ANALOGY BREAKERS: A REALITY CHECK ON EMERGING TECHNOLOGIES

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INTRODUCTION

Like it or not, the analogy is indispensable to legal reasoning. This maxim is perhaps best exemplified by the perennial attempts of jurists to fold the particulars of cyberspace into established criminal procedure doctrine. An e-mail is just like regular mail.[1] Or isn't it? That holds for text messages![2] Or doesn't it? Laptop searches at the border: like luggage?[3] How about GPS? It's a modernized form of the "beeper" from *Knotts* and *Karo*?[4] I think.

In search of the "right" analogy to mediate new technology and old rules, courts and commentators naturally hone in on technological "functions." Cell phones, in the context of the Fourth Amendment, provide a good illustration. Government

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[1] *See, e.g.*, Warshak v. United States, 490 F.3d 455, 474-75 (6th Cir. 2007) (analogizing screening of postal mail to screening of e-mail, and concluding that persons have a reasonable expectation of privacy in the content of e-mails), *vacated on other grounds*, 532 F.3d 521 (6th Cir. 2008) (en banc).

[2] *See, e.g.*, Quon v. Arch Wireless Operating Co., 529 F.3d 892, 905 (9th Cir. 2008) ("We see no meaningful difference between the e-mails at issue in *Forrester* and the text messages at issue here [and] we also see no meaningful distinction between text messages and letters."); *see also* United States v. Forrester, 512 F.3d 500, 510 (9th Cir. 2008) ("[E]-mail to/from addresses . . . constitute addressing information and do not necessarily reveal any more about the underlying contents of communication than do phone numbers.").

[3] *See, e.g.*, United States v. Arnold, 523 F.3d 941, 947 (9th Cir. 2008) ("Arnold has failed to distinguish how the search of his laptop and its electronic contents is logically any different from the suspicionless border searches of travelers' luggage . . . .").

[4] *See, e.g.,* United States v. Garcia, 474 F.3d 994, 996-97 (7th Cir. 2007) (discussing United States v. Knotts, 460 U.S. 276 (1983) and United States v. Karo, 468 U.S. 705 (1984)).

lawyers regularly claim that cell phones should be treated like "address books" because they share a functional role: aggregating contact information of friends and associates. Yet defense lawyers counter that cell phones should be treated like laptop computers because both facilitate word processing and internet access. While some courts buy the first analogy, and others the second, it is important to understand that both decisions rest on a common premise: that a functional analogy is a sufficient condition of legal reasoning.

I will leave the ongoing debates regarding functional equivalence for others. Taking a more collateral approach, this paper critiques the "mono-analogical" framework channeling the debate. The term "mono-analogical" designates a brand of analogical reasoning where only a single dimension of a subject is mapped.[5] I argue that the prevailing mono-analogical approach to cyber-issues (which places near-exclusive emphasis on a technological instrument's functional role) is indeterminate, undisciplined, and in disregard of the subtler lessons of landmark Fourth Amendment opinions such as *United States v. Knotts* and *Kyllo v. United States*.[6]

In this article I call for a shift in constitutional criminal procedure adjudication, away from the mono-analogical and toward the poly-analogical. A poly-analogical framework invites courts to reflect on not only matters of functional equivalence, but also on the more practical implications of a new instrument's emergence. Examples of an instrument's nonfunctional dimensions include frequency of use, storage capacity, efficiency, and ability to facilitate information aggregation.[7] Importantly, courts can incorporate the poly-analogical framework through application of a simple doctrinal test which I

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[5] In the cell phone decisions, one dimension (the phone's functionality) is generally mapped. So, as a practical matter, if the court believes that the *functionality* of a cell phone is like a pager or address book, the warrantless search is reasonable; if not, it is unreasonable.

[6] *Kyllo*, 533 U.S. 27 (2001); *Knotts*, 460 U.S. 276 (1983).

[7] "Prevalence" is doctrine-specific. For "search incident" issues, prevalence includes "frequency of use" within grab area and "storage capacity." For evaluating "expectations of privacy," the "prevalence" factors would be "cost of use" and "effectiveness." *See* discussion *infra* notes 55-57 and accompanying text.

term the "analogy breaker." This proposed test can be applied to most any intersection of criminal procedure and cyberspace technology.

I. ANALOGICAL REASONING IN CRIMINAL PROCEDURE

The intersection of criminal procedure and cyberspace is marked by a flawed method of analogical reasoning. We begin our analysis with a brief and general discussion of the role of the analogy in legal reasoning.

A. Analogy in Law

"There is no word," observed John Stuart Mill, "which is used more loosely, or in a greater variety of senses, than [a]nalogy."[8] A typical definition is "[a] form of logical inference or an instance of it, based on the assumption that if two things are known to be alike in some respects, then they must be alike in other respects."[9] Over the past decades, numerous scholars have examined the role of analogical reasoning in judicial decisionmaking.[10] The "characteristic form of analogical thought in

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[8] 2 JOHN STUART MILL, A SYSTEM OF LOGIC, RATIOCINATIVE AND INDUCTIVE: BEING A CONNECTED VIEW OF THE PRINCIPLES OF EVIDENCE AND THE METHODS OF SCIENTIFIC INVESTIGATION 87 (London, Longmans, Green, Reader, & Dyer 9th ed. 1875).

[9] THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE 64 (4th ed. 2009). "Analogy" is most often confused with "metaphor" and "inductive inference." *See id.* at 1104 (defining "metaphor" as "[a] figure of speech in which a word or phrase that ordinarily designates one thing is used to designate another, thus making an implicit comparison."); *see also* Dan Hunter, *Reason is Too Large: Analogy and Precedent in Law*, 50 EMORY L.J. 1197, 1206-11 (2001) (emphasizing the differences between analogy and inductive reasoning). *But see* RICHARD A. POSNER, THE PROBLEMS OF JURISPRUDENCE 89 (Harvard Univ. Press 1993) (claiming that analogy and induction are one in the same).

[10] For recent discussions of analogical reasoning in law, see generally Larry Alexander, *Bad Beginnings*, 145 U. PA. L. REV. 57 (1996); Scott Brewer, *Exemplary Reasoning: Semantics, Pragmatics, and the Rational Force of Legal Argument by Analogy*, 109 HARV. L. REV. 923 (1996); Ronald Dworkin, *In Praise of Theory*, 29 ARIZ. ST. L.J. 353 (1997); Hunter, *supra* note 9; Frederick Schauer, *Why Precedent in Law (and Elsewhere) is Not Totally (or Even Substantially) about Analogy*, 3 PERSP. ON PSYCHOL. SCI. 454 (2008); Frederick Schauer, *Precedent*, 39 STAN. L. REV. 571 (1987); Emily Sherwin, *A Defense of Analogical Reasoning in Law*, 66 U. CHI. L. REV. 1179 (1999); Cass R. Sunstein, *On Analogical Reasoning*, 106 HARV. L. REV. 741 (1993). For earlier treatments, see generally EDWARD H. LEVI, AN INTRODUCTION TO LEGAL REASONING 9-

law," wrote Professor Sunstein, "appears to work in four simple steps":

> (1) Some fact pattern A has a certain characteristic X, or characteristics X, Y, and Z; (2) Fact pattern B differs from A in some respects but shares characteristics X, or characteristics X, Y, and Z; (3) The law treats A in a certain way; (4) Because B shares certain characteristics with A, the law should treat B the same way.[11]

While analogical reasoning is particularly attractive to judges confronting technologies that were not likely foreseen at the time of the drafting of relevant legislation or precedent,[12] the use of analogical reasoning to mediate old rules and emerging technologies has led to mixed results.[13] As Professor Cohen has observed, whenever "new technologies have entered the market, courts have similarly struggled in analogizing them to older technologies . . . ."[14] Gaffes include the "legal confusion surrounding the analogizing . . . of the telephone to the telegraph" and the failure of courts to initially recognize radio and film as protected forms of speech.[15] Perhaps no analogical mis-

27 (Univ. of Chi. Press 1949); RICHARD A. WASSERSTROM, THE JUDICIAL DECISION: TOWARD A THEORY OF LEGAL JUSTIFICATION 25-30 (Stanford Univ. Press 1961).

[11] *See* Sunstein, *supra* note 10, at 745.

[12] *See* Jonathan H. Blavin & I. Glenn Cohen, *Gore, Gibson, and Goldsmith: The Evolution of Internet Metaphors in Law and Commentary*, 16 HARV. J.L. & TECH. 265, 267 (2002); Susan Freiwald, *First Principles of Communications Privacy*, 2007 STAN. TECH. L. REV. 3, ¶8 (stating that courts generally avoid or cut short "reasonable expectation of privacy analysis for modern electronic communications because the analysis pushes [judges] beyond their [judicial] competence"); Stephanie A. Gore, *"A Rose by Any Other Name": Judicial Use of Metaphors for New Technologies*, 2003 J.L. TECH. & POL'Y 403, 408 (noting that a significant number of Americans are "technophobic" and reasoning that if judges are similar to the vast number of Americans, they may be more willing to accept metaphors and analogies for new technologies rather than undertaking the task of understanding whether the metaphors and analogies fit the particular legal question before them).

[13] *See* City of Ontario v. Quon, 130 S. Ct. 2619, 2629 (2010) ("The judiciary risks error by elaborating too fully on the Fourth Amendment implications of emerging technology before its role in society has become clear.") (citing Olmstead v. United States, 277 U.S. 438 (1928)).

[14] *See* Blavin & Cohen, *supra* note 12, at 268.

[15] *Id.* (citing ITHIEL DE SOLA POOL, TECHNOLOGIES OF FREEDOM 100 (1983)); *see* Mut. Film Corp. v. Indus. Comm'n, 236 U.S. 230, 243-44 (1915) (stating that films were

step was greater than that of *Olmstead v. United States.*[16] The Federal Bureau of Investigation had used wiretaps to obtain evidence of a conspiracy to transport and sell liquors.[17] Finding that the wiretaps were installed without a physical trespass, Chief Justice Taft, writing for the majority, concluded that no Fourth Amendment "search" had occurred.[18] The Court analogized as follows: numerous Fourth Amendment cases of the Court had involved facts without a physical trespass; in none of the cases without a physical trespass had there been a Fourth Amendment "search"; the mere use of a wiretap causes no physical trespass; thus the mere use of a wiretap does not constitute a Fourth Amendment "search."[19]

Looking to improve on this "bad track record,"[20] lower courts in the United States are searching, as I write, for the right analogies to mediate old doctrine and new cyber-technologies. Just a brief survey of current criminal procedure litigation reveals a host of prevailing analogies. These include (but are certainly not limited to) analogies between the content of letters and e-mail; letters and texts; envelopes and e-mail addresses; envelopes and e-mail subject lines; shopping and web-browsing; "beepers" and GPS tracking; and border searches of luggage and laptops.[21]

In their attempts to "cyberize" criminal procedure doctrine, courts regularly utilize a form of legal reasoning that I term "mono-analogical."[22] By "mono-analogical" I mean that

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"moving pictures" rather than a traditional method of expression, and thus not subject to First Amendment protection), *overruled by* United States v. Paramount Pictures, Inc., 334 U.S. 131, 166 (1948); City of Richmond v. S. Bell, Tel. & Tel. Co., 174 U.S. 761, 773-78 (1899); *see also* United States v. Lee, 274 U.S. 559, 563 (1927) ("[U]se of a searchlight is comparable to the use of a marine glass or a field glass.").

[16] 277 U.S. 438 (1928).

[17] *Id.* at 455.

[18] *Id.* at 466.

[19] *Id.* Of course the Court reversed itself nearly forty years later in *Katz v. United States*, 389 U.S. 347 (1967).

[20] *See* Blavin & Cohen, *supra* note 12, at 267.

[21] *See supra* notes 1-4 and accompanying text. *See generally* Orin S. Kerr, *The Fourth Amendment and New Technologies: Constitutional Myths and the Case for Caution*, 102 MICH. L. REV. 801 (2004).

[22] *See* discussion *infra* Part II.A.

only one dimension of a subject is mapped during the adjudication. To illustrate "mono-analogical" reasoning, the following paragraphs profile a particular point of intersection between criminal procedure and cyber-technologies: the incorporation of cell phones into the "search incident to arrest" doctrine.

B. Illustrating Mono-Analogical Reasoning

One of the oldest exceptions to the warrant requirement concerns searches incident to lawful arrests. The exception, at its core, encompasses searches of an arrestee's person and those items found within the arrestee's "grab area."[23] Over the past decades warrantless searches of wallets, purses, tablets, pagers, and address books have been held to be "reasonable" under the "search incident" doctrine.[24]

In recent years, lower courts have been tasked with mediating the "search incident" rules and cell phone technologies.[25] The courts are routinely asked by government lawyers to treat cell phones like pagers, address books, or general containers. Their claim is that the "Contact List" on such phones serves a particular functional role—that of organizing contact

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[23] *See* United States v. Robinson, 414 U.S. 218, 226 (1973); Chimel v. California, 395 U.S. 752, 762-63 (1969). The scope of such a search varies depending on whether the arrestee was a recent occupant of a vehicle. *See* New York v. Belton, 453 U.S. 454, 460-61 (1981), *holding limited by* Arizona v. Gant, 129 S. Ct. 1710 (2009).

[24] *See, e.g.*, United States v. Ortiz, 84 F.3d 977, 984 (7th Cir. 1996) (pager); United States v. Rodriguez, 995 F.2d 776, 778 (7th Cir. 1993) (wallet and address book); United States v. McFarland, 633 F.2d 427, 429 (5th Cir. 1980) (notebook paper); United States v. Garcia, 605 F.2d 349, 355 (7th Cir. 1979) (purse); United States v. Gonzalez-Perez, 426 F.2d 1283, 1287 (5th Cir. 1970) (purse); United States v. Frankenberry, 387 F.2d 337, 339 (2d Cir. 1967) (diary); Grillo v. United States, 336 F.2d 211, 212 (1st Cir. 1964) (wallet); United States v. Vaneenwyk, 206 F. Supp. 2d 423, 425 (W.D.N.Y. 2002) (day planner); United States v. Chan, 830 F. Supp. 531, 535-36 (N.D. Cal. 1993) (pager). The concept of "grab area" is curtailed, at certain points, by due process considerations. Schmerber v. California, 384 U.S. 757, 769-70 (1966) (holding that absent "clear indication" evidence will be found, warrantless searches incident to arrest are unreasonable if they "involv[e] intrusions beyond the body's surface").

[25] While the analogical reasoning in "search incident" cases might be ultimately irrelevant if *Gant*, 129 S. Ct. 1710, is extended to non-vehicle cases, the flaws of mono-analogical reasoning, as illustrated here in particular, would still be generally true and therefore hold in other doctrinal corners of constitutional criminal procedure. *See infra* note 66.

information—and that items that serve such a role, when found within an arrestee's grab area, can be searched without a warrant following a lawful arrest. The government's argument can be framed as follows:

> (1) Address books and pagers have certain functions X and Y; (2) Cell phones differ functionally from address books and pagers in some respects (they also offer Z), but share functions X and Y*;* (3) The law permits warrantless searches of address books and pagers found within an arrestee's grab area; (4) Because cell phones share functions X and Y with address books and pagers*,* the law should permit warrantless searches of cell phones found within an arrestee's grab area.

Perhaps not surprisingly, those judges holding cell phone searches to be "reasonable" have routinely drawn analogies to address books,[26] pagers,[27] or general containers.[28] As a recent district court observed: "Decisions of district courts and Courts of Appeals (often analogizing cell phones to the earlier pager technology) trend heavily in favor of finding that the search

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[26] United States v. Valdez, No. 06-CR-336, 2008 WL 360548, at *2-*4 (E.D. Wis. Feb. 8, 2008) (analogizing cell phones to, *inter alia*, address books); United States v. Urbina, No. 06-CR-336, 2007 WL 4895782, at *13-*14 (E.D. Wis. Nov. 6, 2007) (analogizing cell phones to, *inter alia*, address books); United States v. Cote, No. 03-CR-271, 2005 WL 1323343, at *6 (N.D. Ill. May 26, 2005) ("Searches of items such as wallets and address books, which I consider analogous to Cote's cellular phone since they would contain similar information, have long been held valid when made incident to an arrest.") (citing *Rodriguez*, 995 F.2d 776).

[27] United States v. Finley, 477 F.3d 250, 260 n.6 (5th Cir. 2007) (analogizing cell phones to pagers); United States v. McCray, No. CR408-231, 2009 WL 29607, at *4 (S.D. Ga. Jan. 5, 2009) ("A cell phone, like a beeper, is an electronic 'container,' in that it stores information that may have great evidentiary value (and that might easily be destroyed or corrupted)."); *Valdez*, 2008 WL 360548, at *2-*4 (analogizing cell phones to, *inter alia*, pagers).

[28] *Finley*, 477 F.3d at 259-60 (finding that the "search incident" doctrine "extends to containers found on the arrestee's person" and concluding that search of a cell phone's stored text messages was reasonable); United States v. Wurie, 612 F. Supp. 2d 104, 110 (D. Mass. 2009) ("I see no principled basis for distinguishing a warrantless search of a cell phone from the search of other types of personal containers . . . ."); *see also* People v. Diaz, 244 P.3d 501 (Cal. 2011) (finding that warrantless cell phone searches incident to arrest are reasonable because cell phones are "property").

incident to arrest or exigent circumstances exceptions apply to searches of the contents of cell phones."[29]

While the government claims a functional analogy between cell phones and address books, defendants not only contest such an analogy, but counter with a preferred analogy of their own: one between cell phones and laptop computers.[30] Cell phones, they explain, organize large amounts of information, and in more recent models, facilitate word processing and internet access. Their argument, in its essence, can be framed as follows:

> (1) Laptop computers have certain functions A and B; (2) Cell phones differ functionally from laptops in some respects (they do not offer functions C and D), but share functions A and B*;* (3) The law does not permit warrantless searches of laptops found within an arrestee's grab area; (4) Because cell phones share functions A and B with laptops*,* the law should not permit warrantless searches of cell phones found within an arrestee's grab area.[31]

Courts finding warrantless searches of cell phones incident to arrest to be "unreasonable" have uniformly rejected the proposed analogy to address books, pagers, or containers, and they have regularly (though not always) adopted the defense's counter-analogy to the laptop.[32]

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[29] *Wurie*, 612 F. Supp. 2d at 109. Not surprisingly some lower courts have left the underlying analogies unstated, disposing of the legal claims by resort to citations to authority. *See* United States v. Deans, 549 F. Supp. 2d 1085, 1094 (D. Minn. 2008) (citing *Finley*, 477 F.3d at 258-60); United States v. Santillan, 571 F. Supp. 2d 1093, 1101-04 (D. Ariz. 2008)).

[30] While it seems to be generally understood that warrantless searches of laptop computers incident to arrest are not "reasonable" under the Fourth Amendment, there are surprisingly few cases on point. For one example, see State v. Washington, No. 47773-1-I, 2002 WL 104492, at *3 (Wash. Ct. App. Jan. 28, 2002).

[31] *Cf.* Sunstein, *supra* note 10, at 745.

[32] United States v. Park, No. CR 05-375 SI, 2007 WL 1521573, at *8 (N.D. Cal. May 23, 2007) (analogizing cell phones to laptops); *see also* United States v. Zavala, 541 F.3d 562, 577 (5th Cir. 2008) (stating, in the context of *Terry* stops, that "[a] cell phone is similar to a personal computer that is carried on one's person"); United States v. Urbina, No. 06-CR-336, 2007 WL 4895782, at *13-*14 (E.D. Wis. Nov. 6, 2007) ("If the evidence in a future case were to show that the warrantless search conducted by law enforcement was essentially equivalent to a search of a personal computer, without

With that said, one state high court has recently rejected proposed analogies to both the address book and the laptop.[33] The Ohio Supreme Court, in *State v. Smith*, held that cell phone searches incident to arrest were unreasonable.[34] While three justices bought the government's analogy to pagers (and therefore claimed the underlying search to be "reasonable"), the majority disagreed, observing that:

> [C]ell phones defy easy categorization. On one hand, they contain digital address books very much akin to traditional address books carried on the person . . . . On the other hand, they have the ability to transmit large amounts of data in various forms, likening them to laptop computers . . . . But cell phones are neither address books nor laptop computers.[35]

Although the majority adopted neither of the proposed analogies, it should be emphasized that it did not take issue with the concept of mono-analogical reasoning. To the contrary it seems to have embraced such reasoning. Finding no suitable analogs in place, the Court simply identified a new functional category which would be expected to serve as the touchstone for mono-analogical reasoning in future cases.[36]

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sufficient exigencies to justify such a search, the court's reaction may be different, because of the substantial invasion of privacy."). For commentary on the analogy between cell phones and laptops, see Matthew E. Orso, *Cellular Phones, Warrantless Searches, and the New Frontier of Fourth Amendment Jurisprudence*, 50 SANTA CLARA L. REV. 183, 221 (2010) ("Whatever rule applies to computers should certainly apply to new generation cellular devices . . . ."); Bryan Andrew Stillwagon, *Bringing an End to Warrantless Cell Phone Searches*, 42 GA. L. REV. 1165, 1201 (2008) (urging "the judiciary to recognize that cell phones are . . . much more analogous to modern computers than to wallets, briefcases, or even pagers").

[33] State v. Smith, 920 N.E.2d 949, 955 (Ohio 2009).

[34] *Id.*

[35] *Id.*

[36] *Id.* The Court did not reject "mono-analogical" reasoning, but simply held that they could not find a "right" analog for cell phones within the existing state of precedent. *Id.* at 952 (noting that "whether the warrantless search of a cell phone passes constitutional muster depends upon how a cell phone is characterized"); *id.* at 954 (stating that "the question becomes how [the cell phone] should be classified").

II. THE POLY-ANALOGICAL FRAMEWORK

A. The Problem: "Mono-Analogical" Reasoning

The previous section identified how U.S. courts, in the face of emerging cell phone technologies, have gravitated toward a mode of reasoning marked by excessive reliance on functional analogies. The following paragraphs discuss the dangers of mono-analogical reasoning, emphasizing how it is indeterminate, undisciplined, and (when utilized in the context of criminal procedure litigation) in disregard of some of the subtler lessons of *Knotts* and *Kyllo*.[37]

(1) Indeterminate

Mono-analogical reasoning is oftentimes indeterminate. After all, it casts judges in the roles of etymologist, linguist, and philosopher. Off they go: to discern and compare the Ideal of Cell Phoneness, of Address Bookness, and of Laptopness. This might remind one of H.L.A. Hart and "the most famous hypothetical in the common law world": whether a statue of a truck violates the "no vehicles in the park" ordinance.[38] Or of Professor Hunter's query whether a ferry is a "floating hotel" or merely a "seagoing train."[39] With each, there is (in some real sense) no "wrong" answer, let alone any readily identifiable way to evaluate the merits of a judicial decision. Such indeterminacy offers jurists wide discretion to reach conclusions post hoc.[40]

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[37] Kyllo v. United States, 533 U.S. 27 (2001); United States v. Knotts, 460 U.S. 276 (1983).

[38] Frederick Schauer, *A Critical Guide to Vehicles in the Park*, 83 N.Y.U. L. REV. 1109, 1109 (2008) (referring to Hart's example as "the most famous hypothetical in the common law world"); *see* H.L.A. Hart, *Positivism and the Separation of Law and Morals,* 71 HARV. L. REV. 593, 607 (1958).

[39] Hunter, *supra* note 9, at 1207. In the cell phone context, one might imagine the bench memo that reads: "Address book or laptop? Your call, Judge."

[40] One sees that, as a practical matter, mono-analogical reasoning has led to pro-defendant decisions based on forced (and probably disingenuous) analogies. Too many of the pro-defendant decisions rest on awkward claims that traditional cell phones are like laptop computers, or, alternatively, that cell phones are not "immediately associated with the person" pursuant to *United States v. Chadwick*, 433 U.S. 1, 15 (1977).

(2) Undisciplined

A second flaw with mono-analogical reasoning is that it leads courts to deviate over time (and often subconsciously) from the intended arc of precedent. Assume a court in 1982 holds that it is permissible to conduct a warrantless search of a litigation bag found within the arrestee's grab area. And further assume that thirty years later the same court is faced with the question of whether it is permissible to search word processing files saved on an iPhone found within the arrestee's grab area. Applying a mono-analogical method, a judge might very well find the search of the iPhone "reasonable":

> (1) Litigation bags have certain functions X, Y, and Z; (2) iPhones differ functionally from litigation bags (for instance, they offer functions A and B) but share functions X, Y, and Z*;* (3) The law permits warrantless searches of litigation bags found within an arrestee's grab area; (4) Because iPhones share functions X, Y, and Z with litigation bags*,* the law should permit warrantless searches of iPhones found within an arrestee's grab area.

So, what's the problem here? How might such a holding deviate from precedent? While the iPhone is (arguably) functionally analogous to the litigation bag (both are mobile containers which store documents), the doctrine's application to iPhones exponentially increases the amount of private information obtainable by the government without cause or a warrant.[41] In 1982 perhaps only a few thousand people within the United States at a given point in time had litigation bags within their grab area. (And, of this subset, perhaps only a few hundred people maintained large catalogs of privileged or personal documents in such bags). In 2012, perhaps fifty million people within the United States at any given moment will—due to developing technologies and shifting norms—maintain privi-

[41] *See* Sunstein, *supra* note 10, at 746 ("[A]nalogical reasoning goes wrong when there is an inadequate inquiry into the matter of relevant differences and governing principles."); Blavin & Cohen, *supra* note 12, at 267 (stating that in the related concept of metaphors, "[c]ommentators have warned that the unreflective use of metaphors can lead lawyers to take for granted the 'realities' that metaphors enable").

leged or personal documents within their grab area. And of these fifty million a significant percentage are bound to be maintaining a large catalog of documents. So while the litigation bag is in many ways functionally analogous to the iPhone, it is possible (and perhaps likely) that the 1982 court, had it been able to foresee the future, would have incorporated limiting principles into its decision to prevent this sort of mono-analogical "slide."[42] Is it unreasonable for courts to transpose limiting principles onto decisions handed down in different times or places? Of course not. Any durable common law system demands such inferences. Yet unfortunately, such inferences are systematically foreclosed by mono-analogical reasoning. And so the use of mono-analogical reasoning creates, over time, a sort of "operator" effect: where the essence of past decisions is but faintly recognizable in any of its alleged progeny.

(3) Disregards Lessons of *Knotts* and *Kyllo*

Third, mono-analogical reasoning disregards the subtle lessons of landmark criminal procedure decisions involving emerging technologies.[43] In *United States v. Knotts*[44] and *United States v. Karo*,[45] the Supreme Court held that the use of a beeping tracking device does not violate expectations of privacy so long as it does not provide the government with information that would otherwise be unobtainable through lawful visual surveillance.[46] The *Knotts* and *Karo* holdings stemmed, more or less, from a simple functional analogy: visual surveillance from public spaces is not a "search"; the use of a beeper to track persons in public is functionally analogous to visual surveillance;

[42] *See generally* City of Ontario v. Quon, 130 S. Ct. 2619, 2630 (2010) ("A broad holding concerning employees' privacy expectations vis-à-vis employer-provided technological equipment might have implications for future cases that cannot be predicted. It is preferable to dispose of this case on narrower grounds.").

[43] Kyllo v. United States, 533 U.S. 27 (2001); United States v. Knotts, 460 U.S. 276 (1983).

[44] 460 U.S. 276.

[45] 468 U.S. 705 (1984).

[46] *Knotts*, 460 U.S. at 282 ("Visual surveillance from public places along Petschen's route or adjoining Knotts' premises would have sufficed to reveal all of these facts to the police.").

thus, the use of a beeper to track persons in public does not constitute a "search." Yet in important dictum Justice Rehnquist, writing for the *Knotts* majority, suggested that a valid functional analogy could only carry the government so far: "If such [24-hour surveillance and] dragnet type law enforcement practices as respondent envisions should eventually occur, there will be time enough then to determine whether different constitutional principles may be applicable."[47] Such was a tacit admission that functional analogies, while certainly of value, will not always be a sufficient condition of legal reasoning at the intersections of criminal procedure and emerging technologies.

A second case disregarded by mono-analogical reasoning is *Kyllo v. United States*.[48] The Court in *Kyllo* held that use of thermal-imaging technology on a home violated reasonable expectations of privacy.[49] The government in that case proposed a functional analogy between thermal-imaging technology and ordinary visual surveillance. Justice Stevens, writing for the dissent, relied on such an analogy to conclude that Kyllo's house was not searched.[50]

> [T]he ordinary use of the senses might enable a neighbor or passerby to notice the heat emanating from a building, particularly if it is vented, as was the case here. Additionally, any member of the public might notice that one part of a house is warmer than another part or a nearby building if, for example, rainwater evaporates or snow melts at different rates across its surfaces. Such use of the senses would not convert into an unreasonable search if, instead, an adjoining neighbor allowed an officer onto her property to verify her perceptions with a sensitive thermometer. Nor, in my view, does such observation become an unreasonable search if made from a distance with the aid of a device that merely discloses that the exterior of one house,

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[47] *Id.* at 283-84 (Knotts had expressed "the generalized view that the result of the holding sought by the Government would be that 'twenty-four hour surveillance of any citizen of this country will be possible, without judicial knowledge or supervision.'").

[48] 533 U.S. 27 (2001).

[49] *Id.* at 34.

[50] *Id.* at 43 (Stevens, J., dissenting).

> or one area of the house, is much warmer than another. Nothing more occurred in this case.[51]

The majority opinion, while critical of the dissent on multiple fronts, let alone the analogy between visual surveillance and thermal-imaging technology. The merits of the analogy aside, Justice Scalia rejected the dissent's claim that such analogy was dispositive: "[w]e rejected such a mechanical interpretation of the Fourth Amendment in *Katz*, where the eavesdropping device picked up only sound waves that reached the exterior of the phone booth."[52] *Kyllo* exemplifies how the efficiencies of a new technology can disrupt the citizen-state relationship to the point where functional analogies, even while technically valid, are deemed an inadequate mode of legal reasoning.[53]

B. The Solution: "Poly-Analogical" Reasoning

The lower courts' mediation of cyber-technologies and criminal procedure by resort to mono-analogical reasoning is flawed. And so two questions arise: First, what is missing? Second, what can be done? The missing component, as it turns out, is what I term "prevalence." And the solution is to employ what I term an "analogy breaker." Both concepts are discussed in the following paragraphs.

When courts are tasked with applying precedent to emerging technologies, it is imperative that they contemplate (if only generally) any *implied* limitations in past decisions.[54] The excavation of implied limitations gives courts the foundation to

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[51] *Id.*

[52] *Id.* at 35 (majority opinion). In effect, the *Kyllo* Court read *Katz* as holding that the analogy between wiretaps and eavesdropping was non-dispositive. *See* Katz v. United States, 389 U.S. 347, 364 (1967) (Black, J., dissenting).

[53] Admittedly the Court has been explicit that the increase in government efficiency is not grounds, by itself, to find a reasonable expectation of privacy. *See* United States v. Knotts, 460 U.S. 276, 284 (1983).

[54] For example, when a court holds that a warrantless search of an address book incident to arrest is "reasonable," it is making a finding that it is permissible in our society to give police discretion to read such address books without a warrant. And it is hard to deny that implicit in such a finding is the understanding that a certain percentage of persons will at any given time be carrying an address book, and that those who do will tend to have only a limited amount of information in such books.

draw analogies regarding multiple dimensions of a new technological instrument. For lack of a better word, these other, non-functional dimensions might be referred to as "prevalence" dimensions.

The term "prevalence" bundles at least three dimensions of any new technological instrument. First, "prevalence" relates to how an instrument, taken in conjunction with norms, alters the *amount* of data available (looking at searches in the aggregate) within a traditional search domain.[55] Second, "prevalence" relates to how an instrument, although functionally equivalent to traditional means of surveillance, affects the *efficiency* of government surveillance.[56] Third, "prevalence" relates to how an instrument, although functionally equivalent to traditional means of surveillance, affects the government's ability to *aggregate* information over time and across the population.[57] In each of these situations, "prevalence" reveals a practical implication of an instrument that is hidden when only functions are considered.

But even if this is right—that common sense, the internal structure of common law adjudication, and Fourth Amendment case law suggest that poly-analogous reasoning is theoretically superior to mono-analogous reasoning—how can these "preva-

[55] Examples include the *Katz* Court's recognition that norms of increased public phone usage altered the amount of data available through warrantless public phone wiretaps. *Katz*, 389 U.S. at 352 ("To read the Constitution more narrowly is to ignore the vital role that the public telephone has come to play in private communication."). Beyond the technology realm, a good example is Justice Brennan's view that local ordinances prohibiting burning trash added value to traditional trash searches. *See* California v. Greenwood, 486 U.S. 35, 55 (1988) (Brennan, J., dissenting).

[56] Examples include the *Kyllo* Court's emphasis on the costs and unreliability of watching snow melt off roofs, the *Dow* Court's admission that a "search" might have occurred had the government photographs not been grainy, and the *Katz* Court's mention of the infeasibility of officers eavesdropping on phone booths. *See Kyllo*, 533 U.S. at 35 n.2; Dow Chem. Co. v. United States, 476 U.S. 227, 238 (1986); *Katz*, 389 U.S. at 352. While the Court has of course stated that surveillance "efficiency" is not a ground to recognize a new expectation of privacy, *see Knotts*, 460 U.S. at 284, the Court's actions should speak at least as loudly as its words. *Kyllo*, 533 U.S. 27.

[57] The best example here is the Court's statement in *Knotts* that it would be willing to revisit its ruling, that the use of beepers to track public movements are not "searches," should dragnet surveillance became commonplace. 460 U.S. at 284.

lence" dimensions be incorporated, as a practical matter, into the numerous criminal procedure doctrines?

Incorporation, as it turns out, is easy. The "analogy breaker" is a straightforward, supplemental analysis to be applied before courts adjust doctrine based on a functional analogy. To illustrate the "analogy breaker," we return to the "search incident" doctrine.

In the context of the "search incident" rules, the "analogy breaker" would provide:

> Do not rely on a functional analogy to allow warrantless searches of a new technological instrument if either:
>
> (1) the use of that instrument within the grab area (across the population); or
>
> (2) the information generally extractable from that item (across the population)
>
> is significantly greater than that associated with its functional analog at the time the search of the analog was first allowed.[58]
>
> And, conversely, do not rely on a functional analogy to disallow warrantless searches of a new technological instrument if either:
>
> (1) the use of that instrument within the grab area (across the population); or
>
> (2) the information generally extractable from that item (across the population)
>
> is significantly less than that associated with its functional analog at the time the search of the analog was first disallowed.[59]

[58] While admittedly vague, the term "significantly" cannot be quantified. It seems permissible to leave this to judicial discretion. I would say, however, that the usage of cell phones is without a doubt "significantly" greater than that of address books. Moreover, the information generally extractable from a cell phone is "significantly" greater than that from an address book.

Note that if the functional analogy fails, or, alternatively, the functional analogy is "broken," the reviewing court should undertake a fresh "default" analysis of the new technological instrument.[60] (For instance, in the "search incident to arrest" context, the default analysis would ask: "Do officers need to search cell phones in order to preserve their safety or to prevent the destruction of evidence?"[61]) The "analogy breaker" does not despise functional analogies. It simply offers the courts a tool to identify misleading functional analogies and direct their analyses back to first principles.

C. Application of Poly-Analogical Reasoning

When we apply the "analogy breaker" to mediate the "search incident" rules and cell phone technology, we find three possible scenarios:

> A court could reject the functional analogy to address books and laptops. It would then resort to the default query.[62]

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[59] One should note that only a single strain of "prevalence," relating to the *amount* of information affected, is relevant to the analogy breaker for the "search incident" doctrine. This is because the analyzed instrument is the target of the government action rather than the instrument of government action. Conversely, the analogy breaker to consider the use of an instrument of government action (e.g., the scope of a "search") turns on a consideration of alternative strains of "prevalence" (efficiency and aggregation). *See infra* Part II.D.

[60] This would also have the effect of allowing courts to revisit precedent regarding a specific instrument if use within the grab area, or information generally extractable, decreases significantly with time.

[61] *See* Chimel v. California, 395 U.S. 752 (1969) (explaining that the search incident doctrine is motivated by the need to protect officers and prevent the destruction of evidence). Courts at this level would also consider "intrusiveness." *See, e.g.*, Florida v. Riley, 488 U.S. 445 (1989); United States v. Place, 462 U.S. 696, 706-07 (1983). Intrusiveness differs from prevalence as it focuses not on the windfall of information, but on the interruption of quality of experience.

[62] The default query is: "Do officers need to search cell phones to preserve their safety or to prevent the destruction of evidence?" If the answer is yes, then the search is reasonable. If no, the search is unreasonable. For an example of similar legal reasoning in the "search incident" context, see Judge Werdegar's dissenting opinion in *People v. Diaz*, 244 P.3d 501, 513 (Cal. 2011) (Werdegar, J., dissenting) ("A particular context-dependent balancing of constitutionally protected privacy interests against the police interests in safety and preservation of evidence led the United States Supreme Court,

> A court could adopt the functional analogy to address books. It would then apply the "analogy breaker," asking whether the (1) the use of cell phones within the grab area (across the population); or (2) the information generally extractable from cell phones (across the population) are significantly greater than that of the address book at the time the search of the address book was first allowed. If the answer to both is no, then the functional analogy holds, and the cell phone will be treated in law like the address book. If the answer to one or both is yes, then the analogy is broken and the court should resort to the default query.[63]

> A court could adopt the functional analogy to laptops. It would then apply the "analogy breaker," asking whether the (1) the use of cell phones within the grab area (across the population); or (2) the information generally extractable from cell phones (across the population) are significantly less than that of the laptop at the time the search of the laptop was first disallowed. If the answer to both is no, then the analogy holds, and the cell phone is treated in law like the laptop. If the answer to one or both is yes, then the analogy is broken and the court should resort to the default query.[64]

One immediate concern might be that judges lack the expertise to determine the applicable "usage" or "extract" rates. Such a concern, however, is unreasonable. At least in the context of criminal procedure, nearly all of the vanguard cyberspace issues are litigated with assistance from public interest groups. These groups have the resources to commission studies and retain the experts required to estimate the various "prevalence" dimensions of all new and relevant technological instruments.[65] Litigants are therefore quite capable of educating

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over 30 years ago, to hold searches of the arrestee's person reasonable despite the lack of probable cause or a warrant and despite substantial delay between the arrest and the search. Today, in a very different context of mobile phones and related devices, that balance must be newly evaluated." (citation omitted)).

[63] *See supra* note 62.

[64] *See supra* note 62.

[65] Examples include the Electronic Frontier Foundation and the ACLU's Technology and Liberty Program.

courts to render competent and informed judgments in their applications of "analogy breakers."

D. Extrapolating the Analogy Breaker

The "analogy breaker" is not confined to "search incident" doctrine, but can be applied across the spectrum of criminal procedure issues.[66] Take the perennial question of whether the government's use of a new surveillance instrument constitutes a Fourth Amendment "search." The "analogy breaker" in this context would preclude a court from holding "no search" through a mere functional analogy if either (1) the efficiencies of collection gained by the new surveillance instrument, or (2) the ability to aggregate information through the new surveillance instrument, is significantly greater than its functional analog at the time the court first held that its use did not constitute a "search."[67] Of course the breaking of the analogy would not mean that the use of the challenged surveillance instrument constitutes a "search"—it would simply mean that the court must engage in a fresh analysis of whether the instrument's use violates a "reasonable expectation of privacy."[68]

For instance, consider GPS tracking devices. *Knotts* and *Karo* held, as a general matter, that no expectations of privacy are violated when one is tracked by a beeper in public. Beeper surveillance is functionally analogous to GPS surveillance (both are used to locate a moving entity). A court might be prone to extend this ruling, through mono-analogical reason-

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[66] So even if the cell phone cases are resolved in a different manner (e.g., extending *Arizona v. Gant* to non-vehicle arrests), the lessons from the lower court's treatment of cell phone searches can be extrapolated to other areas of criminal procedure.

[67] Note that the relevance of "reliability" and "aggregating power" can be inferred from *Kyllo* and *Knotts*. *See supra* notes 56 & 57.

[68] *See generally* Freiwald, *supra* note 12, at ¶8 ("It requires them first to analyze society's views about the intricacies of new technologies that most users, including judges, do not understand. Properly done, the reasonable expectation of privacy analysis also requires that courts supplement that positive finding with a normative inquiry into the role of new communications technologies and whether users should be entitled to believe such communications are private. Courts have either avoided the reasonable expectation of privacy analysis, or have cut short the analysis, because they lack adequate empirical data for the positive inquiry and adequate guidance for the normative one." (footnote omitted)).

ing, to GPS surveillance. Yet such an analysis would ignore the "prevalence" dimensions of GPS technology. Through application of the "analogy breaker," a court should ask, before altering the "search" doctrine, whether (1) the efficiencies of collection gained by GPS, or (2) the ability to aggregate information through GPS, is significantly greater than that which was associated with beeping devices at the time the Court ruled on beepers. If the answer to both is no, then the reviewing court should hold that there is no expectation of privacy to be free of GPS surveillance while in public. If the answer to one or both is yes, then the court should undertake a fresh analysis (denuded of the functional analogy between GPS and beepers) whether persons have a reasonable expectation of privacy to be free from GPS surveillance while in public.

CONCLUSION

Courts naturally and necessarily turn to analogical reasoning to incorporate cyber-technologies into existing doctrinal rules. And when it comes to criminal procedure, the preferred form of legal reasoning has been mono-analogous. Such reasoning, however, is indeterminate, undisciplined, and in disregard of the subtleties of landmark cases like *Knotts* and *Kyllo*. This article suggests, as an alternative, a poly-analogous approach: one that respects the necessity for functional comparisons but at the same time gives due credit to the practical dimensions of emerging technologies. Such practical dimensions can be incorporated into prevailing doctrine with little difficulty. The "analogy breaker," applicable across the spectrum of criminal procedure doctrine, will help courts identify the essence of precedent and, as a result, effectively mediate old criminal procedure rules and new technologies.