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Recommended Citation

Andrew C. Michaels, *Abstract Innovation, Virtual Ideas, and Artificial Legal Thought*, 14 J. Bus. & Tech. L. 1 (2019)

Available at: <https://digitalcommons.law.umaryland.edu/jbtl/vol14/iss1/2>

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Abstract Innovation, Virtual Ideas, and Artificial Legal Thought

ANDREW C. MICHAELS*

INTRODUCTION

In the Silicon Valley culture of tech-triumphalism,¹ it is often assumed that advances in technology are necessarily “making the world a better place,”² though in reality technology can have both positive and negative effects.³

* Assistant Professor of Law, University of Houston Law Center. The author thanks the Maryland Journal of Business & Technology Law for its excellent Spring 2018 symposium on “Virtual Legality,” out of which this article in part developed, and the editors of this journal for their judicious editing and publishing work. The author also thanks Paul Janicke and those who participated in the 2018 Mid-Atlantic Junior Faculty at the University of Richmond School of Law, the same year’s Patcon 8 conference at the University of San Diego School of Law, the 2018 IP Scholars Conference at UC Berkeley School of Law, and the 2018 IP Scholars Roundtable at Texas A&M University School of Law.

¹ See SHANNON VALLOR, TECHNOLOGY AND THE VIRTUES: A PHILOSOPHICAL GUIDE TO A FUTURE WORTH WANTING 126 (2016) (“we can no longer afford the modern illusion that our technosocial innovations are conducive to human *mastery*”); see also KENTARO TOYAMA, GEEK HERESY: RESCUING SOCIAL CHANGE FROM THE CULT OF TECHNOLOGY x (2015) (“World leaders are convinced that technology will make the world a better place. But does technology really cause positive social change?”).

² See, e.g., Andrew Marantz, *How Silicon Valley Nails Silicon Valley*, THE NEW YORKER (June 9, 2016), <https://www.newyorker.com/culture/culture-desk/how-silicon-valley-nails-silicon-valley>; Dov Greenbaum, *Making Law School A Better Place: Using HBO’s Silicon Valley to Teach Intellectual Property Law & Entrepreneurship*, 57 IDEA 183, 202-03 (2017) (“The mantra ‘making the world a better place,’ inexplicably attached to every software development, no matter the level of esotericism.”).

³ See, e.g., Jacob Weisberg, *The Digital Poorhouse*, Vol. LXV No. 11 THE NEW YORK REVIEW OF BOOKS 45 (June 7, 2018) (“Automated decision-

Mobile technology, for example, does have its advantages but it also enables employers to “demand that employees are available at all hours of the day,” and “an increasing number of individuals face the health risks associated with over work and burn out.”⁴

Of course there have long been some skeptics;⁵ over three decades ago an astute observer noted: “No one objects when a retail transaction takes three times longer than it did ten years ago because now it’s enacted on a computerized cash register.”⁶ These days, some people are being paid to assist or act like robots,⁷ and the occasional machine malfunction may be the only thing preserving their jobs.⁸ Technology may even be changing the way we think, and not

making has revolutionized many sectors of the economy and it brings real gains to society. It also threatens privacy, autonomy, democratic practice, and the ideals of social equality in ways we are only beginning to appreciate.”); E.F. SCHUMACHER, *SMALL IS BEAUTIFUL: ECONOMICS AS IF PEOPLE MATTERED* 157 (1973) (“The amount of real leisure a society enjoys tends to be in inverse proportion to the amount of labour-saving machinery it employs.”) (internal quotations omitted).

⁴ Paul M. Secunda, *The Employee Right to Disconnect*, MARQUETTE L. SCH. LEGAL STUD. PAPER NO. 18-02, 19 (Feb. 1, 2018), <https://ssrn.com/abstract=3116158>.

⁵ See, e.g., JIMMY BUFFETT, *Everybody’s On The Phone*, on TAKE THE WEATHER WITH YOU (RCA Records, 2006) (“Everybody’s on the phone; So connected and all alone; From the pizza boy to the socialite; We all salute the satellites.”).

⁶ PAUL FUSSELL, *CLASS: A GUIDE THROUGH THE AMERICAN STATUS SYSTEM* 176 (1983).

⁷ Cf. Olivia Solon, *The Rise of ‘Pseudo-AI’: How Tech Firms Quietly Use Humans to do Bots’ Work*, THE GUARDIAN (July 6, 2018, 3:01 AM), <https://www.theguardian.com/technology/2018/jul/06/artificial-intelligence-ai-humans-bots-tech-companies> (“it’s cheaper and easier to get humans to behave like robots than it is to get machines to behave like humans”).

⁸ See generally Camilla A. Hrdy, *Intellectual Property and the End of Work* (Aug. 1, 2018) (unpublished manuscript), available at <https://ssrn.com/abstract=3011735>.

necessarily for the better.⁹ The effects on our minds of “a world in which we’re constantly watched and always distracted,” are not currently fully understood, but it would be naïve to think that such effects are entirely positive or do not exist.¹⁰ Technology itself is neither inherently good nor evil; it is a neutral force and its effects depend on how it is employed.¹¹ Shawn Bayern puts it well: “The problem isn’t technology; it’s what we’re doing with it.”¹²

This article will explore how technology could change the way we think (or don’t think) about law, and whether such changes would be beneficial. Part I will use the novel *Ready Player One* to consider how virtual reality technology might distract people from reality. Considering a hypothetical patent on a virtual reality idea from the novel, Part II will discuss the evolving law of patentable subject matter and abstract ideas. Part III will consider predictions that legal thought of the type done in the previous part will become automated and then will consider some potential drawbacks of replacing human legal thought with artificial legal thought. This article will then briefly conclude by

⁹ See, e.g., Robert Darnton, *The Greatest Show on Earth*, LXV 11 THE NEW YORK REVIEW OF BOOKS 68, 72 (June 28, 2018) (“According to McIntyre, the change that did the most to create the current post-truth environment is the rise of social media.”) (reviewing LEE MCINTYRE, *POST-TRUTH* (2018)).

¹⁰ FRANKLIN FOER, *WORLD WITHOUT MIND: THE EXISTENTIAL THREAT OF BIG TECH* 8 (2017); see generally NICHOLAS G. CARR, *THE SHALLOWS: WHAT THE INTERNET IS DOING TO OUR BRAINS* (2010).

¹¹ See MARTIN HEIDEGGER, *THE QUESTION CONCERNING TECHNOLOGY* 33 (1977) (“The essence of technology is in a lofty sense ambiguous.”); ALBERT CAMUS, *THE REBEL* 295 (1956) (“The machine is bad only in the way that it is now employed. Its benefits must be accepted even if its ravages are rejected.”).

¹² Shawn Bayern, *Why I Don’t Blog*, HUFFPOST (June 20, 2010, 5:12 AM), https://www.huffingtonpost.com/shawn-bayern/why-i-dont-blog-yes-i-rec_b_542127.html.

questioning whether anyone will be thinking about the law in the future, and whether it matters.

I. VIRTUAL LAW

In his sci-fi novel *Ready Player One*,¹³ Ernest Cline imagines the promises and perils of virtual reality technology. The novel is set in a mid-twenty-first century future where the physical world has deteriorated to the point that most people live primarily in a virtual environment known as OASIS.¹⁴ The OASIS was created by an eccentric genius character,¹⁵ and one positive aspect of the OASIS virtual reality is that it seems to have a beneficial and democratizing effect on the education system.¹⁶ Books, movies, and music, all seem to be easily and freely accessible, at least so long as the materials are more than forty years old.¹⁷

One can imagine, though, that if a less benevolent organization or figure were to gain control, the system could

¹³ ERNEST CLINE, *READY PLAYER ONE* (2011).

¹⁴ *See id.* at 58-60 (“As the era of cheap, abundant energy drew to a close, poverty and unrest began to spread like a virus. Every day, more and more people had reason to seek solace inside Halliday and Morrow’s virtual utopia.”).

¹⁵ *See id.* at 55-56 (“Despite his eccentricities, no one ever questioned Halliday’s genius.”). The eccentric genius, James Halliday, “suffered from Asperger’s syndrome, or from some other form of high-functioning autism,” and created Gregarious Games, which later became Gregarious Simulation Systems [GSS] along with his childhood friend, Ogden Morrow. *Id.* at 54-56.

¹⁶ *See id.* at 47 (“All of my teachers were pretty great. Unlike their real-world counterparts, most of the OASIS public school teachers seemed to genuinely enjoy their job, probably because they didn’t have to spend half their time acting as babysitters and disciplinarians.”).

¹⁷ *Id.* at 62 (“The *Almanac* contained thousands of references to Halliday’s favorite books, TV shows, movies, songs, graphic novels, and videogames. Most of these items were over forty years old, and so free digital copies of them could be downloaded from the OASIS.”).

instead easily be used as a tool for mind control and propaganda. Indeed in the novel, the genius creator has recently passed away, and the protagonists are attempting to prevent the OASIS from falling into the hands of a “fascist multinational conglomerate.”¹⁸

While the OASIS provides an escape from the bleak physical world, it may also contribute to the decay of that world by providing a distraction.¹⁹ The main protagonist doesn’t bother voting for U.S. government officials, reasoning that it “didn’t matter who was in charge,” because those “people were rearranging deck chairs on the Titanic and everyone knew it,” but he does vote in the OASIS User Council elections.²⁰ With this lack of attention, the laws of the United States in the novel have apparently devolved to the point where large corporations can force a citizen with unpaid debts into “indenturement” via a “corporate arrest.”²¹

The virtual world of the OASIS is divided into different sectors, and to some extent the “rules of the game” differ

¹⁸ *Id.* at 118. *See also id.* at 33 (“I was horrified at the thought of IOI [Innovative Online Industries, the world’s largest Internet service provider] taking control of the OASIS. . . . User anonymity and free speech would become things of the past.”); *id.* at 28 (“Back when Halliday was still running the company, GSS had won the right to keep every OASIS user’s identity private in a landmark Supreme Court ruling.”).

¹⁹ ERNEST CLINE, *READY PLAYER ONE* 120 (2011) (Ogden Morrow left the company he co-founded, GSS, because he felt that OASIS had “become a self-imposed prison for humanity,” that is, a “pleasant place for the world to hide from its problems while human civilization slowly collapses, primarily due to neglect.”).

²⁰ *See id.* at 201 (“I did take the time to vote in the OASIS elections, however, because their outcomes actually affected me. . . . I voted to reelect . . . those two geezers [who] had been doing a kick-ass job of protecting user rights for over a decade.”).

²¹ *Id.* at 270-73 (“These men were IOI [corporate] credit officers with a valid indenturement arrest warrant.”).

depending on which zone the user is in.²² These rules (or virtual laws)²³ are mostly hard-coded into the virtual reality; certain areas, for example, are “no player-versus-player combat” zones, where any attempt to harm another person (or “player”) will simply be ineffectual.²⁴ This automatic enforcement is an interesting aspect of “law” in virtual reality, and obviously a major difference from most of our current reality, where laws must be enforced through other mechanisms. In such a future, virtual (or even real) patents might automatically issue upon an invention in virtual reality, and patent infringement in virtual reality could perhaps automatically be disallowed.²⁵

There is at least one minor reference to patent law in *Ready Player One*. Before he died, James Halliday, the eccentric genius creator of OASIS, programmed into the virtual world an elaborate contest, the winner of which would gain control of his company and effective control of the virtual

²² *Id.* at 49-50 (“Each zone had a unique combination of rules and parameters. Magic would function in some zones and not in others. The same was true of technology.”).

²³ *Cf.* Gilad Yadin, *Virtual Reality Exceptionalism*, 20 VAND. J. ENT. & TECH. L. 839, 841 (2018) (“In Wonderland, the rules of the real world do not apply; Alice moves between areas governed by anarchy, mock etiquette, and absurdist absolute sovereignty.”) (citing Mary Liston, *The Rule of Law Through the Looking Glass*, 21 LAW & LITERATURE 42, 46 (2009)).

²⁴ CLINE, *supra* note 13, at 50 (“If you flew your technology-based starship into a zone where technology didn’t function, your engines would fail the moment you crossed the zone border. . . . There were pacifist zones where no player-versus-player combat was allowed, and player-versus-player zones where it was every avatar for themselves.”).

²⁵ *Cf.* Richard M. Re, *Imagining Perfect Surveillance*, 64 UCLA L. REV. DISC. 264 (2016); *see also* Frank Pasquale, *A Rule of Persons, Not Machines: The Limits of Legal Automation*, GEO. WASH. L. REV. (forthcoming), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3135549 (“[A]n unappealable fine imposed by a red light camera, and automatically deducted from a motorist’s bank account, would amount to pure automation of law[.]”).

OASIS.²⁶ One minor “level” in this contest involves the contestant stepping into the role of a movie character, and having to correctly say the lines and act in the role of that character in order to move on.²⁷ Apparently no one had thought of designing a game like this before, but it turned out to be very popular, and upon realizing what Halliday had done, his company “patented the idea,” and began creating such interactive games for many different movies, calling the games *Flicksyncs*.²⁸

At first glance, the patenting of this entire class of games seems to run afoul of the adage that “one may not patent an idea,”²⁹ that is, the patent eligibility prohibition on “abstract ideas.”³⁰ On the other hand, as explained below, to the extent that new technology was required to implement the idea, that technology would potentially be patent eligible. The next part will consider the patentability of this fictional class of games as a thought experiment for teasing out some incoherence in the contemporary doctrine of patent eligible subject matter.

²⁶ CLINE, *supra* note 13, at 1–4.

²⁷ *See id.* at 108–12.

²⁸ *Id.* at 112 (“When GSS got wind of the *WarGames* simulation inside the First Gate (and they did a short time later), the company quickly patented the idea and began to buy up the rights to old movies and TV shows and convert them into immersive interactive games that they dubbed *Flicksyncs*.”).

²⁹ *Gottschalk v. Benson*, 409 U.S. 63, 71 (1972). *See also In re Comiskey*, 554 F.3d 967, 978 (Fed. Cir. 2009) (“The Supreme Court has held that ‘[a]n idea of itself is not patentable.’”) (quoting *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. 498, 507 (1874)).

³⁰ *See, e.g., In re Comiskey*, 554 F.3d at 977 (“‘Abstract ideas’ are one type of subject matter that the Supreme Court has consistently held fall beyond the broad reaches of patentable subject matter under § 101.”).

II. PATENT ELIGIBLE SUBJECT MATTER

A. Abstraction and Innovation

The Patent Act defines patent eligible subject matter in § 101: “Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”³¹ This language is fairly broad and inclusive, which is reasonable given that it defines only *eligibility*, not patentability.³² If something is not patent eligible, it of course cannot be patentable. But if it is eligible, that doesn’t necessarily make it patentable.³³ In order to be *patentable*, the invention must also meet the statute’s other requirements, such as novelty (§ 102), nonobviousness (§ 103), and enablement (§ 112).³⁴

Some inventions or discoveries that are novel, nonobvious, and enabled are *nevertheless* not patentable because they claim subject matter that is not even eligible for a patent under § 101.³⁵ In order to avoid conflating

³¹ 35 U.S.C. § 101 (2012).

³² *Cf.* Berkheimer v. HP, Inc., 890 F.3d 1369, 1370 n.2 (Fed. Cir. 2018) (Moore, J., concurring in the denial of the petition for rehearing en banc) (“the single sentence in § 101 actually contains two patentability requirements: eligibility and utility.”).

³³ *See* Research Corp. Techs., Inc. v. Microsoft Corp., 627 F.3d 859, 869 (Fed. Cir. 2010) (“a patent that presents a process sufficient to pass the coarse eligibility filter may nonetheless be invalid as indefinite because the invention would ‘not provide sufficient particularity and clarity to inform skilled artisans of the bounds of the claim.’” (quoting Star Sci., Inc. v. R.J. Reynolds Tobacco Co., 537 F.3d 1357, 1371 (Fed. Cir. 2008))).

³⁴ *See* 35 U.S.C. §§ 102, 103, 112 (2012).

³⁵ *See, e.g.*, Maxus Strategic Sys. v. Aquamin LLC, No. A-11-CV-073-LY, 2015 U.S. Dist. LEXIS 152032, at *3 (W.D. Tex. Aug. 18, 2015) (“If a claim is not drawn to patent-eligible subject matter, it ‘must be rejected even if

patentability with eligibility, it has been urged that courts should consider eligibility *after* patentability,³⁶ but perhaps unfortunately, the recent law has not tended to go in this direction.³⁷ The recognized categories of non-eligible subject matter are: (1) laws of nature; (2) natural phenomena; and (3) abstract ideas.³⁸

What I would like to suggest here is that the third category of non-eligible subject matter, abstract ideas, is different from the first two in that it does not invoke “nature” or the “natural,” and that this is an important and under-recognized difference.³⁹ Something that is natural, though it might be *discovered* by humans, is almost by definition not

it meets all the other legal requirements of patentability.” (quoting *In re Bilski*, 545 F.3d 943, 950 (Fed. Cir. 2008)).

³⁶ See, e.g., *MySpace, Inc. v. GraphOn Corp.*, 672 F.3d 1250, 1260 (Fed. Cir. 2012) (“Rather than taking the path the dissent urges, courts could avoid the swamp of verbiage that is § 101 by exercising their inherent power to control the processes of litigation, and insist that litigants initially address patent invalidity issues in terms of the conditions of patentability defenses as the statute provides, specifically §§ 102, 103, and 112.”) (internal citation omitted); *BASCOM Glob. Internet Services, Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1353 (Fed. Cir. 2016) (Newman, J., concurring) (“There is no good reason why the district court should be constrained from determining patentability, instead of eligibility based on ‘abstract idea,’ when the patentability/validity determination would be dispositive of the dispute.”).

³⁷ See Paul R. Gugliuzza, *The Procedure of Patent Eligibility*, 97 TEX. L. REV. (forthcoming 2018) (manuscript at 21), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3161621 (“[A] surprising amount of case law states that courts *must* decide patent eligibility before analyzing other issues [.]”).

³⁸ See *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2354 (2014) (“We have long held that this provision contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable.” (quoting *Ass’n for Molecular Pathology v. Myriad Genetics Inc.*, 133 S. Ct. 2107, 2116 (2013))).

³⁹ See *Interval Licensing LLC v. AOL, Inc.*, No. 2016-2502, 896 F.3d 1335, 1348 (Fed. Cir. 2018) (Plager, J., concurring and dissenting).

created or *invented* by humans⁴⁰ (at least not in the colloquial sense of the word “invention”).⁴¹ By contrast, abstract ideas are at least arguably products of human thought or imagination, so an abstract idea can potentially be inventive.⁴² But due to the Court’s view of § 101, even a truly inventive pure abstract idea is not patent eligible subject matter.⁴³

⁴⁰ *Natural*, DICTIONARY.COM, <http://dictionary.reference.com/browse/natural> (last visited Sept. 24, 2018); *Artificial*, DICTIONARY.COM, <http://dictionary.reference.com/browse/artificial> (last visited Sept. 24, 2018); *cf.* Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 132 (1948) (“[I]t certainly was not the product of invention. There is no way in which we could call it such unless we borrowed invention from the discovery of the natural principle itself.”).

⁴¹ *But cf.* 35 U.S.C. § 100(a) (“The term ‘invention’ means invention or discovery.”); PETER S. MENELL ET AL., PATENT CASE MANAGEMENT JUDICIAL GUIDE 14-31 (3d. ed. 2016) (“The fact that § 101 of the Patent Act confers patent eligibility on ‘[w]hoever invents or *discovers* any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof . . .’ however, only adds to the confusion.”).

⁴² *See, e.g.*, Derek Abbott, *The Reasonable Ineffectiveness of Mathematics*, 101 Proc. IEEE No. 10, 2147, 2153 (2013) (“Mathematics is a human invention for describing patterns and regularities.”). *But see* CLS Bank Int’l v. Alice Corp. Pty. Ltd., 717 F.3d 1269, 1283 (Fed. Cir. 2013) (Lourie, J., concurring) (“[A] person cannot truly ‘invent’ an abstract idea or scientific truth. He or she can discover it, but not invent it.”). This article agrees with Judge Lourie that one cannot “invent” a scientific truth, but takes the position (contrary to his) that one can at least arguably invent an abstract idea. *See* discussion *supra* Part II.A; *see also* Frederick Schauer, *Law as a Malleable Artifact*, Oxford Univ. Press (forthcoming 2018) (manuscript at 2), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3183928 (“[T]he very ideas (or concepts, if you will) of chairs, of art, and of music are human creations, and are consequently unlike gold, water, and elephants . . .”).

⁴³ *See* Ass’n for Molecular Pathology v. Myriad Genetics, Inc., 133 S.Ct. 2107, 2117 (2013) (“Groundbreaking, innovative, or even brilliant discovery does not by itself satisfy the § 101 inquiry.”); Berkheimer v. HP, Inc., 890 F.3d 1369, 1375 (Fed. Cir. 2018) (Lourie, J., concurring in the denial of the petition for rehearing en banc) (“[M]any brilliant and

This is all to say while “nature” and “natural” at least pull in the other direction from “inventive,” the same is not true of “abstract.” The opposite of abstract is concrete,⁴⁴ whereas the opposite of natural is artificial, *i.e.*, made by humans.⁴⁵ A thing cannot be both natural and invented (though it could be discovered), but an idea can be both abstract and invented by humans;⁴⁶ abstractness and inventiveness are separate and essentially unrelated concepts.⁴⁷

A pure algorithm for example, even if inventive or “newly discovered,” is an abstract idea ineligible for patent protection.⁴⁸ The idea for blockchain technology described in

unconventional ideas must be beyond patenting simply because they are ‘only’ ideas, which cannot be monopolized.”); *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1151 (Fed. Cir. 2016) (“[A] claim for a *new* abstract idea is still an abstract idea.”).

⁴⁴ *Abstract*, DICTIONARY.COM, <http://dictionary.reference.com/browse/abstract> (defining “abstract” as “thought of apart from concrete realities, specific objects, or actual instances”) (last visited September 24, 2018).

⁴⁵ See *Artificial and Natural*, *supra* note 40.

⁴⁶ Whether machines could invent an idea is an interesting question. See generally Liza Vertinsky, *Thinking Machines and Patent Law*, in RESEARCH HANDBOOK OF ARTIFICIAL INTELLIGENCE (forthcoming 2018), available at <https://ssrn.com/abstract=3036030>.

⁴⁷ Cf. *Affinity Labs of Tex. v. DirecTV, LLC*, 838 F.3d 1253, 1263 (Fed. Cir. 2016) (the patentee asserted that its idea was “novel as of the priority of the patent,” but the court found that even “assuming that is true, it does not avoid the problem of abstractness”); *Two-Way Media Ltd. v. Comcast Cable Commc’ns., LLC*, 874 F.3d 1329, 1340 (Fed. Cir. 2017) (“Eligibility and novelty are separate inquiries.”).

⁴⁸ See, e.g., *Market Track, LLC v. Efficient Collaborative Retail Mktg., LLC*, No. 14-C-4957, 2015 WL 3637740, at *3 (N.D. Ill. June 11, 2015) (“[M]erely implementing the arithmetic steps in a newly discovered mathematical algorithm . . . did not add enough . . . to transform that algorithm—an abstract idea—into patentable subject matter[.]”) (citing *Gottschalk v. Benson* 409 U.S. 63, 71 (1972)).

the Bitcoin whitepaper was a brilliantly inventive idea,⁴⁹ though it may have been too abstract to be patentable. Such a patent would preempt downstream innovation and “might tend to impede innovation”⁵⁰ in the blockchain space, although more specific implementations of the technology could be patentable.⁵¹

Some mathematical equations may describe laws of nature, but all pure equations are also ineligible as abstract ideas,⁵² though a specific application of an equation could be patent eligible.⁵³ Einstein’s $E=mc^2$, for example, is an

⁴⁹ See generally Satoshi Nakamoto, BITCOIN: A PEER-TO-PEER ELECTRONIC CASH SYSTEM (2009), available at <https://bitcoin.org/bitcoin.pdf>.

⁵⁰ See *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 71 (2012) (“[M]onopolization of those tools through the grant of a patent might tend to impede innovation more than it would tend to promote it.”); see also *id.* at 85 (“In *Bilski* the Court pointed out that to allow ‘petitioners to patent risk hedging would pre-empt use of this approach in all fields.’”) (quoting *Bilski v. Kappos*, 561 U.S. 593, 612 (2010)).

⁵¹ See Gurneet Singh, *Are Internet-Implemented Applications of Blockchain Technology Patent-Eligible in the United States*, 17 CHI. KENT J. INTELL. PROP. 356, 376 (2018) (“federal U.S. law allows a patent to be granted for many, but not all, aspects of internet-implemented applications of blockchain technology.”); see also Ira Schaefer and Ted Mylnar, *Is a Blockchain Patent Still Possible?* COINDESK (Nov. 15, 2016, 10:05 PM), <https://www.coindesk.com/blockchain-patent-still-possible/> (“[I]mprovements in blockchain data structures, in solving proof of work problems, and in encryption and hashing functions have the potential to be patent-eligible subject matter.”).

⁵² See *McRO, Inc. v. Bandai Namco Games Am., Inc.*, 837 F.3d 1299, 1312 (Fed. Cir. 2016) (“Mathematical formulas are a type of abstract idea.”); *Arrhythmia Research Tech., Inc. v. Corazonix Corp.*, 958 F.2d 1053, 1056 (Fed. Cir. 1992) (“A mathematical formula may describe a law of nature, a scientific truth, or an abstract idea.”); *SAP Am., Inc. v. InvestPic, LLC*, 250 F. 3d 705, 711 (N.D. Tex. 2017) (“Mathematical calculations and formulas are abstract ideas.”).

⁵³ See, e.g., *In re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994) (en banc) (“This is not a disembodied mathematical concept which may be characterized as an ‘abstract idea,’ but rather a specific machine to

abstract equation which at least in theory describes a law of nature.⁵⁴ Einstein did not invent the law of nature, he discovered it (to the extent that the theory is correct), but he did arguably invent the abstract idea of the equation, as he developed an abstract theory of physics and worked out the mathematical description.⁵⁵

This was a major accomplishment, and a major breakthrough for science, but such pure abstract ideas are nevertheless not patent eligible subject matter. One reason is that mathematical equations are elemental building blocks of scientific and technological work.⁵⁶ Another reason is that abstract ideas are essentially thoughts, and patents should not be capable of monopolizing thoughts.⁵⁷ Constraining

produce a useful, concrete, and tangible result.”); *Arrhythmia*, 958 F.2d at 1058-59 (holding patentable a method for analyzing electrocardiograph signals that used “electronic equipment programmed to perform mathematical computation.”).

⁵⁴ See *Mayo Collaborative Servs.*, 566 U.S. at 78 (“Einstein, we assume, could not have patented his famous law by claiming a process consisting of simply telling linear accelerator operators to refer to the law to determine how much energy an amount of mass has produced (or vice versa).”).

⁵⁵ See generally DAVID BODANIS, *E=MC²: A BIOGRAPHY OF THE WORLD’S MOST FAMOUS EQUATION* (Bloomsbury Publishing 2009).

⁵⁶ See *Mayo Collaborative Servs.*, 566 U.S. at 71 (“Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.” (quoting *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972))); *id.* at 89 (“[T]he cases have endorsed a bright-line prohibition against patenting laws of nature, mathematical formulas and the like, which serves as a somewhat more easily administered proxy for the underlying ‘building-block’ concern”); PETER S. MENELL ET AL., *PATENT CASE MANAGEMENT JUDICIAL GUIDE* 14-31 (3d ed. 2016) (“[L]aws of nature, physical phenomena, and abstract ideas are basic building blocks of human ingenuity.”).

⁵⁷ See *Berkheimer v. HP, Inc.*, 890 F.3d 1369, 1375 (Fed. Cir. 2018) (Lourie, J., concurring in the denial of the petition for rehearing en banc) (“No one should be inhibited from thinking by a patent. . . . Moreover such a patent would be unenforceable. Who knows what people are

thought would seem to be counterproductive to the patent system's goal of promoting innovation, whereas a society where free thought is encouraged would likely tend to be more innovative.⁵⁸ Indeed, patentable innovation requires thought that would not have been obvious to others.⁵⁹

So even inventive abstract ideas are not patent eligible. But to avoid confusion, it is important to recognize that abstractness and innovativeness are separate concepts; that abstract ideas can be inventive, even if they are nevertheless not patent eligible. The doctrine has often failed to articulate this idea; indeed in *Alice* itself the Court states: “[W]e must examine the elements of the claim to determine whether it contains an ‘inventive concept’ sufficient to ‘transform’ the claimed abstract idea into a patent-eligible application.”⁶⁰ Taking this cue from *Alice*, courts often look for “additional claim elements that *introduce* an inventive concept to the claim.”⁶¹ Such language seems to ignore the possibility that the abstract idea itself could have been an inventive concept. What the courts should be looking for is not just any inventive concept, but a *non-abstract* inventive

thinking?”) (quoting Letter from Thomas Jefferson to Isaac McPherson (Aug. 13, 1813) (“[I]f nature has made any one thing less susceptible, than all others, of exclusive property, it is the action of the thinking power called an Idea.”)).

⁵⁸ Cf. Bertrand Russell, *The Role of Individuality*, in AUTHORITY AND THE INDIVIDUAL 37 (1949) (“[A] community needs, if it is to prosper, a certain number of individuals who do not wholly conform to the general type. Practically all progress, artistic, moral, and intellectual, as depended upon such individuals . . .”).

⁵⁹ See 35 U.S.C. § 103 (2012).

⁶⁰ *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2357 (2014) (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 at 72-73 (2012)).

⁶¹ *Icon Health & Fitness, Inc. v. Polar Electro Oy*, 243 F. Supp. 3d 1229, 1235-36 (D. Utah 2017) (emphasis added) (citing *Alice*, 134 S. Ct. at 2355).

concept.⁶² But courts sometimes find that claims are ineligible because “the patent does not reveal anything more than a non-inventive abstract idea,”⁶³ which confusingly seems to imply that the claims would be patent eligible if the abstract idea were inventive. With courts often failing to recognize that abstractness is a separate concept from inventiveness,⁶⁴ the doctrine has become rather muddled and confused.⁶⁵ That such imprecise use of language has led to confusion should be no surprise.⁶⁶

⁶² See, e.g., *SAP Am., Inc. v. InvestPic, LLC*, 890 F.3d 1016, 1018 (Fed. Cir. 2018) (“No matter how much of an advance in the finance field the claims recite, the advance lies entirely in the realm of abstract ideas, with no plausibly alleged innovation in the non-abstract application realm. An advance of that nature is ineligible for patenting.”).

⁶³ *Proctor & Gamble Co. v. QuantifiCare, Inc.*, 288 F. Supp. 3d 1002, 1025 (N.D. Cal. 2017).

⁶⁴ Cf. *Jedi Techs., Inc. v. Spark Networks, Inc.*, No. 1:16-1055-GMS, 2017 WL 3315279, at *8 (D. Del. Aug. 3, 2017) (“although the ’977 patent recites an abstract idea, it should not be found invalid if there is evidence of an inventive concept or contribution”).

⁶⁵ See, e.g., *Berkheimer v. HP, Inc.*, 890 F.3d 1369, 1374 (Fed. Cir. 2018) (Lourie, J., concurring in the denial of the petition for rehearing en banc) (“I believe the law needs clarification by higher authority, perhaps by Congress, to work its way out of what so many in the innovation field consider are § 101 problems”); cf. Andres Sawicki, *The Central Claiming Renaissance*, 103 CORNELL L. REV. 645, 647 (“The consensus view is that the Court’s eligibility jurisprudence is impenetrable.”); Ryan Davis, *Iancu Decries ‘Tortured Exercise’ of Patent Eligibility Analysis*, LAW360 (June 12, 2018, 9:02 PM), <https://www.law360.com/articles/1052844/iancu-decries-tortured-exercise-of-patent-eligibility-analysis>; Robert Stoll, *Alice Angst Intensifies*, LAW360 (March 23, 2018, 1:01 PM), <https://www.law360.com/articles/1025590/alice-angst-intensifies>.

⁶⁶ See Paul M. Janicke, *A Need for Clearer Language about Patent Law*, 11 JOHN MARSHALL REV. OF INTELL. PROP. L. 457 (2012).

B. The Non-Abstract Inventive Concept

Proceeding now down the rabbit hole of *Alice*'s wondrous two-part test, the first step is to determine whether the claims are "directed to" one of the three categories of patent ineligible subject matter: laws of nature, natural phenomena, or abstract ideas.⁶⁷ If not, the claims are patent eligible, (that is, they clear the § 101 hurdle, though they may not be patentable).⁶⁸ But if so, the next step is to look for an "inventive concept" that transforms the claims into "something more" than the patent ineligible subject matter.⁶⁹

Although a number of judges have, for good reason, questioned the value of the two-step test,⁷⁰ the Federal Circuit has reaffirmed that both steps are substantial.⁷¹ For

⁶⁷ *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2355 (2014) (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1297 (2012)).

⁶⁸ See *supra* note 31 and accompanying text; see also *Bascom Glob. Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1354 (Fed. Cir. 2016) (Newman, J., concurring) ("Claims that are imprecise or that read on prior art or that are unsupported by description or that are not enabled raise questions of patentability, not eligibility.").

⁶⁹ *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2354-55 (2014) (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72 (2012)).

⁷⁰ See, e.g., *Bascom*, 827 F.3d at 1352-53 (Newman, J., concurring) ("I write separately to urge a more flexible approach to the determination of patent eligibility, for the two-step protocol for ascertaining whether a patent is for an 'abstract idea' is not always necessary to resolve patent disputes."); *Iron Gate Sec., Inc. v. Lowe's Cos.*, No. 15-cv-8814(KBF), 2016 U.S. Dist. LEXIS 101796, at *40 n.10 (S.D.N.Y. Aug. 3, 2016) ("A number of courts have aptly observed that it is easier to separate the two steps in recitation than in application and that the two steps could arguable be collapsed into a single one.").

⁷¹ See *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016) (explaining that the Supreme Court's two-stage inquiry "plainly contemplates that the first step of the inquiry is a meaningful one, *i.e.*,

example in *Enfish*, the court found that the claims were not directed to an abstract idea, because the “plain focus of the claims [was] on an improvement to computer functionality itself, not on economic or other tasks for which a computer is used in its ordinary capacity.”⁷² As such, the court did not proceed to the more complicated inquiry of step two.⁷³ Step one may thus function as an initial filter or first look at the claims; if the general focus of the claims is not on ineligible subject matter, then it is not necessary to engage the more difficult inquiry of whether the additional matter contains an inventive concept.

Step two is where the difference between abstract ideas and the first two categories becomes relevant. Because nature (or the natural) cannot be invented by humans,⁷⁴ an inventive concept must necessarily be something other than the law of nature or natural phenomena. By contrast, an abstract idea could be an inventive concept, though it is not the type of inventive concept that one should be looking for at step two of the *Alice* test. So the “inventive concept” part of the test makes more sense in the context of natural phenomena or laws of nature; indeed the two-step test was “initially set forth in *Mayo* in the context of natural laws,” but then was extended to abstract ideas in *Alice*.⁷⁵ Traditionally, the evaluation of *inventiveness* was more appropriate under §§ 102 and 103, but the Court in *Alice* / *Mayo* has moved the inventiveness inquiry more into § 101.⁷⁶

that a substantial class of claims are *not* directed to a patent-ineligible concept”).

⁷² *Id.* at 1336 (explaining that the claims “are directed to a specific improvement to the way computers operate, embodied in the self-referential table”).

⁷³ *Id.* at 1339.

⁷⁴ See *supra* notes 39–47 and accompanying text.

⁷⁵ *Iron Gate*, 2016 U.S. Dist. LEXIS 101796, at *16–17 n.4.

⁷⁶ See *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 90 (2012) (“We recognize that, in evaluating the significance of additional

The need for a non-abstract inventive concept stems from the notion that one cannot transform an abstract idea into patentable subject matter simply by adding “insignificant post-solution activity,”⁷⁷ or by applying the abstract idea using routine and conventional technology such as a general purpose computer.⁷⁸ This is true even if the

steps, the § 101 patent-eligibility inquiry and, say, the § 102 novelty inquiry might sometimes overlap.”); Andrew Schreiber, *Go (En)Fish: Drawing CAD Files from the Patent Eligibility Pool*, 58 IDEA 1, 54 (2017) (“[T]he *Alice* step two inventive concept analysis imports § 102 and § 103 considerations.”); PETER S. MENELL ET AL., PATENT CASE MANAGEMENT JUDICIAL GUIDE 14-31 (3d ed. 2016) (“As the evolution of these doctrines reveals, the Supreme Court’s emphasis on *inventive* application rests on a questionable jurisprudential foundation.”) (citing Jeffrey A. Lefstin, *Inventive Application: A History*, 67 FLA. L. REV. 565 (2015)); see also Paxton M. Lewis, Comment, *The Conflation of Patent Eligibility and Obviousness: Alice’s Substitution of Section 103*, 2017 UTAH L. REV. ONLAW 13 (2017).

⁷⁷ See *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2352 (2014) (“We hold that the claims at issue are drawn to the abstract idea of intermediated settlement, and that merely requiring generic computer implementation fails to transform that abstract idea into a patent-eligible invention.”); see also *Bilski v. Kappos*, 561 U.S. 593, 610-11 (2010) (explaining that the “prohibition against patenting abstract ideas ‘cannot be circumvented by [merely] . . . adding [superfluous] postsolution activity.’”) (quoting *Diamond v. Diehr*, 450 U.S. 175, 191-192 (1981)); *Mayo*, 132 S. Ct. at 1299 (“‘[P]ost-solution activity’ that is purely ‘conventional or obvious,’ the Court wrote, ‘can[not] transform an unpatentable principle into a patentable process.’”) (quoting *Parker v. Flook*, 437 U.S. 584, 590 (1978)); see also Laurence Rogers, *Mayo Overlap Between Sections 101 And 102/103 — Not New*, LAW360: EXPERT ANALYSIS (July 20, 2012, 1:20 PM), <https://www.law360.com/articles/356042/mayo-overlap-between-sections-101-and-102-103-not-new>.

⁷⁸ See, e.g., *Bascom Glob. Internet Servs. v. AT&T Mobility LLC*, 827 F.3d 1341, 1349 (Fed. Cir. 2016) (“An inventive concept that transforms the abstract idea into a patent-eligible invention must be significantly more than the abstract idea itself, and cannot simply be an instruction to implement or apply the abstract idea on a computer.”) (citing *Alice*, 134 S.Ct. at 2358).

abstract idea itself is innovative.⁷⁹ If the doctrine is to maintain some semblance of coherence, what the courts should be searching for at step two is an inventive concept *aside from* the abstract idea; a non-abstract inventive concept.⁸⁰

Courts often do not articulate this clearly, instead describing step two as simply a search for an inventive concept.⁸¹ There is no claim here that abstract ideas are any less deserving of exemption under § 101 than the two categories of nature, the point here is simply that abstract ideas can fairly be thought of as “invented” by humans, whereas nature generally cannot, and that courts should be more cognizant of this difference. Particularly so, when importing language from a test developed in the context of natural phenomena into the context of abstract ideas, if confusion is to be avoided.

⁷⁹ See *supra* note 60 and accompanying text.

⁸⁰ See *Mayo*, 566 U.S. at 82 (explaining that in *Flook*, “putting the formula to the side, there was no ‘inventive concept’ in the claimed application of the formula.”) (citing *Parker v. Flook*, 437 U.S. 584, 594 (1978)); *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1336 (Fed. Cir. 2016) (explaining that “the second step of the *Alice* inquiry” asks if “there is some inventive concept in the *application* of the abstract idea.”) (emphasis added).

⁸¹ See, e.g., *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1259 (Fed. Cir. 2014) (“In short, the claimed solution amounts to an inventive concept for resolving this particular Internet-centric problem, rendering the claims patent-eligible.”); *IPLearn-Focus, LLC v. Microsoft Corp.*, No. 14-cv-00151-JD, 2015 U.S. Dist. LEXIS 90077, at *10 (N.D. Cal. July 10, 2015) (“The second step of this test has been described as a search for an inventive concept.”) (internal quotes omitted) (citations omitted); *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121, 1124 (Fed. Cir. 2018) (stating that the district court below found that the claims were “directed to abstract ideas without inventive concepts.”); *Pres. Wellness Techs. LLC v. Allscripts Healthcare Solutions*, No. 2:15-CV-1559-WCB, 2016 U.S. Dist. LEXIS 61841, at *20 (E.D. Tex. May 9, 2016) (“Following the analytical framework set forth in *Alice*, the Court addresses the questions whether the ’271 claims are drawn to an abstract idea and, if so, whether they embody an inventive concept.”).

C. Improvement or Application

Back to virtual reality: what if one were to think of a new, non-obvious abstract idea, and simply say, “Do it in virtual reality.” Would that idea be patent eligible? We know that simply applying an abstract idea on a routine and conventional general-purpose computer is not sufficient to make the claims patent eligible,⁸² but is virtual reality technology routine and conventional? In the future of *Ready Player One*, where many people spend the majority of their time in virtual reality,⁸³ the answer would seem to be a clear yes. As such, the novel’s hypothetical patent on *Flicksyncs* would seem to be of questionable validity. The idea of a video game where the player receives points for correctly acting the part of a character in a movie is an abstract one, even assuming that it is novel and non-obvious as was alleged in the book.⁸⁴ It is perhaps an inventive concept, but that does not make the idea any less abstract.

Applying this abstract idea using routine and conventional virtual reality technology would not be sufficient to make it patent eligible. But if some improvement to the virtual reality technology itself were required to implement the idea, this would likely make it patentable, as it could be a sufficient non-abstract “inventive concept,” to pass *Alice* step two.⁸⁵ Whether the application technology is

⁸² See *supra* note 78 and accompanying text.

⁸³ See ERNEST CLINE, *READY PLAYER ONE* 58–60 (2011).

⁸⁴ See *id.* at 112.

⁸⁵ See *Iron Gate Sec., Inc. v. Lowe’s Cos.*, No. 15-cv-8814(KBF), 2016 U.S. Dist. LEXIS 101796, at *34 (S.D.N.Y. Aug. 3, 2016) (finding the claims patent eligible because they were “directed to particular improvements over prior art multimedia data indexing techniques that render such data accessible in real time.”); see also *Bascom Glob. Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1351 (Fed. Cir. 2016) (finding the patent claims at issue patent eligible because they were “not claiming the

routine and conventional is a question of fact,⁸⁶ and the novel *Ready Player One* is not entirely clear on whether some improvement to the technology was required to make *Flicksyncs* possible.

It is important to note that the technology probably need not be entirely novel or non-obvious in order to avoid being routine and conventional.⁸⁷ In other words, the eligibility hurdle of not routine and conventional seems to be potentially lower than the patentability hurdle of novelty and nonobviousness.⁸⁸

Consider a claim to an inventive abstract idea, where the non-abstract portion of the claim is more than routine and conventional, but less than new and non-obvious. In other words, the non-abstract portion of the claim could be a sufficient “inventive concept” to pass § 101, but in order to pass §§ 102 and 103, it would need the help of the abstract (but more inventive) portion of the claim. Such a claim would raise the question of whether ineligible subject matter should be filtered out of the §§ 102 and 103 analysis, that is, treated as prior art for purposes of that analysis even if new and non-obvious, as has been persuasively argued.⁸⁹ However, the

idea of filtering content simply applied to the Internet,” but were “instead claiming a technology-based solution . . . to filter content on the Internet that overcomes existing problems . . .”).

⁸⁶ See Gugliuzza, *supra* note 37, manuscript 7 n.38; see also *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121, 1130 (Fed. Cir. 2018).

⁸⁷ See *Exergen Corp. v. Kaz USA, Inc.*, 725 Fed. Appx. 959, 965 (Fed. Cir. 2018) (“Something is not well-understood, routine, and conventional merely because it is disclosed in a prior art reference.”).

⁸⁸ *But see* PETER S. MENELL ET AL., PATENT CASE MANAGEMENT JUDICIAL GUIDE 14-30 – 14-31 (3d. ed. 2016) (“[T]he inventiveness required for § 101 eligibility is distinct from and arguably *more demanding* than § 103 nonobviousness analysis.”) (emphasis added).

⁸⁹ See Nicholas J. Szabo, Comment, *Elemental Subject Matter*, 7 (unpublished Comment), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=936326 (“For § 101 subject matter analysis to be

prevailing approach instead seems to be to try to filter the ineligible matter out of the (comparatively) shorthand inventiveness inquiry at the § 101 stage, but not to do so in the full-blown § 103 obviousness analysis.⁹⁰ As such, it seems that the inventiveness of an abstract idea can help to establish § 103 nonobviousness, even though it cannot help establish § 101 eligibility.

Although at some point virtual reality technology will likely become routine and conventional,⁹¹ the cases seem to suggest that we are not there yet. Practically, framing the application of an abstract idea in virtual reality as a specific improvement to the virtual reality apparatus itself, if possible, can increase the likelihood of a finding of patent eligibility.⁹² For example, in *Thales*, the Federal Circuit

coherent, it must serve not as a bar but as a filter, a preliminary step that alters element by element how the claims will be analyzed by § 102 and § 103.”). *See also* *Berkheimer v. HP, Inc.*, 881 F.3d 1369, 1378 (Fed. Cir. 2018) (en banc) (Reyna, J., dissenting from the denial of the petition for rehearing en banc) (noting that the “Supreme Court has characterized the § 101 patent-eligibility inquiry as a threshold test that precedes the requirements described in §§ 102, 103, and 112.”).

⁹⁰ *MENELL ET AL.*, *supra* note 41, at 14-31 (“According to *Mayo*, the inventive application requirement treats the patentees’ discovery of the law of nature, physical phenomena, abstract ideas, or algorithms (in *Flook*) as known (even where it was not), whereas § 103 nonobviousness focuses on ‘the differences between the claimed invention and the prior art.’”); *see also* *Rogers*, *supra* note 77 (explaining that the § 101 analysis “need not be the same thing as conducting an in-depth novelty or obviousness analysis in which the claimed invention is rigorously compared to the prior art.”).

⁹¹ *See* LEXINNOVA, VIRTUAL REALITY: PATENT LANDSCAPE ANALYSIS 4 (2015), http://www.wipo.int/edocs/plrdocs/en/lexinnova_plr_virtual_reality.pdf (“Virtual Reality is expected to be a far-reaching technology in the next 10 years.”).

⁹² *See* *Visual Memory LLC v. NVIDIA Corp.*, 867 F.3d 1253, 1258 (Fed. Cir. 2017) (explaining that courts evaluating eligibility must “ask whether the claims are directed to an improvement to computer

found that the claims at issue were “not directed to an abstract idea” because they “specif[ied] a particular configuration of inertial sensors and a particular method of using the raw data from the sensors in order to more accurately calculate the position and orientation of an object on a moving platform.”⁹³

Following *Thales*, the district court in *Electronic Scripting Products* found the claims patent eligible because they were “not merely directed to the abstract idea of observing known points in space and determining their position and orientation,” but rather, were directed to the use of “photodetectors and relative motion sensors mounted on manipulated objects to provide a low-cost method to determine absolute pose in close-range and confined three-dimensional environments, ideal for virtual reality applications.”⁹⁴ Thus, it seems that by claiming for example a particular configuration or use of physical sensors to implement an abstract idea in virtual reality, a patentee can avoid pre-empting too much future innovation and increase the chances that the claims will be upheld as patent eligible.⁹⁵

functionality versus being directed to an abstract idea”) (quoting *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016)).

⁹³ *Thales Visionix, Inc. v. United States*, 850 F.3d 1343, 1349 (Fed. Cir. 2017); *see also* *Chargepoint, Inc. v. Semaconnect, Inc.*, No. MJG-17-3717 2018 U.S. Dist. LEXIS 49026, *29 (D. Md. Mar. 23, 2018) (stating that in *Thales*, “the Federal Circuit held that the claims were directed to an improvement in technology instead of an abstract idea”).

⁹⁴ *Elec. Scripting Prods. v. HTC Am. Inc.*, No. 17-cv-05806-RS 2018 U.S. Dist. LEXIS 43687, at *12–13 (N.D. Cal. Mar. 16, 2018).

⁹⁵ *See id.* at *13 (“Nor do the asserted Patents disproportionately preempt the use of all virtual reality products.”).

III. ARTIFICIAL THOUGHTS

As the preceding discussion has shown by way of example, the law is not always a model of clarity and coherence. But it is worth considering whether such occasional inefficiencies may just be part of the price we pay for governing ourselves.⁹⁶ Allegedly the “rise of Big Data could fundamentally change the design and structure of legal norms and thus the legal system itself.”⁹⁷ Indeed, with the rise of self-driving vehicles,⁹⁸ Anthony Casey and Anthony Niblett have predicted “that laws, too, will be self-driving.”⁹⁹ In the same vein, these same authors predict that advances in artificial intelligence and communications technology will “be able to identify the rules applicable to an actual situation and inform the regulated actor exactly how to comply” and that such “microdirectives will become the dominant form of law[.]”¹⁰⁰ Accordingly they predict that “opportunities for statutory interpretation and filling the gaps in vague standards will dry up as citizens are simply instructed to *obey simple directives*.”¹⁰¹

⁹⁶ See THE DECLARATION OF INDEPENDENCE para. 2 (U.S. 1776) (“[T]o institute a new Government, laying its foundations on such principles as to them shall seem most likely to effect their Safety and Happiness[.]”).

⁹⁷ Christoph Busch & Alberto De Franceschi, *Granular Legal Norms: Big Data and the Personalization of Private Law*, in RESEARCH HANDBOOK ON DATA SCIENCE AND LAW (forthcoming 2018), available at <https://ssrn.com/abstract=3181914>.

⁹⁸ See Daisuke Wakabayashi, *Self-Driving Uber Car Kills Pedestrian in Arizona, Where Robots Roam*, THE N. Y. TIMES (Mar. 19, 2018).

⁹⁹ Anthony J. Casey & Anthony Niblett, *Self-Driving Laws*, 66 U. TORONTO L. J. 429, 442 (2016).

¹⁰⁰ Anthony J. Casey & Anthony Niblett, *The Death of Rules and Standards*, 92 IND. L. J. 1401, 1404 (2017).

¹⁰¹ *Id.* at 1435 (emphasis added). Casey and Niblett note that one might alternatively frame this trend towards “a simple microdirective for how to comply with the law,” as “the death of standards.” *Id.* at 1405. It is worth observing that the recent trend at least in patent law seems to have

Casey and Niblett explicitly decline to take a normative position on whether this alleged trend, which they say implies a reduced role for judges, is beneficial for society,¹⁰² though they do seem to contend that it will happen regardless.¹⁰³ This sort of tech-determinism is not uncommon in the realm of technology generally,¹⁰⁴ but it seems particularly inappropriate as applied to law.¹⁰⁵ The fact that

been in precisely the opposite direction. *See, e.g.*, Peter Lee, *The Supreme Assimilation of Patent Law*, 114 MICH. L. REV. 1413, 1416 (2016) (“[T]he Court has consistently adopted holistic standards to replace the bright-line, formalistic rules that are characteristic of Federal Circuit patent doctrine”).

¹⁰² Casey & Niblett, *supra* note 100, at 1405 (“Our analysis is positive rather than normative. One might think of perfect calibration of laws to legislative goals as problematic in a system with multiple branches and checks and balances. Indeed, our analysis implies a reduced role for judges and perhaps the need for institutional reforms to preserve important aspects of our current system.”). It is interesting that the authors explicitly decline to make a normative case for the sweeping changes they seem to herald.

¹⁰³ *See id.* at 1445 (“One might think that if the institutional upheaval and autonomy concerns are great enough, lawmakers will reject the move to microdirectives. We do not see this happening. The growth of predictive technology is robust.”); *id.* at 1402 (“This new form – we call it the microdirective – is the future of law.”); Casey & Niblett, *supra* note 99, at 438 (“The trend towards micro-directives will be real as the cost of prediction and communication falls. The consequences relating to morality, privacy, and autonomy should be addressed before micro-directives arrive.”).

¹⁰⁴ *See, e.g.*, ROB RIEMEN, TO FIGHT AGAINST THIS AGE 129 (2018) (“[H]e added threateningly that ‘we simply have to adjust to the fact that this is the future, these are the coming technological developments, you can’t stop them, no one can.’”).

¹⁰⁵ *Cf.* John Gardner, *The Twilight of Legality* 16 (University of Oxford, Working Paper No. 4/2018) available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3109517 (“Tech-determinism is today the favoured way of making those who still believe in the rule of law look like they are going to be on the wrong side of history. Uber, for example, has notoriously favoured that line: the rule of law is so yesterday; Uber is the unstoppable future.”).

we may have acquired the technology to change the law in a certain way does not by itself provide adequate justification for doing so; the normative case must be made.¹⁰⁶

What could possibly go wrong? One concern recognized in this literature is that personalized automated law “abandons the equal application of general standards to all individuals,” and perhaps one of the advantages of more general laws is that they “deliberately ignore personal details and thus grant a ‘protective space’ of individual freedom where the law does not enter.”¹⁰⁷ Similarly, autonomy “may be increasingly constrained as more and more ethical decisions are shifted from the purview of flawed humans to consistent machines,”¹⁰⁸ and “[citizens who simply] follow rules and directives may become robotic, mere automatons who fail to appreciate the moral choices that should underlie their actions.”¹⁰⁹

This concern also seems to suggest some tension between, on the one hand, the push towards micro-managing people through legal micro-directives, and on the other hand, the notion that the liberal democratic state should be a limited state.¹¹⁰ If the laws governing daily life in a society

¹⁰⁶ See *supra* note 102. Despite explicitly disclaiming the normative, Casey and Niblett do contend that the “micro-directive” “[capture] the benefits of both rules and standards without incurring the costs.” Casey & Niblett, *supra* note 100, at 1402. See also *id.* at 1402 n.1 (citing Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L. J. 557, 561 n.6 (1992)). There is at least one persuasive alternative account of the rules and standards dialectic that Casey and Niblett do not address. See Pierre Schlag, *Rules and Standards*, 33 UCLA L. REV., 379 (1985) (discussing an alternative account of the rules and standards dialectic that Casey and Niblett do not address).

¹⁰⁷ Busch & De Franceschi, *supra* note 97, at *15–16.

¹⁰⁸ Casey & Niblett, *supra* note 99, at 438.

¹⁰⁹ Casey & Niblett, *supra* note 100, at 1444.

¹¹⁰ Pierre Schlag, *Hohfeldian Analysis, Liberalism and Adjudication (Some Tensions)*, THE LEGACY OF WESLEY HOHFELD: EDITED MAJOR WORKS, SELECT PERSONAL PAPERS, AND ORIGINAL COMMENTARY,

become so complex that ordinary citizens would need an artificially intelligent robot directing them as to how to be in compliance,¹¹¹ perhaps the better solution might be to simplify the laws—to make them more understandable and bring them more into accord with intuition.¹¹² As for constitutional objections, Casey and Niblett proclaim that “courts could, of course, bless the use of particular types of algorithms going forward, deeming those to be constitutionally proper,” and that such “delegation would facilitate the promulgation of micro-directives in the constitutional law space.”¹¹³

There is at least one additional concern that does not seem to be fully recognized in this literature: the effect that legal automation could have upon legal thought. Artificial intelligence can tend to reduce thought when we let machines do our thinking for us.¹¹⁴ For example, when one uses GPS automatic driving navigation systems, part of the mind shuts off and one does not tend to learn their way around the roads

(Balganesh, Sichelman, Smith eds. 2018) (manuscript at 22) (forthcoming 2018) (“From a Hohfeldian perspective, the assertion that a privilege is a law-free zone is an *analytical* error. But from the strictly political perspective of liberalism, it is not an error at all. On the contrary, the spatialization strategy is wrought up with the fundamental political liberal project of protecting the freedom of the sovereign individual legal subject.”).

¹¹¹ Casey & Niblett, *supra* note 100, at 1401 (“When an individual citizen faces a legal choice, the machine will select from the catalog and communicate to that individual the precise context-specific command (the microdirective) necessary for compliance.”).

¹¹² See R. George Wright, *The Role of Intuition in Judicial Decisionmaking*, 42 HOUS. L. REV. 1381, 1384 (2006) (“[I]ntuition is invariably central—whether overtly so or not—to the process of arriving at a judicial outcome by any standard recognized means.”).

¹¹³ Casey & Niblett, *supra* note 100, at 1436.

¹¹⁴ See, e.g., Jeremy Bernstein, *Out of My Mind: “A.I.”*, 49 AM. SCHOLAR, 295, 299 (1980); Cf. FOER, *supra* note 10, at 72 (“The problem is that when we outsource thinking to machines, we are really outsourcing thinking to the organizations that run the machines.”).

as well.¹¹⁵ Now this may not be a huge problem by itself, but it does potentially raise a red flag about automating other things, such as the law. Despite the modern (arguably detrimental) reverence for *positive* thinking,¹¹⁶ it seems that relatively little attention is paid to the value of thought itself.

It was observed some time ago that one of the drawbacks of computerized law is that it would render law uninteresting.¹¹⁷ This is not meant in the sense that the law would become boring, but rather that people would no longer have much of an incentive to be interested in it. Judges and lawyers have a strong incentive to think about the law¹¹⁸ and currently spend lots of time and energy doing just that,¹¹⁹ as the analysis of patentable subject matter above shows by way of example. But judges and lawyers are predicted to have a reduced role in the future of automated law,¹²⁰ and of course,

¹¹⁵ See, e.g., Joseph Stromberg, *Is GPS ruining our ability to navigate for ourselves?*, VOX (Sept. 2, 2015, 11:31 AM), available at <https://www.vox.com/2015/9/2/9242049/gps-maps-navigation> (“we have good reason to believe that when we blindly follow GPS for direction, we’re not exercising crucial navigational skills – and many of the scientists who study how the human brain navigates are concerned”).

¹¹⁶ See BARBARA EHRENREICH, *BRIGHT-SIDED: HOW POSITIVE THINKING IS UNDERMINING AMERICA* (2009). See also Albert J. Matricciani, *Law & The Culture of Civility*, 36 MD. B. J. 12, 14 (2003) (discussing the value of thought and the loss of personal space that has come with 21st century technology.).

¹¹⁷ See Anthony D’Amato, *Can/Should Computers Replace Judges*, 11 GA. L. REV. 1277, 1299 (1977) (“A second cost will be to render areas of the law uninteresting.”).

¹¹⁸ Cf. Pasquale, *supra* note 25, at manuscript 56 (explaining that articulable legal standards “help us formulate convincing explanations and justifications of legal decisionmaking, without foreordaining outcomes in advance.”).

¹¹⁹ See D’Amato, *supra* note 117, at 1299 (“At present, many people are immediately interested, whether financially or from a teaching or research point of view, in conflicts of laws.”).

¹²⁰ *Id.* at 1301.

if there are fewer judges and lawyers, then there would also be fewer law students, and fewer law professors.

In such a future, who would pay attention to whether the law is fair or makes sense? Our current system, where the law is shaped through a collaborative process involving judges, lawyers, and to some extent clients, may not always provide the clearest law most efficiently, but it does have the advantage of ensuring that a class of people are paying close attention to the law, and thus provides a certain degree of accountability.¹²¹ The legal thought and effort of many people could be called redundant, (as compared with law in the hands of a machine), but redundancy is not always a bad thing.¹²² The human collaborative process through which the law is applied (and to some extent made) is an important aspect of the rule of law.¹²³

Law in a sense is something that we as a society “do,” so if we let machines do it for us, we might lose something important, even if the machines do it well.¹²⁴ An excellent argument can move a judge and incrementally change the law. This circumstance might be rare but the possibility

¹²¹ See BENJAMIN N. CARDOZO, *THE NATURE OF THE JUDICIAL PROCESS* 35 (1921) (“[T]he judgment of the lawyer class, will spread to others, and tinge the common consciousness and the common faith.”).

¹²² See generally John Golden, *Redundancy: When Law Repeats Itself*, 94 *TEX. L. REV.* 629 (2016).

¹²³ Richard H. Fallon, “*The Rule of Law*” as a Concept in Constitutional Discourse, 97 *COLUM. L. REV.* 1, 19 (1997) (“[T]heories approaching the Legal Process ideal type tend to conceive the subjects of legal justice as reasonable persons, open to argument and persuasion, and deserving of reasoned explanations that the law should aspire to provide.”); Pasquale, *supra* note 25, at manuscript 49 (explaining that where legal technology “reduces a legal relationship to a clear prescription . . . it is unlikely to meet the complex standards of review and appeal embodied in the Legal Process conception of the rule of law.”).

¹²⁴ See PIERRE SCHLAG, *THE ENCHANTMENT OF REASON* 140 (1998) (“To put it plainly: To be really good at ‘doing law,’ one has to have serious blind spots and a stunningly selective sense of curiosity.”).

encourages citizens to think about and question *our* laws, instead of blindly submitting to them.¹²⁵ The process by which society can influence the law (through lawyers and judges as intermediaries) may give us some sense that the law is our collective creation instead of an opaque governing authority.¹²⁶

When law is instantaneously determined and communicated such that actors need only “obey,”¹²⁷ the period of suspended conclusion, during which thought takes place,¹²⁸ is lost. Can we trust machines to make and explain the value judgments inherent in legal analysis?¹²⁹ Are we

¹²⁵ Cf. Matthew Redna, *Kennedy Defends Rule of Law, Europe in Ninth Circuit Speech*, COURTHOUSE NEWS SERV. (July 26, 2018), <https://www.courthousenews.com/kennedy-defends-rule-of-law-europe-in-ninth-circuit-speech/> (quoting Justice Kennedy as saying, “For us [the law is] a promise. It’s a promise of liberty, of freedom, it means the right to plan our own destiny.”).

¹²⁶ See Pasquale, *supra* note 25, at manuscript 6 (“In order for legal automation to truly respect rule of law principles, the adage ‘a rule of law, not of men’ thus must be complemented by a new commitment – to a ‘rule of persons, not machines.’”).

¹²⁷ Compare Casey & Niblett, *supra* note 100, at 1402 (“The citizen does not have to weigh the reasonableness of her actions, nor does she have to search for the content of a law. She just obeys a simple directive.”); with Learned Hand, *THE SPIRIT OF LIBERTY*, 33 N.Y. ST. B. J. 415, 415 (1944) (“Liberty lies in the hearts of men and women; when it dies there, no constitution, no law, no court can save it; no constitution, no law, no court can even do much to help it.”).

¹²⁸ See JOHN DEWEY, *HOW WE THINK* 12 (1933) (explaining that reflective thinking “involves (1) a state of doubt, hesitation, perplexity, mental difficulty, in which thinking originates, and (2) an act of searching, hunting, inquiring, to find material that will resolve the doubt, settle and dispose of the perplexity.”); see also Donald J. Kochan, *Thinking Like Thinkers: Is the Art and Discipline of an ‘Attitude of Suspended Conclusion’ Lost on Lawyers?*, 35 SEATTLE U. L. REV. 1, 2-3 n.5 (2011).

¹²⁹ See Rebecca Haw Allensworth, *The Commensurability Myth in Antitrust*, 69 VAND. L. REV. 1, 68 (2016) (“Inherent in the very idea of judging is the notion of judgment; courts are frequently delegated regulatory and adjudicative tasks that must choose between valid and

comfortable with the idea of a future where, instead of providing a legal opinion supported by reasons and developed after considering arguments advanced through an adversarial process, a “black box” machine simply spits out a legal directive,¹³⁰ and the obedient citizen complies? This system would amount to a pure assertion of authority, as opposed to the giving of reasons in a judicial opinion after an opportunity to be heard, which at least serves as an explanation.¹³¹ But when the only legal rule that people know or understand is to follow the “micro-directive”—“obey the machine”—then so much for transparency, candor, and perhaps even rule of law.¹³²

important social values.”); Joshua P. Davis, *Law Without Mind: AI, Ethics, and Jurisprudence* 1 (Univ. of S.F. Law Research Paper No. 2018-05, 2018), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3187513 (arguing that the “ultimate bulwark against ceding legal interpretation to computers – from having computers usurp the responsibility and authority of attorneys, citizens, and even judges – may be to recognize the role of moral judgment in saying what the law is.”).

¹³⁰ Davis, *supra* note 129, at 12 (“AI is often not transparent.”). For the sake of transparency, were we to allow some AI to make its way into our law, it is important that the underlying code at least be made public and not be kept as a trade secret. *Cf.* David S. Levine, *Secrecy and Unaccountability: Trade Secrets in our Public Infrastructure*, 59 FLA. L. REV. 135 (2007) (arguing that trade secrets should to transparency and accountability in public infrastructure).

¹³¹ Frederick Schauer, *Giving Reasons*, 47 STAN. L. REV. 633, 636–37 (1995) (“The act of giving a reason is the antithesis of authority. When the voice of authority fails, the voice of reason emerges. *Or vice versa.*”) (emphasis added).

¹³² *See* JOSEPH RAZ, *THE AUTHORITY OF LAW: ESSAYS ON LAW AND MORALITY* 213 (1979) (“It is one of the important principles of the [rule of law] doctrine that the making of particular laws should be guided by open and relatively stable general rules.”); *cf.* SCOTT J. SHAPIRO, *LEGALITY* 195 (Harv. Univ. Press 2011) (“the exercise of legal authority . . . is an activity of social planning”); Micah Schwartzman, *Judicial Sincerity*, 94 VA. L. REV. 987, 990–91 (2008) (“[J]udges must make public the legal grounds for their decisions. Those who fail to give sincere legal justifications

CONCLUSION

In *Ready Player One*, the eccentric genius creator of the OASIS was interested in 1980s culture and created a contest for control of his company in part to give the world an incentive to share his obsession, a strategy which worked to considerable effect.¹³³ Judges, lawyers, law students, and law professors, are to some degree obsessed with the law (or at least quite interested in it), because they have an incentive to be, as the above discussion of abstract ideas and patent eligible subject matter shows by way of example.

The more the law is automated, the less we as a society will pay attention to and think about the law. This result might not seem like a problem if the artificial intelligence of the law is entirely just and well made. But let's assume, *arguendo*, that it is, and that automated law initially works just fine—or even better than fine; more efficient and more consistent than when law was in the hands of humans. Citizens become accustomed to a world in which they simply obey the law machine. No one is thinking about the law because the machines do our legal thinking for us.

Is this potential loss of legal thought a problem? Perhaps not initially, but it could become a very serious problem if some untrustworthy group of people were to gain control of the law machine, and start changing its commands for their own benefit, rather than for the benefit of society.¹³⁴

violate this condition of legitimacy.”); Emily Berman, *A Government of Laws and Not of Machines*, 98 B.U. L. REV. (forthcoming 2018).

¹³³ See CLINE, *supra* note 13, at 50.

¹³⁴ Cf. TOYAMA, *supra* note 1, at 29 (“Like a lever, technology amplifies people’s capacities in the direction of their intentions.”). Potentially, one way to at least partially guard against this sort of usurpation could be through the use of decentralized blockchain technology. Cf. Michael Abramowicz, *Cryptocurrency-Based Law*, 58 ARIZ. L. REV. 359, 368 (2016) (“Part I of this article will introduce the concept of peer-to-peer

It might be difficult to imagine that corrupt people could rise to power, but the possibility cannot be discounted. And if it did happen, with the world engrossed in a virtual reality oasis, simply obeying the law machine in the real world, then who would notice, and when?

governance by identifying its three critical components: (1) a decentralized ledger; (2) a decentralized decision; and (3) a decentralized fisc.”).