which of these systems to use.[297] Another approach Wolfram suggests would extend greater control over the ranking process to the user by allowing the user to specify sorting criteria or present results in a non-hierarchical format, instead of presenting search results in a simple ranked list.[298] O'Neil describes how as an alternative to the tyrannical college

---

293 Sunstein, *Free Markets and Social Justice*, 152.

294 Sunstein, 155.

295 Sunstein, 156.

296 S., *Optimizing for Engagement*, 9–13.

297 S., *Optimizing for Engagement*, 9–13.

298 S., *Optimizing for Engagement*, 9–13.

ranking system, the Education Department compiles extensive data on all schools that can be searched by students for specific school characteristics and strengths.[299] A system that is more transparent and user-directed like this could result in more equal representation of content, as well as encouraging more critical thinking and discernment on the part of the user.

Newman suggest strengthening the market for user data and privacy to address many privacy related ethical issues by giving searchers more control over what data is given and what can be done with that data.[300] While such an approach may likely impact search companies' profits that rely on user data, there is no clear ethical imperative to value corporate profits over searcher's privacy rights. Some scholars suggest that changing or removing intellectual property rights associated with search engine algorithms could address several ethical concerns by changing the market dynamics, by treating search engine algorithms as a patent, instead of a trade secret.[301] While this might open the market to increased competition, potential private licensing, and added transparency, this solution may also violate ethical principles of freedom.

4. Democracy

Optimists argue that low barriers to entry and open access makes the internet naturally democratic, forming a free marketplace of ideas, enabling the best information to rise to the top.[302] This free information environment would seem to only improve democratic institutions by contributing to an informed and engaged citizenry. However, as we have discussed, the online marketplace of ideas is subject to numerous constraints and influences that create incentives for outcomes that undermine democratic ideals. Filter bubbles, misinformation, and extremist content have proven to be profitable and difficult to filter out. Open access and limitless content can still "fail to promote an educated

---

[299] O'Neil, *Weapons of Math Destruction*, 67.

[300] Newman, "Search, Antitrust, and the Economics of the Control of User Data," 20–21.

[301] Bracha and Pasquale, "Federal Search Commission?," 1181.

[302] Sunstein, *Free Markets and Social Justice*, 201.

citizenry and political equality…There is no logical or a priori connection between a well-functioning system of free expression and limitless broadcasting or internet options."[303]

In a trend toward decentralization of authority on the internet, search engines could shift to a peer-to-peer model that facilitates a more egalitarian distribution of power. One example of this emerging technology is YaCy, a free search service that relies on independent user computers to index and contribute to results.[304] While still lacking the public awareness and power over the market of Google, YaCy currently has "about 1.4 billion documents in its index and more than 600 peer operators contribute each month. About 130,000 search queries are performed with this network each day."[305] With growing concerns over Google's ethics, decentralized alternatives may become more ubiquitous, perhaps provoking the same skeptical acceptance as sites like Wikipedia. Such skepticism and an active role in the search process could be beneficial side effects that address the concerns of digital literacy and mental passivity.

D. CODE

Lessig notes that some behavior that is difficult to regulate can be made more regulable by indirectly controlling the technology that facilitates behavior.[306] This is especially applicable to online and search behavior, where all conditions on user access and choice are set by the code. Lessig argues that code is unique among the four constraints because it can be human-made, but it can also be a natural limitation like the speed of light.[307] Additionally, the other constraints relay on some degree of human action in the regulation process; code may be developed by humans but is subsequently "self-executing in way that the constraints of law, norms, and the market are not."[308] Therefore, lack of

---

303 Sunstein, 171.

304 "YaCy - The Peer to Peer Search Engine: Home," accessed September 18, 2019, https://yacy.net/en/index.html.

305 "YaCy - The Peer to Peer Search Engine: Home."

306 Lessig, *Code, Version 2.0*, 67.

307 Lessig, 342.

308 Lessig, 342.

agency is the fundamental difference in coded constraints; the continuous public support and participation required by the others are absent. Lessig speculates that this feature makes code uniquely susceptible to enabling unpopular or "unseemly" practices; by circumventing the need for societal consent, it operates as a constraint without accountability.[309]

Some experts contend that addressing transparency in the fundamental commercial, societal, and political issues surrounding search technology is likely too difficult and may not be able to be achieved in a useful way.[310] Wolfram suggests that it is impossible to code a comprehensive set of ethical principles into search technology, especially algorithmic or artificial intelligence-based systems.[311] He explains that because such systems are constantly generating new cases, any "finite set of computational principles (or, for that matter, laws)…meant to constrain automated content selection systems" would require the ethical principles to be redefined to address each new case, which he states would be beyond human capability.[312]

1. Privacy

Blockchain technology is a digital ledger that has begun to transform the financial sector, beginning with cryptocurrency, but now securely tracking transactions of all types.[313] This system could transform data privacy in the same way, ensuring users do not lose control of their data. Echoing Pasquale's assessment that trying to prevent data collection will be less effective than controlling its use, Owen proposes that blockchain for personal data will improve both convenience and privacy.[314] Rather than users entering personal information on multiple sites and then having no idea who buys it and why, using

---

309 Lessig, 342.

310 S., *Optimizing for Engagement*, 2.

311 S., *Optimizing for Engagement*, 8.

312 S., 8.

313 Shawn Owen, "Worried About Your Data Privacy? Blockchain Could Help," *Fortune*, accessed August 28, 2019, https://fortune.com/2018/06/27/facebook-data-privacy-blockchain/.

314 Owen.

blockchain, they can keep a single official record and transfer selected parts to companies and government agencies as needed.[315] These transactions will be transparently recorded and secure from tampering.

2. Justice

Pasquale recounts a discussion about *search* with a Silicon Valley consultant who dismissed ethics and fairness reform suggestions as impossible because they are unable to be coded.[316] Coding solutions alone cannot guarantee justice, but they can create conditions through default settings and built-in transparency that are more conducive to fair and just outcomes. As previously discussed, blockchain can help avoid government and corporate overreach, discrimination, and redlining. Pasquale notes the current imbalance of transparency that makes citizens' records open books to the highest bidder, while over-protecting the powerful from public scrutiny.[317] This could be reversed by improving privacy protections for individuals while opening up government and corporate operations to review by the public or regulators. Like the application to privacy, the ability to review how personal data is being used and by whom is essential to preserving the rights of due process and the presumption of innocence. This is necessary to regain accountability, enforce the rule of law, and protect individual rights.

3. Freedom and Autonomy

Noble considers what search results could be if they were not limited to the standard ranked list, with only a handful visible per page. She envisions one alternative design, the "imagination engine" that could present a broad array of results, organized by category, with user control over what area to explore and whether to include potentially harmful content.[318] This design would allow users to choose the content most relevant to their needs, without relying on the search algorithm to predict and direct the outcome. A broader

---

315 Owen.

316 Pasquale, *The Black Box Society*, 196.

317 Pasquale, 57.

318 Noble, *Algorithms of Oppression*, 180.

and differently organized constellation of results would also provide a nudge to users by making it easier to distinguish commercial services, governmental or academic content, or entertainment. This type of categorization is an opportunity to insert bias, but the process currently used also relies on algorithmic categorization, and not transparently.

4. Democracy

In collecting personal data for profiling users, transparency can once again provide a path toward a more equal balance of power. If citizens were able to access and review the profiles that politicians are already compiling for them, these data bases could become a tool for more effective representation. Hersch suggests that, rather than the imprecise correlative shortcuts currently used by campaigns, an open-access data base could allow citizens to provide the information they want politicians to have, including the issues they care most about.[319] This kind of interface platform could turn collection and targeting practices that can seem opaque and suspicious to the public into an open democratic forum for interacting with representatives.

In this chapter, we completed the third and final step of our analysis by evaluating several approaches to address the disclosed issues using laws, norms, markets, or code against the ethical principles of privacy, justice, freedom, and democracy from step two.

[319] Hersch, *Hacking the Electorate*, 211

VII. CONCLUSION

This thesis focused on understanding the ethical concerns associated with the wide-spread use of search engines with the goal of identifying guiding ethical theories of how *search* should work in democratic societies. In doing so, we examine the hidden ethical issues of *search*, and make several broad arguments about those issues and how to address them.

First, we argue that *search* presents unique ethical issues broadly related to personalization, judgment, and scale. The personalized nature of *search* reveals issues related to reinforcing bias and polarization, collecting and exploiting personal data, government surveillance, and lack of consent and voluntary disclosure. The influence of *search* on judgment reveals issues concerning algorithmic bias, objectivity neutrality, and search engine optimization. The implications from the immensity of *search* relate to stifling competition, accountability, universality, permanency and the right to be forgotten, the Internet of Things and non-public internet devices, and complexity. Transparency is an underlying concern with all these issues.

Adopting Brey's Disclosive Ethics model, our second argument is that *search* related issues should be evaluated against the ethical principles of privacy, justice, freedom and autonomy, and democracy. Evaluating the issues in this way from both consequentialist and deontological perspectives offer different outcomes for Brey's model. Unsurprisingly, nearly all of the disclosed issues are ethically concerning from a deontological perspective, and all of the issues offer mixed results from a consequentialist perspective. The only mixed result issues from a deontological perspective are those related to privacy involving judgment, and in this case only from a consequentialist-like deontological theory—communitarianism. The mixed results of the consequentialist perspectives are due to several reasons, but the two most common relate to transparency and epistemic issues. In these cases, the consequentialist approach is not able to adequately evaluate principles without transparency or knowing some other objective, yet unknown truth, such as the 'best' personalized search result for a given query.

Finally, we argue for using the principles from Brey's model as the guiding ethical principles for governing *search* and that contemporary governance approaches that do not adhere to these principles are insufficient to address many of the disclosed ethical issues. We categorize existing and proposed methods for governing *search* as laws, norms, markets, and code, and find that approaches within these categories are integrally related to transparency. Many of the limitations in the efficacy of the applications are related to issues of transparency, especially in cases concerning markets and laws which rely on transparent processes to function.

Greater transparency in some form is likely the cornerstone for efforts to identify implicit bias and discrimination, hold companies accountable and enforce the law, and give users greater choice and control over their data and experience. Transparency requirements can backfire, however, as seen when companies dump an overwhelming quantity or unintelligibly written documents, complying with court orders but maintaining obfuscation. Pasquale distinguishes three types of secrecy: real secrecy, maintained by erecting barriers; legal secrecy, which compels those in the know to keep secrets as in non-disclosure agreements; and obfuscation, which is deliberate attempts at concealment through intentional confusion and complexity.[320] This presents real challenges for advocates of greater transparency for black box technologies.

Even were transparency not a concern, the issues associated with complexity remain. The interaction of numerous algorithmic processes is difficult to understand without an advanced computer science education and most users do not possess the specific education needed to understand this interaction. Furthermore, the complexity of these systems is amplified by artificial intelligence and machine learning technologies which are increasingly becoming complex beyond human understandability.[321] As such, it is nearly impossible to ensure that ethical principles are being adhered to or evaluate such complex systems. Considering these challenges, in a highly complex and evolving search engine, meaningful transparency cannot be limited to simply revealing code. Accountability

[320] Pasquale, *The Black Box Society*, 6–7.

[321] S., *Optimizing for Engagement*, 7–8.

measures must include an intelligible explanation of how decisions are made and a means of verifying fairness and accuracy.

Kristian Hammond suggests that thinking, reasoning, and decision-making are amazing gifts and not to be lightly handed over to algorithms and artificial intelligence.[322] The power of AI to make more efficient and statistically more successful decisions will guarantee its expansion, but humans must be in the lead, not following blindly behind. If an algorithm is unable to explain why it made an ethical decision, or humans are unable to understand the explanation, perhaps that technology is not appropriate or ready for use. In his example of a self-driving car striking one victim to save another, we would demand an explanation from a human driver and expect the same from the AI.[323] When stakes are high, it is worth questioning whether technologies that are too advanced to be comprehended or controlled by humans are worth using at all.

This problem of complexity could make transparency impossible to achieve, but some argue it may not be necessary to ensure ethical use of algorithms. Even the person who created a machine learning system cannot explain or keep up with the constantly evolving analytics. This means looking inside the black box actually reveals less than evaluating the outputs for fairness, accuracy, and appropriateness.[324] To this end, some experts recommend designing systems with "procedural regularity," allowing observers to see how the algorithm makes decisions, as well as built-in tests that the system does what it is designed to do.[325] Black box technologies, if designed in this way, can be held accountable without having to reveal the proprietary secrets.

The potential of new technological developments to alter the grounds of these ethical questions could outpace attempts at policy and regulation. Trends in the expansion

---

322 TEDx Talks, "A New Philosophy on Artificial Intelligence | Kristian Hammond | TEDxNorthwesternU," Youtube video, 20:52, June 8, 2018, https://www.youtube.com/watch?v=tr9oe2TZiJw.

323 TEDx Talks.

324 Ferguson, *The Rise of Big Data Policing*, 139.

325 Ferguson, 139.

of blockchain technology beyond financial transactions is one example of a larger trend toward decentralization that could reshape the nature of online interactions and attempts to control them. The early incarnation of the internet was fundamentally decentralized and open, designed for collaboration rather than control.[326] Over time, power has consolidated in tech giants that build on snowballing success and swallow competition.[327] The trend could reverse back to a decentralized model as new peer-to-peer technologies gain popularity amid a public backlash to the domination of companies like Google and Amazon.

Muneeb Ali sees two problems with the current state of the internet: that users blindly trust in big corporations and unknown intermediaries, and that user data is owned by tech companies.[328] Blockchain addresses each of these issues, and simultaneously decentralizes control online, disrupting the hegemony of big tech companies. However, Zuboff suggests that there is a cost to this new version of trust, either through centralized surveillance or through decentralized verification like blockchain.[329] These technologies are not a new version of contracts or trust, but rather herald the end of contracts, by eliminating the need for trust, uncertainty, and even consent.[330]

Given the current lack of transparency, a major security implication of s*earch* is its ability to promulgate misinformation under the guise of objectivity, leaving democratic societies vulnerable to manipulation from both domestic and international actors. In light of this, there is a surprising lack of a robust or unified response, despite discussions between major tech companies and government officials to reduce misinformation and

---

326 Lessig, *Code, Version 2.0*, 2–3.

327 Galloway, *The Four*, 49.

328 TEDx Talks, "Welcome to the New Internet," Youtube video, 10:31, December 1, 2016, https://www.youtube.com/watch?v=qtOIh93Hvuw.

329 Shoshana Zuboff, "Big Other: Surveillance Capitalism and the Prospects of an Information Civilization," *Journal of Information Technology* 30, no. 1 (March 2015): 75–89.

330 Zuboff, 18.

foreign interference.[331]. While Google says it will monitor its services and share "relevant information with law enforcement and industry peers," the determination of what information is relevant has been left in the hands of tech companies.[332] However, these partnerships also raise concerns about the extent of warrantless surveillance and overreaching law enforcement use of personal data. Where working together to counter misinformation, governments and private organizations must be careful not to interfere with freedoms and other fundamental rights.[333]

Accountability through transparency, ethical designs, or back-end output testing is necessary to preserve our society's values in an age dominated by digital technology. Balkin advises, "twentieth-century media, with all of its faults, served as a countervailing force to government power in a democracy. In the same way, twenty-first-century media companies, at best, may provide platforms for democratic organization and protest and act as checks on the power of territorial governments, even as these governments are necessary checks on technology companies' burgeoning economic and political power."[334] Writing about the challenges ahead for navigating an ethical response to surveillance capitalism, Zuboff calls upon scholars and citizens to "act in the knowledge that deception-induced ignorance is no social contract, and freedom from uncertainty is no freedom."[335]

This warning against deception, uncertainty, and obfuscation is a call for disclosive ethics. These issues can only be adequately confronted by clear-eyed examination in open public discourse. The underlying issues of *search* are especially troubling considering the surprising lack of transparency for something so universal and integral for the navigation of daily life. Search engine companies have become the gatekeepers of knowledge, yet

---

331 Proposed efforts include cooperation on "threat modeling, intelligence sharing and building stronger ties between the public and private sector agencies." Mike Isaac and Davey Alba, "Big Tech Companies Meeting With U.S. Officials on 2020 Election Security," *The New York Times* (September 4, 2019), https://www.nytimes.com/2019/09/04/technology/2020-election-facebook-google.html.

332 Isaac and Alba.

333 European Commission, "A Multi-dimensional Approach to Disinformation," *Report of the Independent High Level Group on Fake News and Online Disinformation* (March 2018): 30.

334 Balkin, "Free Speech Is a Triangle," 2044.

335 Zuboff, "Big Other," 86.

innovations in *search* have outpaced public awareness of how these technologies work and the significant social implications and ethical concerns that arise from the use of search technology.

LIST OF REFERENCES

"A New Philosophy on Artificial Intelligence." *TedX* (Northwestern University, 2018), https://www.youtube.com/watch?v=tr9oe2TZiJw.

Alexander, Larry, and Michael Moore. "Deontological Ethics." In *The Stanford Encyclopedia of Philosophy* (Winter 2016), edited by Edward N. Zalta. Palo Alto, CA: Center for the Study of Language and Information, Stanford University. https://plato.stanford.edu/archives/win2016/entries/ethics-deontological/.

Asp, E. W., and D. Tranel. "False Tagging Theory: Toward a Unitary Account of Prefrontal Cortex Function." In *Principles of Frontal Lobe Function,* edited by D. T. Stuss and R. T. Knight, 383–416. New York, NY: Oxford University Press.

Baker, C. Edwin, W. Lance Bennett, and Robert M. Entman. *Media Concentration and Democracy: Why Ownership Matters.* Cambridge, United Kingdom: Cambridge University Press, 2006. http://ebookcentral.proquest.com/lib/ebook-nps/detail.action?docID=281758.

Baghramian, Maria, and J. Adam Carter. "Relativism." *The Stanford Encyclopedia of Philosophy* (Winter 2019), edited by Edward N. Zalta. https://plato.stanford.edu/archives/win2019/entries/relativism/.

Balkin, Jack M. "Free Speech Is A Triangle." *Columbia Law Review* 118, no. 7 (2018): 2011–056. https://www-jstor-org.libproxy.nps.edu/stable/26524953.

Baumgold, Deborah. *Contract Theory in Historical Context Essays on Grotius, Hobbes, and Locke*. Leiden: Brill, 2010.

Baumrin, Bernard. and Benjamin Freedman, eds. *Moral Responsibility and the Professions*. New York: Haven Publications, 1983.

Berendt, Bettina, Oliver Günther, and Sarah Spiekermann. "Privacy in E-Commerce: Stated Preferences vs. Actual Behavior." *Communications of the ACM* 48, no. 4 (April 1, 2005), 101–6. https://doi.org/10.1145/1053291.1053295.e-come.

Berreby, David. *Us and Them: The Science of Identity*. Chicago, IL: Chicago University Press, 2008.

Black, J. "Critical Reflections on Regulation." *Australian Journal of Legal Philosophy*. No. 27, 2002, 1–35. http://www.austlii.edu.au/au/journals/AUJlLegPhil/2002/1.pdf.

Bohman, James. "Critical Theory," *The Stanford Encyclopedia of Philosophy* (Fall 2016), edited by Edward N. Zalta. https://plato.stanford.edu/archives/fall2016/entries/critical-theory/.

Bracha, Oren, and Frank Pasquale. “Federal Search Commission? Access, Fairness, And Accountability in The Law of Search.” *Cornell Law Review*, no. 93 (September 1, 2008): 1149–1437.

Brey, Philip. “Disclosive Computer Ethics.” *ACM SIGCAS Computers and Society* 30, no. 4 (December 1, 2000): 10–16. https://doi.org/10.1145/572260.572264.

Brin, Sergey, and Lawrence Page. “The Anatomy of a Large-Scale Hypertextual Web Search Engine,” 2007, http://infolab.stanford.edu/~backrub/google.html.

Brink, David. “Mill’s Moral and Political Philosophy.” *The Stanford Encyclopedia of Philosophy* (Winter 2018), edited by Edward N. Zalta. https://plato.stanford.edu/archives/win2018/entries/mill-moral-political/.

Brown, Rebecca L. “The Harm Principle and Free Speech.” *Southern California Law Review* 89, no. 5 (July 1, 2016): 953–1010.

Bynum, Terrell. “Computer and Information Ethics”,*The Stanford Encyclopedia of Philosophy* (Summer 2018), edited by Edward N. Zalta. https://plato.stanford.edu/archives/sum2018/entries/ethics-computer/.

Cafaggi, Fabrizio, and Andrea Renda. “Public and Private Regulation: Mapping the Labyrinth.” *The Dovenschmidt Quarterly*, no. 1, 2012: 16–33.

Californians for Consumer Privacy. “About the California Consumer Privacy Act.” accessed September 5, 2019. https://www.caprivacy.org/about.

Corradetti, Claudio. “Frankfurt School and Critical Theory.” *The Internet Encyclopedia of Philosophy*. Accessed August 26, 2019. https://www.iep.utm.edu/frankfur/.

D’Agostino, Fred, Gerald Gaus, and John Thrasher. “Contemporary Approaches to the Social Contract,” The Stanford Encyclopedia of Philosophy (Spring 2019), edited byEdward N. Zalta. https://plato.stanford.edu/archives/spr2019/entries/contractarianism-contemporary/.

Dann, Gary, and Neil Haddow. “Just Doing Business or Doing Just Business: Google, Microsoft, Yahoo! and the Business of Censoring China’s Internet.” *Journal of Business Ethics* 79, no. 3 (May 2008): 219–234.

DeMarco, C. W. “Knee Deep in Technique: The Ethics of Monopoly Capital,” J*ournal of Business Ethics* 31, no. 2 (May 2001): 151–164.

“The Dialog between Data, Segmentation and Personalization and Its Impact on Customer Experience.” *Dynamic Yield* (blog). April 13, 2015. https://www.dynamicyield.com/blog/segmentation-is-not-personalization/.

Edelman, Murray. “Contestable Categories and Public Opinion.” *Political Communication* 10, no. 3 (January 1, 1993): 231–42. https://doi.org/10.1080/10584609.1993.9962981.

Entman, Robert M. *Democracy Without Citizens: Media and the Decay of American Politics*. New York: Oxford University Press, 1989.

———. “Framing Bias: Media in the Distribution of Power.” *Journal of Communication* 57, no. 1 (March 2007): 163–73.

European Commission. “A Multi-dimensional Approach to Disinformation.” *Report of the Independent High Level Group on Fake News and Online Disinformation* (March 2018).

———. “Factsheet on the ‘Right to Be Forgotten’ Ruling,” accessed October 25, 2019. https://www.inforights.im/media/1186/cl_eu_commission_factsheet_right_to_be-forgotten.pdf.

Ferguson, Andrew G. *The Rise of Big Data Policing: Surveillance, Race, and the Future of Law Enforcement*. New York: New York University Press. 2017.

Feuz, Martin, Matthew Fuller, and Felix Stalder. “Personal Web Searching in the Age of Semantic Capitalism: Diagnosing the Mechanisms of Personalisation.” *First Monday* 16, no. 2 (February 1, 2011). https://doi.org/10.5210/fm.v16i2.3344.

Flynn, D. J., B. Nyhan, and J. Reifler.) “The Nature and Origins of Misperceptions: Understanding False and Unsupported Beliefs About Politics.” *Advances in Political Psychology*, 38 (2017): 127–150. doi:10.1111/pops.12394.

Flynn, Kerry. “After Charlottesville, Tech Companies Are Forced to Take Action against Hate Speech.” *Yahoo News*. August 16, 2017. https://news.yahoo.com/charlottesville-tech-companies-forced-action-213554799.html

Fricker, Miranda. *Epistemic Injustice: Power and the Ethics of Knowing*. Oxford; New York: Oxford University Press, 2007.

Friend, Celeste. “Social Contract Theory.” *The Internet Encyclopedia of Philosophy*.” accessed August 28, 2019. https://www.iep.utm.edu/soc-cont/#H2.

Gaal, Holly Habstritt. “Ethical, by Design.” DuckDuckGo Blog. January 22, 2019, https://spreadprivacy.com/ethical-by-design/.

Gallagher, Ryan. “Google Plans to Launch Censored Search Engine in China, Leaked Documents Reveal,” *The Intercept* (blog), August 1, 2018. https://theintercept.com/2018/08/01/google-china-search-engine-censorship/.

Galloway, Scott. *The Four: The Hidden DNA of Amazon, Apple, Facebook, and Google*. First Portfolio/Penguin trade paperback edition. (New York, New York: Portfolio/Penguin. 2018.

Gentzkow, Matthew, Jesse Shapiro, and Daniel Stone. "Media Bias in the Marketplace: Theory." Cambridge, MA: National Bureau of Economic Research, February 2014. https://doi.org/10.3386/w19880.

Gilbert, Daniel T., Douglas S Krull, and Patrick S. Malone. "Unbelieving the Unbelievable: Some Problems in the Rejection of False Information." *Journal of Personality and Social Psychology* 59, no. 4 (October 1990): 601–613.

Glanzberg, Michael. "Truth." *The Stanford Encyclopedia of Philosophy*. (Fall 2018 Edition), edited by Edward N. Zalta. https://plato.stanford.edu/archives/fall2018/entries/truth/.

Goldman, Eric. "Search Engine Bias and the Demise of Search Engine Utopianism." *Yale J. L. & Tech* 188 (2006): 188–200. https://digitalcommons.law.scu.edu/facpubs/76

Goodman, John B., and Gary W. Loveman. "Does Privatization Serve the Public Interest?," *Harvard Business Review* (November 1, 1991). https://hbr.org/1991/11/does-privatization-serve-the-public-interest.

Google. "About Google." Accessed 7 August 2019, https://about.google/.

———. "AI at Google: Our Principles." Accessed 7 August 2019. https://www.blog.google/technology/ai/ai-principles/.

———. "An External Advisory Council to Help Advance the Responsible Development of AI." Accessed 7 August 2019. https://www.blog.google/technology/ai/external-advisory-council-help-advance-responsible-development-ai/.

———. "How Search Works." Accessed August 20, 2019. https://www.google.com/search/howsearchworks/.

———. "Some Thoughts on Personalization." Inside Search (blog). Accessed September 5, 2019. https://search.googleblog.com/2011/11/some-thoughts-on-personalization.html.

———. "Trying to Help Suicidal Searchers," Search Engine Land, April 5, 2010. https://searchengineland.com/google-trying-to-help-suicidal-searchers-39389.

Grewlich, Klaus W. "Good Governance in the Age of Cyberspace." *Info* 1, no. 3 (June 1, 1999): 264–270.

Halavais, Alexander. *Search Engine Society*. Oxford: Polity Press, 2008.

Hazan, Joshua G. “Stop Being Evil: A Proposal for Unbiased Google Search.” *Michigan Law Review* 111 (n.d.): 798–820.

Hersh, Eitan D. *Hacking the Electorate: How Campaigns Perceive Voters.* Cambridge: Cambridge University Press, 2015. doi:10.1017/CBO9781316212783.

Hildebrandt, Mireille. “Algorithmic Regulation and the Rule of Law.” *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* 376, no. 2128 (September 13, 2018): 1–11. https://doi.org/10.1098/rsta.2017.0355.

Holt, Thomas J. “Exploring the Intersections of Technology, Crime, and Terror.” *Terrorism and Political Violence* 24, no. 2 (April 1, 2012): 337–354.

Internet Society of China, “ISC Members,” Accessed 6 August 2019, http://www.isc.org.cn/english/Member/listinfo-15319.html.

Isaac, Mike, and Davey Alba. “Big Tech Companies Meeting With U.S. Officials on 2020 Election Security.” *The New York Times* (September 4, 2019). https://www.nytimes.com/2019/09/04/technology/2020-election-facebook-google.html.

Jang, S., and Joon K. Kim. “Third Person Effects of Fake News: Fake News Regulation and Media Literacy, Interventions,” *Computers and Human Behavior* 80 (2018): 295–302.

Jeffries, Adrianne. “Why Does Google Think Obama Is Planning a Coup d’etat?” *The Outline*. Accessed September 18, 2019. https://theoutline.com/post/1192/google-s-featured-snippets-are-worse-than-fake-news.

Johnson, Deborah. “Ethics On-Line.” In *Readings in CyberEthics*. Ed. Spinello, Richard, and Tavani, Herman. Sudbury, MA: Jones and Bartlett, 2001.

Kant, Immanuel. *Grounding for the Metaphysics of Morals*; with, *On a Supposed Right to Lie Because of Philanthropic Concerns*. Trans., James W Ellington. 3rd ed. Indianapolis: Hackett Pub. Co., 1993.

Kilpatrick, Dean G. “Definitions of Public Policy and the Law.” *National Violence Against Women Prevention Research Cente*r. Medical University of South Carolina. https://mainweb-v.musc.edu/vawprevention/policy/definition.shtml.

Lakoff, George, and Mark Johnson. *Metaphors We Live by.* Chicago: University of Chicago Press, 1980.

Lakoff, George, and Elisabeth Wehling. *Your Brain’s Politics: How the Science of Mind Explains the Political Divide*. Exeter, UK: Andrews UK Limited. 2016. http://ebookcentral.proquest.com/lib/ebook-nps/detail.action?docID=4770263.

Lamont, Julian, and Christi Favor. “Distributive Justice.” *The Stanford Encyclopedia of Philosophy* (Winter 2017), edited by Edward N. Zalta. https://plato.stanford.edu/archives/win2017/entries/justice-distributive/.

Lane, Jan-Erik. *The Public Sector: Concepts, Models, and Approaches*. 3rd ed. London: SAGE, 2000.

Lasswell, Harold D. *Politics; Who Gets What, When, How*. New York, NY: Whittlesey house, McGraw-Hill Book Company, Inc., 1936. http://hdl.handle.net/2027/mdp.39015002397050.

Lessig, Lawrence. *Code, Version 2.0*. New York: Basic Books, 2006.

Lewandowsky, Stephan, Ullrich Ecker, Colleen Seifert, Norbert Schwarz, and John Cook. “Misinformation and Its Correction: Continued Influence and Successful Debiasing.” *Psychological Science in the Public Interest* 13, no. 3 (December 1, 2012): 106–131.

Manila Principles. “The Manila Principles on Intermediary Liability Background Paper.” May 30, 2015. https://www.eff.org/files/2015/07/08/manila_principles_background_paper.pdf

Martens, Bertin, Luis Aguiar, Estrella Gomez-Herrera, and Frank Mueller-Langer. “The Digital Transformation of News Media and The Rise of Disinformation and Fake News.” *European Commission, Joint Research Centre Digital Economy Working Paper*. 2018–02. https://ec.europa.eu/jrc/sites/jrcsh/files/jrc111529.pdf

“Measuring the Filter Bubble: How Google Is Influencing What You Click,” DuckDuckGo Blog, December 4, 2018. https://spreadprivacy.com/google-filter-bubble-study/.

Mill, John Stuart. *On Liberty*. Auckland, New Zealand: The Floating Press, 1909.

Moor, James. “Reason, Relativity, and Responsibility in Computer Ethics.” In *Readings in CyberEthics*, ed. Richard Spinello and Herman Tavani. Sudbury, MA: Jones and Bartlett (2001): 36–50.

Newman, Nathan. “The Costs of Lost Privacy: Consumer Harm and Rising Economic Inequality in The Age of Google.” *William Mitchell Law* Review, no. 40 (January 1, 2014): 1–35.

———. “Search, Antitrust, and the Economics of the Control of User Data.” *Yale Journal on Regulation* 31, no. 2 (June 22, 2014): 401–54.

Nissenbaum, Helen. “A Contextual Approach to Privacy Online.” *Daedalus* 140, no. 4 (October 2011): 32–48. https://doi.org/10.1162/DAED_a_00113.

Noble, Safiya. “Algorithms of Oppression.” Seaside, California, November 28, 2018.

Noble, Safiya Umoja. *Algorithms of Oppression: How Search Engines Reinforce Racism*. New York: New York University Press, 2018.

OED Online. *Oxford University Press (*December 2018). http://www.oed.com.libproxy.nps.edu/view/Entry/119699

O’Neil, Cathy. *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*. 1st ed. New York: Crown, 2016.

Owen, Shawn. “Worried About Your Data Privacy? Blockchain Could Help.” *Fortune*. Accessed August 28, 2019. https://fortune.com/2018/06/27/facebook-data-privacy-blockchain/.

Pasquale, Frank. *The Black Box Society: The Secret Algorithms That Control Money and Information*. Cambridge: Harvard University Press, 2015.

Perrin, Andrew. “Americans Are Changing Their Relationship with Facebook.” *Pew Research Center* (blog). September 5, 2018. https://www.pewresearch.org/fact-tank/2018/09/05/americans-are-changing-their-relationship-with-facebook/.

Perritt, Henry H. Jr. “Towards a Hybrid Regulatory Scheme for the Internet.” *University of Chicago Legal Forum* 2001 (January 1, 2001): 215–613.

Persak, Nina. *Criminalising Harmful Conduct: The Harm Principle, Its Limits and Continental Counterparts.* 1st ed. 2007. New York, NY: Springer New York, 2007.

Powles, Julia, and Chaparro, Enrique. “How Google Determined Our Right to Be Forgotten.” *The Guardian*. February 18, 2015, sec. Technology, https://www.theguardian.com/technology/2015/feb/18/the-right-be-forgotten-google-search.

“Privacy Research,” DuckDuckGo Blog, June 18, 2019, https://spreadprivacy.com/tag/research/.

Purcell, Kristen, Joanna Brenner, and Lee Rainie. “Search Engine Use 2012.” *Pew Internet and American Life Project* (March 9, 2012): 3-10.

Quinn, Michelle. “After Mass Shootings, Tech Industry Shuns 8chan.” *Voice of America*. August 6, 2019. https://www.voanews.com/silicon-valley-technology/after-mass-shootings-tech-industry-shuns-8chan.

Reed, Homer Blosser. “The Morals of Monopoly and Competition.” *International Journal of Ethics* 26, no. 2 (1916): 258–81. http://www.jstor.org.libproxy.nps.edu/stable/2376624.

Resnick, Paul, Aviv Ovadya, and Garlin Gilchrist. “Iffy Quotient: A Platform Health Metric for Misinformation.” *Center for Social Media Responsibility, University of Michigan School of Information* (October 10, 2018).

Rohle, Theo. “Desperately Seeking the Consumer: Personalized Search Engines and the Commercial Exploitation of User Data.” *First Monday* 12, no. 9 (September 3, 2007). https://doi.org/10.5210/fm.v12i9.2008.

Roosevelt, Theodore. “New Nationalism.” presented at the Dedication of John Brown Memorial Park, Osawatomie, Kansas, August 31, 1910. http://teachingamericanhistory.org/library/document/new-nationalism-speech/.

Rosch, Elanor, and Carolyn Mervis. “Family Resemblances.” *Cognitive Psychology* 7, no. 4 (October 1975): 573–605.

Shore, Zachary. *Blunder: Why Smart People Make Bad Decisions*. New York: Bloomsbury, 2008.

Singer, P. W. (Peter Warren), and Emerson T Brooking. *Likewar: the Weaponization of Social Media*. Boston: Houghton Mifflin Harcourt, 2018.

Sinnott-Armstrong, Walter. “Consequentialism,” *The Stanford Encyclopedia of Philosophy* (Winter 2015), edited by Edward N. Zalta. https://plato.stanford.edu/archives/win2015/entries/consequentialism/.

Southwell, Brian, Emily Thorson, and Laura Sheble. “The Persistence and Peril of Misinformation.” *American Scientist* 105, no. 6 (November 1, 2017): 372–375.

Spinello, Richard A. *Cyberethics: Morality and Law in Cyberspace.* Fifth edition. Burlington, MA: Jones & Bartlett Learning, 2014.

Stephens-Davidowitz, Seth. *Everybody Lies: Big Data, New Data, and What the Internet Can Tell Us about Who We Really Are*. 1st ed. New York, NY: Dey St, an imprint of William Morrow, 2017.

Sullivan, Danny. “How We Keep Search Relevant and Useful.” Google, The Keyword (blog): July 15, 2019. https://www.blog.google/products/search/how-we-keep-google-search-relevant-and-useful/.

Sunstein, Cass. “Democracy and the Problem of Free Speech.” *Publishing Research Quarterly* 11, no. 4 (December 1995): 58–72.

Sunstein, Cass R. *Free Markets and Social Justice.* New York: Oxford University Press, Incorporated, 1999. http://ebookcentral.proquest.com/lib/ebook-nps/detail.action?docID=431310.

Tavani, Herman. “Search Engines and Ethics.” In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta, (Fall 2016). Metaphysics Research Lab, Stanford University, 2016. https://plato.stanford.edu/archives/fall2016/entries/ethics-search/.

Taylor, Sven. “13 Best Private Search Engines for 2019.” *Restore Privacy*. May 9, 2019. https://restoreprivacy.com/private-search-engine/.

TEDx Talks. “A New Philosophy on Artificial Intelligence | Kristian Hammond | TEDxNorthwesternU.” Youtube video, 20:52. June 8, 2018. https://www.youtube.com/watch?v=tr9oe2TZiJw.

———. “Welcome to the New Internet.” Youtube video, 10:31. December 1, 2016. https://www.youtube.com/watch?v=qtOIh93Hvuw.

Terwangne, Cécile, de. “The Right to Be Forgotten and the Informational Autonomy in the Digital Environment.” *Joint Research Centre Institute for the Protection and the Security of the Citizen* (2013): 1–28. https://doi.org/10.2788/54562.

Thaler, Richard H., and Cass R. Sunstein. *Nudge: Improving Decisions about Health, Wealth, and Happiness.* Rev. and expanded ed. New York: Penguin Books. 2009.

Tiku, Natasha. “Jeff Bezos Says Tech Companies Should Work With the Pentagon.” *Wired.* October 15, 2018. https://www.wired.com/story/amazons-jeff-bezos-says-tech-companies-should-work-with-the-pentagon/.

Tran, Nguyen Khoi, et. al. “Internet of Things Search Engine.” *Communications of the ACM* 62 no. 7 (July 2019): 66–73.

United Nations. “Universal Declaration of Human Rights.” December 10, 1948. https://www.un.org/en/universal-declaration-human-rights.

U.S. Congress. House of Representatives. *Algorithms: How Companies’ Decisions About Data and Content Impact Consumers*. Written testimony of Frank, Pasquale. Hearing before the Energy and Commerce Committee, Subcommittee on Digital Commerce and Consumer Protection. 115th Cong., 1st sess., November 29, 2017.

U.S. Congress. Senate. *GDPR & CCPA: Opt-ins, Consumer Control, and the Impact on Competition and Innovation*. Written testimony of Gabriel Weinberg. Hearing before the Subcommittee on Communications, Technology, Innovation, and the Internet. 116th Cong., 1st sess., March 12, 2019.

———.*Google and Censorship through Search Engines*, written testimony of Karan Bhatia. Hearing before Senate Judiciary Subcommittee on The Constitution, 116th Cong., 1st sess., July 16, 2019. https://www.judiciary.senate.gov/meetings/google-and-censorship-though-search-engines.

———. *Optimizing for Engagement: Understanding the Use of Persuasive Technology on Internet Platforms*. Written testimony of Stephen Wolfram. Hearing before the Judiciary Committee. 116th Cong., 1st sess., June 25, 2019.

U.S. Department of Homeland Security. "Countering Misinformation, Rumors, and False Information on Social Media Before, During, and After Disasters and Emergencies." *Social Media Working Group for Emergency Services and Disaster Management and DHS S&T First Responders Group* (March 2017). https://www.dhs.gov/sites/default/files/publications/Best-Practices-Incorporating-Social-Media-Into-Exercises-508%20.pdf

Van den Hoven, Jeroen. "Privacy and the Varieties of Informational Wrongdoing." In *Readings in Cyberethics*, edited by. Richard A Spinello, and Herman T. Tavani. Boston: Jones and Bartlett, 2001.

Van Mill, David. "Freedom of Speech." *The Stanford Encyclopedia of Philosophy* (Summer 2018), edited by Edward N. Zalta. https://plato.stanford.edu/archives/sum2018/entries/freedom-speech/.

Vaughan, Liwen, and Mike Thelwall. "Search Engine Coverage Bias: Evidence and Possible Causes." *Information Processing and Management* 40, no. 4 (2004): 693–707. https://doi.org/10.1016/S0306-4573(03)00063-3.

Ward, David V. "Philosophical Issues in Censorship and Intellectual Freedom." *Library Trends* (Summer/Fall 1990): 83–91.

Walzer, Michael. *Spheres of Justice: A Defense of Pluralism and Equality*. New York: Basic Books. 2010.

"What Happened When Dylann Roof Asked Google For Information About Race?." NPR.org. Accessed October 10, 2019, https://www.npr.org/sections/thetwo-way/2017/01/10/508363607/what-happened-when-dylann-roof-asked-google-for-information-about-race.

Wineburg, Sam, and Sarah McGrew. "Lateral Reading: Reading Less and Learning More When Evaluating Digital Information." *SSRN Scholarly Paper*. Rochester, NY: Social Science Research Network. October 6, 2017. https://papers.ssrn.com/abstract=3048994.

YaCy. "YaCy—The Peer to Peer Search Engine: Home." Accessed September 18, 2019. https://yacy.net/en/index.html.

Zhang, D., L. T Yang, and H. Huang. "Searching in Internet of Things: Vision and Challenges," in *2011 IEEE Ninth International Symposium on Parallel and Distributed Processing with Applications* (2011): 201–206. https://doi.org/10.1109/ISPA.2011.53.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California