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# Data Mining and Attention Consumption

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## Chapter #

# DATA MINING AND ATTENTION CONSUMPTION

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**Abstract:** This Essay challenges the prevailing hostility towards data mining and direct marketing. The Essay starts by defining data mining and shows that the only important step is how data is used, not its aggregation or sorting. The Essay then discusses one particular type of data use, the sending of direct marketing. The Essay establishes a model for calculating the private utility experienced by a direct marketing recipient. The model posits that utility is a function of the message's substantive content, the degree of attention consumed, and the recipient's reaction to receiving the message. The Essay concludes with some policy recommendations intended to help conserve recipients' attention while preserving space for direct marketing tailored to minority interests.

**Key words:** Data mining, database, data warehouse, privacy, advertising, marketing, email, spam, telemarketing, direct marketing, direct mail, junk mail, customer relationship management (CRM), economics of attention, economics of marketing, externalities, Coase Theorem

## 1. INTRODUCTION

The term “data mining” has developed a pejorative taint. Commentators frequently assume, without explication, that data mining is wrong or harmful,<sup>1</sup> as if the harms of data mining are so universally acknowledged that no one would question the assumption.

<sup>1</sup> See, e.g., Andrew J. McClurg, *A Thousand Words Are Worth a Picture: A Privacy Tort Response to Consumer Data Profiling*, 98 NW. U. L. REV. 63 (2003) (providing examples of data aggregation and sorting without explaining the specific harms arising from these examples).

This Essay questions that assumption. First, I question how data mining, without more, creates consequential harm. If defined properly, data mining appears to be merely a prerequisite to possibly objectionable activity. Second, I question the prevailing hostility towards direct marketing assisted by data mining.<sup>2</sup> While direct marketing imposes some negative utility on every recipient by consuming some of the recipient's scarce attention, direct marketing can enhance overall social welfare. Data mining specifically can increase the likelihood that a particular message enhances social welfare.

Direct marketing's effect on attention leads to three policy observations. First, we should not allow attention consumption concerns to foreclose socially beneficial communications between minority interests. Second, we should not discourage marketers from targeting their marketing communications, including using data mining as appropriate. Finally, we should not discourage the display of summary/preview content that recipients can use to make efficient sorting decisions.

## 2. DATA MINING AS AN INCHOATE ACTIVITY

Although the term "data mining" is often treated as a term of art, it actually has multiple definitions.<sup>3</sup> To understand the term, we need to understand a bit about database operations as illustrated in the following figure:<sup>4</sup>



Figure #1. Model of Database Operations

To build a database (or "data warehouse"), a data controller first obtains data, either from interactions with data subjects (such as by asking the data subject to volunteer information or by recording interactions between the data subject and the system) or from third party sources, such as data vendors or business partners providing joint services to the data subject.

<sup>2</sup> See, e.g., ANNE W. BRANSCOMB, WHO OWNS INFORMATION? (Basic Books 1994).

<sup>3</sup> See McClurg, *supra* note 1, at 71 & n.50.

<sup>4</sup> See generally Tal Z. Zarsky, *Desperately Seeking Solutions: Using Implementation-Based Solutions for the Troubles of Information Privacy in the Age of Data Mining and the Internet Society*, 56 ME. L. REV. 13, 17-31 (2004) (describing an analogous three-stage process).

After obtaining data, the data controller may aggregate the data into one or more databases. In theory, a data controller could aggregate all data collected from or about a data subject into a single database. The reality, of course, is far different. A data controller may obtain data that it does not aggregate into the data warehouse. For example, a data subject may use an “email this page to a friend” web tool where the data subject provides two email addresses (the data subject’s and the friend’s), but neither address may be added to the data warehouse. Other examples include non-web communications, such as customer support emails, telephone calls or in-person communications, where the data subject may provide valuable data to the data controller but the data controller may lack a technical or operational means to add that data to its data warehouse.

Further, in some cases, the data controller may have multiple independent databases instead of a single unified data warehouse. In these situations, fragmented database architecture may prevent the data controller from “connecting the dots” about that data subject.

Once data is aggregated, the data controller can sort it in a variety of ways, such as (1) using personally identifying information as a criteria (or not), (2) systematically or on an ad hoc basis, and (3) using rudimentary criteria (e.g., provide every mailing address we have) or very sophisticated criteria (e.g., every Wisconsin resident who purchased wool sweaters on a Friday evening during the last month).

After sorting, the data controller or a third party can use the sorted data to take some action or make some decision. For example, sorted data can be used to determine whether a data subject is extended credit, hired (or fired), treated differently from other customers (such as enhanced status in a customer loyalty program), or targeted for a marketing communication.

I define “data mining” as data aggregation and sorting done as preparation for some subsequent data use. In doing so, I distinguish data mining from data use. Privacy advocates often consider mere data aggregation and sorting to be harmful, regardless of how the sorted data is used.<sup>5</sup> But how, exactly, does mere data aggregation or sorting cause harm? While data mining may be a predicate to some unwanted use, how do the preparatory activities cause harm by themselves?

A hypothetical situation illustrates how data aggregation and sorting, without use, lacks any meaningful consequences. Assume a data controller aggregates the following data about data subjects into a database: social security numbers, birthdates, addresses, gender, race, sexual orientation and HIV status. The data controller then initiates a query: identify all homosexual Latino males over 40 who live in Texas and have tested positive

<sup>5</sup> See, e.g., A. Michael Froomkin, *Symposium: Cyberspace and Privacy: A New Legal Paradigm?: The Death of Privacy?*, 52 STAN. L. REV. 1461 (2000).

for HIV, and list their addresses, social security numbers and birth dates. The computer generates a results list. However, the list is not displayed to a human, printed out, archived or further processed by the computer; instead, it is immediately discarded.

This hypothetical is admittedly implausible because this behavior lacks business sense. However, the hypothetical demonstrates the illogic of focusing on aggregation and sorting divorced from usage. How have the data subjects identified on this list been harmed?

Unquestionably, many data subjects would object to public *disclosure* of this information. Being identified on this list might publicize private facts, like sexual orientation or health condition, that could lead to further adverse treatment. Disclosure of the information could allow identity thieves to prey on the individual.

However, based on the hypothetical's parameters, none of these adverse consequences would or could occur. Indeed, no adverse consequence of any sort occurs because the world is exactly the same whether the list is generated or not. The data subject does not experience any change, internally (the data subject never knows that the list was generated) or externally (no one else knows either). This situation brings to mind the ancient Zen parable: if a tree falls in a forest and no one is around to hear it, does it make a sound? Applied to this hypothetical, we might restate the parable: whether the tree makes a sound or not, why do we care?

Some privacy advocates view privacy as a fundamental right<sup>6</sup> or believe that data subjects have the right to control their information.<sup>7</sup> To them, this hypothetical might still be objectionable despite the seeming lack of consequences. By engaging in behavior the data subject might find objectionable if known, the data controller deprives the data subject of control over their circumstances even if the behavior has no perceivable consequences.

It is, of course, impossible to refute the argument that privacy is a fundamental right. Social scientists cannot empirically prove or disprove the claim, and no single objective source authoritatively classifies what constitutes a fundamental right. Instead, classification of fundamental rights often devolves into an irresolute binary polemic ("Yes it is!" "No it's not!"). I am not attempting to resolve that debate. For people who believe that privacy is a fundamental right, this Essay will not convince them otherwise.

<sup>6</sup> See Council Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the Protection of Individuals with Regard to the Processing of Personal Data and on the Free Movement of Such Data, art. 1(1), 1995 O.J. (L 281) 31, 38.

<sup>7</sup> See, e.g., Jerry Kang, *Information Privacy in Cyberspace Transactions*, 50 STAN. L. REV. 1193 (1998).

The rest of us, however, cannot understand how inconsequential data aggregation and sorting is inherently harmful.

While privacy advocates generally reject data mining in all of its forms, many privacy advocates harbor particular animus towards the sale of data by one data controller to another.<sup>8</sup> However, data sales, without more, are indistinguishable from other types of preparatory data mining. We can see this by slightly modifying the prior hypothetical. Assume that data controller #1 generates the results list and electronically sends it to data controller #2 for a fee, but data controller #2 (instead of data controller #1) immediately discards the results list without looking at it or acting on it. In this situation, the data is exposed to a new party (data controller #2), but the data subject still does not experience any consequences from this transfer. It remains as much a non-event to the data subject as the initial hypothetical.

Admittedly, both hypotheticals are highly stylized because the actors' behavior does not make business sense. However, the data controller's motivations for data mining are irrelevant. Even the worst motivations do not make inconsequential behavior consequential. Data mining becomes consequential only when the data mining leads to some impactful use. In other words, all of the preparatory steps prior to data use result in harm only if the usage results in harm. Therefore, to determine the possible harms from data mining, we need to understand how the data is used.<sup>9</sup>

In this respect, data mining concerns are analogous to concerns about the regulation of new technologies. The technology community regularly argues that regulators should outlaw bad technology uses, not the technology itself. I advocate a similar approach to data mining. Data mining is not the problem; the problem is bad uses of mined data, and that is where our focus should lie.

### 3. MARKETING COMMUNICATIONS AND ATTENTION CONSUMPTION

To many, using personal information to send direct marketing (including junk mail, telemarketing and spam) is the archetypical bad use of data mining. Recipients passionately hate direct marketing<sup>10</sup> and may transfer

<sup>8</sup> See, e.g., Paul M. Schwartz, *Property, Privacy, and Personal Data*, 117 HARV. L. REV. 2055 (2004).

<sup>9</sup> See Zarsky, *supra* note 4.

<sup>10</sup> See, e.g., *Consumer Perceptions of Various Advertising Mediums*, Dynamic Logic Beyond The Click (Mar. 2004) (showing that consumer attitudes towards telemarketing, spam and direct mail are significantly more negative than ads delivered through other media), at

negative feelings to data mining by association. However, the academic literature is surprisingly opaque about why consumers hate direct marketing.<sup>11</sup> Why do people object to direct marketing so much, or stated in economic terms, how does direct marketing create negative utility?

### 3.1 A Utility Model of Direct Marketing

To analyze these questions, we can model an individual recipient's utility from a single direct marketing communication. The total utility contains three discrete components.

*Substantive Utility.* To the extent that the recipient is substantively exposed to the content (as opposed to discarding the message without being exposed to the substantive content), the recipient derives utility from the communication's content. An individual's response to the communication's contents can vary from highly positive (e.g., contents will lead to a transaction producing significant consumer surplus) to highly negative (e.g., the contents were uninteresting and offensive/objectionable).

*Attention Utility.* Attention is a scarce resource, both temporally (we have only a certain number of attention-minutes in our lives) and at any one time (we can only pay simultaneous attention to a limited number of focal targets). Each communication consumes some of the recipient's attention.

*Reaction Utility.* Recipients may derive utility from their reaction to receiving a communication. For example, many recipients are annoyed to receive a telephone call during dinner or a favorite TV show, regardless of the communication's contents.<sup>12</sup>

Formula #1 recaps the model for an individual's utility derived from a single marketing communication:

$$\text{NPU} = \text{SU} + \text{AU} + \text{RU} \quad (\text{Formula \#1})$$

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[http://www.dynamiclogic.com/na/research/btc/beyond\\_the\\_click\\_mar2004\\_part2.html](http://www.dynamiclogic.com/na/research/btc/beyond_the_click_mar2004_part2.html) (last visited Dec. 29, 2004).

<sup>11</sup> See Eric Goldman, *Where's the Beef? Dissecting Spam's Purported Harms*, 22 J. MARSHALL J. COMPUTER & INFO. L. 13 (2003) (discussing possible reasons why recipients hate spam).

<sup>12</sup> While typically consumers derive negative utility from their reaction to the interruption/intrusion of direct marketing communications, in some cases this reaction can generate positive utility. See Susan Chang & Mariko Morimoto, *An Assessment of Consumer Attitudes toward Direct Marketing Channels: A Comparison between Unsolicited E-Mail and Postal Direct Mail* (Apr. 1, 2003) (quoting one student as getting a "thrill" when he receives mail, even if it is "junk"), at <http://www.inma.org/subscribers/papers/2003-Chang-Morimoto.doc> (last visited Dec. 29, 2004).

where

NPU = net private utility

SU = substantive utility

AU = attention utility

RU = reaction utility

### 3.2 Attention Consumption and Externalities

Compared to SU and RU, the AU component of Formula #1 has received little scrutiny from commentators. This is somewhat surprising because all recipients experience negative utility from having their scarce attention consumed. Thus, AU is the only component that is guaranteed to be negative for all recipients (with respect to SU and RU, recipients may derive positive, negative or no utility).

Because direct marketing communications create negative AU for every recipient, some commentators have analogized these communications to negative externalities like pollution.<sup>13</sup> Taking this argument to its logical conclusion, marketers overproduce direct marketing communications because the true social cost (including the negative AU imposed on every recipient) is greater than the marketers' private costs. If so, economically efficient levels of production could be reached by forcing the externality producer (the marketer) to internalize the externalized costs (the attention consumed), such as through a cost-internalizing tax (a "Pigouvian tax"). Alternatively, some commentators have proposed schemes that would allow consumers to shift costs to marketers.<sup>14</sup>

Unfortunately, the analogy between pollution and direct marketing does not survive critical scrutiny. Pollution constitutes a negative externality because it imposes negative utility on everyone. By focusing solely on the AU component of Formula #1, direct marketing looks analogous to pollution because it too imposes negative utility on all recipients. However, it is analytically inaccurate to isolate a single component of Formula #1 to assess the social utility of direct marketing. While pollution uniformly generates negative utility on all affected individuals, direct marketing recipients can experience positive NPU from the communication even though the AU component may be negative.

<sup>13</sup> See, e.g., Kenneth C. Laudon, *Markets and Privacy*, COMM. OF THE ACM, Sept. 1996, at 92.

<sup>14</sup> See Ian Ayres & Matthew Funk, *Marketing Privacy*, 20 YALE J. ON REG. 77 (2003); Laudon, *supra* note 13. According to the Coase Theorem, it is unclear how these cost-shifting efforts would change the outcome. See Ronald Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960).

In addition, direct marketing may facilitate marketplace competition.<sup>15</sup> As a result, non-recipients of a marketing communication may benefit from lower prices or better products caused by the marketing communication. This non-recipient effect may constitute a *positive* externality from the communication.

In theory, we could calculate the social welfare impact of a direct marketing communication by adding together all recipients' NPU's, the marketer's net private utility, and any externalities (positive or negative) generated by the marketing communication.

In practice, of course, this calculation cannot be made on an *ex ante* basis because the recipients' interests are heterogeneous but undisclosed. No one—not the government, not the marketer, perhaps not even recipients themselves—precisely knows the recipients' substantive interests, tolerance of attention consumption or reaction to receiving a communication.

Indeed, a recipient's utility may vary from day to day. Consider the following example. A marketer delivers to Jane a coupon offering a \$100 discount on a new Dell computer. In scenario 1, the coupon arrives after Jane has already decided to buy a Dell but before she has made the purchase. In this case, the coupon may generate significant positive utility for Jane. In scenario 2, the coupon arrives immediately after Jane has made her purchase and cannot take advantage of the coupon. In this case, the coupon may be irrelevant; indeed, it could be upsetting because Jane may develop buyer's remorse (because she thinks she overpaid). As this example illustrates, the utility generated by a particular marketing communication varies dynamically, making reliable computations impossible.

### 3.3 Policy Implications

While the social welfare effects of direct marketing communications may be indeterminate, the prior discussion suggests three policy observations.

#### 3.3.1 Observation #1: Everyone Must Tolerate Some Communications of Interest Only to a Minority of Recipients

Because the social welfare effects from a particular direct marketing communication are unknown (and unknowable) *ex ante*, we cannot assume the message has negative net social welfare. Indeed, even if most recipients experience negative utility from a communication, the communication could still create net positive social utility if the remaining recipients (or non-recipients benefiting from positive externalities) experience more positive

<sup>15</sup> See Lee Benham, *The Effect of Advertising on the Price of Eyeglasses*, 15 J.L. & ECON. 337 (1972).

NPU than the negative NPU experienced by the majority recipients. This scenario most likely arises when a communication is extremely useful to a minority community and the majority of recipients are simply uninterested. Preferably marketers will do more targeting (discussed in Observation #2) to avoid unnecessary impositions on uninterested recipients, but this is not always possible.

Overresponding to majority interests regarding messages that are broadly unpopular but extremely useful to minority recipients could reduce social welfare. Ultimately, members of the majority must have some attention consumed by unwanted or irrelevant messages as the “price tag” of allowing members of the minority to communicate with each other.<sup>16</sup>

### 3.3.2 Observation #2: Facilitate Marketer Targeting

While we each must tolerate some unwanted messages catering to minority interests, social welfare would improve if marketers did a better job of targeting their messages. In an ideal world, marketers would communicate only with recipients who derive positive SU from the message, and recipients would receive only communications that create positive SU.<sup>17</sup> While we may never reach this idyllic state, we would nevertheless benefit by encouraging marketers to do more targeting.

Data mining can help marketers with this targeting, which in turn could increase social welfare. Therefore, it would be counterproductive to set up a regulatory scheme that discourages marketers from engaging in data mining.

Beyond data mining, marketers are developing other technologies to infer consumers’ undisclosed and latent interests. An example of this technology

<sup>16</sup> Everyone has some interests that are minority in nature. Our obligation to tolerate—and defend—minority interests that do not coincide with our own interests reminds me of the poem *First They Came...* by Reverend Martin Niemöller:

First they came for the communists, and I did not speak out—  
because I was not a communist;  
Then they came for the socialists, and I did not speak out—  
because I was not a socialist;  
Then they came for the trade unionists, and I did not speak out—  
because I was not a trade unionist;  
Then they came for the Jews, and I did not speak out—  
because I was not a Jew;  
Then they came for me—  
and there was no one left to speak out for me.

<sup>17</sup> See JOHN HAGEL III & MARC SINGER, *NET WORTH: SHAPING MARKETS WHEN CUSTOMERS MAKE THE RULES* (Harv. Bus. Sch. Press 1999) (arguing that “infomediaries” would mediate communications between marketers and consumers to improve marketing targeting for both groups).

is “adware,” which monitors an individual’s online behavior and, based on the activity, generates marketing communications that reflect the adware vendor’s prediction of the individual’s interests. These technologies may allow marketers to significantly improve message targeting.

However, a regulatory assault on relevancy-improving technologies threatens their development. For example, in March 2004, Utah enacted a law prohibiting adware vendors from delivering certain types of contextually relevant advertising *even if the recipient wanted it*.<sup>18</sup> Although this law was preliminarily enjoined in June 2004,<sup>19</sup> it represents an all-too-common regulatory paranoia about marketers engaging in social welfare-enhancing targeting efforts.

In part, this paranoia reflects the inherent tension between “privacy” and relevancy targeting. To provide consumers with more highly targeted marketing, marketers must know more about an individual’s interests—including latent interests that the individual may not be able to articulate even if asked. However, the more data that marketers capture about individuals, the greater the privacy concerns. As discussed in Part 2 *supra*, this tension can be resolved only by focusing on bad uses of data, not by prophylactically inhibiting data mining or other data aggregation/sorting techniques. When regulating bad data uses, we must be very careful not to mischaracterize socially beneficial targeting as a bad data use.

### 3.3.3 Observation #3: Facilitate Recipients’ Ability to Make Predictive Relevancy Judgments

Each marketing communication necessarily consumes some of the recipient’s attention for sorting purposes. Ordinarily, a recipient will scan a marketing communication to make a predictive judgment about the message’s relevancy to the recipient’s interests.<sup>20</sup> If the recipient initially deems the message irrelevant, the recipient will usually discard the message. On the other hand, if the recipient initially makes a predictive judgment that the communication may be relevant, the recipient usually then will do a more careful review to make an evaluative judgment of relevancy.<sup>21</sup>

This two-stage review process suggests that social welfare can increase if recipients can make more efficient predictive judgments, thereby lessening the need to make more time-consuming evaluative judgments. In other

<sup>18</sup> Utah Spyware Control Act, H.B. 323, 2004 General Session, Part 2 (Utah 2004).

<sup>19</sup> *WhenU.com, Inc. v. Utah*, Civil No. 0407097578 (Utah Dist. Ct. June 22, 2004), available at <http://www.benedelman.org/spyware/whenu-utah/pi-ruling-transcript.pdf>.

<sup>20</sup> See Soo Young Rieh, *Judgment of Information Quality and Cognitive Authority in the Web*, 53 J. AM. SOC’Y FOR INFO. SCI. & TECH. 145, 150 (2002).

<sup>21</sup> *Id.*

words, each recipient will experience less negative utility due to attention consumption if the recipient can sort the communication faster.

Recipients can make quicker predictive judgments if the marketing communication provides easy-to-scan content that summarizes or previews the marketing communication's contents. I refer to this summary or preview content as "filtering content." An email's subject line is an example of filtering content. If the subject line contains useful predictive information, many uninterested recipients can delete the email without having to open the email and scan its contents. While reviewing email subject lines still consumes some of the recipient's attention, the quick sorting can reduce the negative utility.

Regulators recognize the importance of filtering content inconsistently. In some situations, regulations mandate filtering content. For example, certain emails now must be labeled "advertising" or "sexually explicit,"<sup>22</sup> and telemarketers must display their name and phone number to recipients using caller identification devices.<sup>23</sup>

However, regulations do not mandate or encourage filtering content in comparable circumstances. For example, senders of direct mail are not required to include any filtering content on the envelope's exterior—no name, return address or other predictive content of any type. As a result, direct mail recipients often must open the envelope to make any predictive judgments.

In yet other situations, the regulatory scheme discourages filtering content. For example, some Internet trademark cases have imposed liability on an intermediary merely for displaying filtering content to searchers, irrespective of the filtering content's usefulness in making predictive judgments.<sup>24</sup> This type of liability may curtail the display of filtering content seen by searchers, thus unnecessarily consuming more attention.

While regulations should not inhibit the provision of accurate filtering content, the converse proposition—requiring marketers to provide accurate filtering content—does not always hold true. Specifying that recipients be

<sup>22</sup> See 15 U.S.C. § 7704(a)(5)(A)(i) (commercial electronic mail messages must provide "clear and conspicuous identification that the message is an advertisement or solicitation"); 16 C.F.R. § 316.1 (commercial electronic mail messages that include sexually oriented material must "include in the subject heading the phrase 'SEXUALLY-EXPLICIT:' in capital letters as the first nineteen (19) characters at the beginning of the subject line").

<sup>23</sup> See 16 C.F.R. § 310.4(a)(7) (defining as an abusive telemarketing practice the failure "to transmit or cause to be transmitted the telephone number, and, when made available by the telemarketer's carrier, the name of the telemarketer, to any caller identification service in use by a recipient of a telemarketing call").

<sup>24</sup> See, e.g., *1-800 Contacts, Inc. v. WhenU.com, Inc.*, 309 F. Supp. 2d 467 (S.D.N.Y. 2003).

exposed to filtering content structures how the recipients' attention will be consumed, which may require more attention from recipients than would have been required without the regulation. If so, the additional benefits of the mandatory filtering content need to be weighed against the implicit attention consumption costs.<sup>25</sup> Mandatory filtering content could create social welfare, but regulators rarely or never balance the attention consumption costs they are imposing—and they should.

Furthermore, even when mandatory filtering content creates positive net social welfare, the filtering content should reflect how individuals process information. Usually, regulators determine what mandatory filtering content to require based on intuitive assumptions about individuals' informational needs. However, regulators often have no training in human cognitive processes and thus may require unhelpful filtering content (or fail to require useful filtering content). To the extent that regulators determine that recipients should get filtering content, regulators should rely upon experts, such as information scientists, to structure the filtering content in a useful and efficient manner.

#### 4. CONCLUSION

People who obsess over data mining are misdirecting their energies. Data mining is not the problem; at worst, it is just a preparatory step towards a problem. In the case of direct marketing, data mining is a *beneficial* preparatory step, and social welfare would improve if direct marketers used it more often.

The obsession with data mining as a standalone harm has also masked the important role of attention consumption in direct marketing. Properly isolated, we can see the value of trying to conserve attention where it is conservable; but we also recognize that everyone must sacrifice some attention to preserve breathing room for communications catering to minority interests.

<sup>25</sup> There may be other costs to consider, such as the marketer's production and compliance costs.