ARTIFICIAL INTELLIGENCE: DISTINGUISHING BETWEEN TYPES & DEFINITIONS

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"We should make every effort to understand the new technology. We should take into account the possibility that developing technology may have important societal implications that will become apparent only with time. We should not jump to the conclusion that new technology is fundamentally the same as some older thing with which we are familiar. And we should not hastily dismiss the judgment of legislators, who may be in a better position than we are to assess the implications of new technology."–Supreme Court Justice Samuel Alito[1]

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[1] Brown v. Entm't Merchs. Ass'n, 564 U.S. 786, 806 (2011) (Alito, J., concurring).

INTRODUCTION

When we say or hear the phrase "Artificial Intelligence" (or "AI") various things can come to mind—images from robot armies trying to extinguish humanity to less intimidating images of Alexa asking someone trivia questions. The phrase has become ubiquitous to describe countless forms of advanced technology.[2] Colloquially using a term in this way can lead to general confusion, but it can be far more damaging in a legal context. Unambiguous definitions are critical in the application of the law, whether in determining if a burrito is a sandwich,[3] or if a film is considered pornography.[4] With the promise of efficiency and money, companies have begun pursuing artificial intelligence and investing copious amounts of money into its development.[5] Governments and legislatures have certainly taken note, and some states have attempted to outline regulations for artificial intelligence.[6]

There is a myriad of legal questions and problems that arise from the development and implementation of artificial intelligence. However, without definitions, or at the very least a clear understanding of the concept, many resources will be wasted on litigation and inept policy making.[7] Certain states have acknowledged the presence of and attempted to define AI, either in terms of a specific function or by incorporating it into other definitions, but this only ends up skirting the question.[8] Thus, there is no general legal definition for what constitutes AI outside of a specific application, such as in the context of autonomous automobiles or electronic agents trading in the markets.[9] However,

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[2] *See* Cristiano Castelfranchi, *Alan Turing's "Computing Machinery and Intelligence"*, SPRINGER SCI. & BUS. MEDIA DORDRECHT 293, 293 (2013); James Vincent, *What Counts as Artificially Intelligent? AI and Deep Learning, Explained*, VERGE (Feb. 29, 2016, 3:40 PM), http://www.theverge.com/2016/2/29/11133682/deep-learning-ai-explained-machine-learning [https://perma.cc/23V8-MJQE].

[3] Associated Press, *Massachusetts Judge Settles Dispute by Ruling Burrito is Not a Sandwich*, FOX NEWS (Jan. 13, 2015), http://www.foxnews.com/story/2006/11/10/massachusetts-judge-settles-dispute-by-ruling-burrito-is-not-sandwich.html [https://perma.cc/X6D4-23PE].

[4] Jacobellis v. Ohio, 378 U.S. 184, 196 (1964).

[5] Matthew U. Scherer, *Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies*, 29 HARV. J.L. & TECH. 353, 354 (2016).

[6] *See* discussion *infra* Part III; *see generally* Assemb. Con. Res. 215, 2017-18 Leg., Reg Sess. (Cal. 2018).

[7] *See* Scherer, *supra* note 5, at 359–62.

[8] CAL. EDUC. CODE § 75008 (West 2018); 410 ILL. COMP. STAT. 520/6 (2018); KY. REV. STAT. ANN. § 367.680 (West 2018); OHIO REV. CODE ANN. § 4763.01 (West 2018); OHIO REV. CODE ANN. § 4768.01 (West 2018); *see* discussion *infra* Part III.

[9] *See* discussion *infra* Sections III.B–III.C.

the applications of AI are expanding to a point where it will be impractical to define it for every application.[10]

A general definition, therefore, can be used across fields and applications as long as the definition is flexible and encompasses the new development of autonomous AI. To do this, it is first necessary to untangle preconceived notions of AI to determine what that term encompasses. Specifically, there needs to be a key distinction made between complex and sophisticated programs and systems, and systems that are capable of autonomy or human-like intelligence. Understanding this key distinction allows for an accurate definition of AI to be used across applications.

The utility of such definitions must be understood in order to have an applicable and workable definition.[11] For instance, the definitions of single-word nouns or short phrases can range from lengthy and complicated definitions to one- or two-word phrases.[12] With AI, it is likely to be the former. It must be noted that even with a definition—no matter how precise or specific—that definition will no doubt be the subject of litigation.[13] Terms that are seemingly well-defined and settled, such as "physical force"[14] or "serious drug offense,"[15] are brought to the Supreme Court for clarity on scope and application.[16] I point this out not to dissuade anyone from the importance of statutory definitions, but to illuminate the fact that no definition is perfect. However, in this particular case the best definition would be one flexible enough to deal with new situations, as everyday there are new uses of AI.[17] Nevertheless, creating a statutory definition can be beneficial to head off the unavoidable ambiguity courts will face when tasked with defining AI.

The goal of this note is to first explain the invasiveness and impact that AI has and will have in our lives, and thus, why a legal definition is necessary for

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[10] *See* discussion *infra* Part I.

[11] Jeanne Frazier Price, *Wagging, Not Barking: Statutory Definitions*, 60 CLEV. ST. L. REV. 999, 1000 (2013) ("Although practitioners and academics routinely interact with statutory definitions, there has been little discussion of the functions served by those definitions or of their utility.").

[12] *Id.*

[13] *Id.* at 1001 ("But the frequency of litigation around the application of legislative definitions belies that assumption. Within the last few years alone, the United States Supreme Court has on many occasions considered the scope and application of terms seemingly well defined by federal statute.").

[14] Johnson v. United States, 559 U.S. 133, 135 (2010).

[15] McNeil v. United States, 563 U.S. 816, 817 (2011).

[16] *See* Price, *supra* note 11, at 1001 ("Within the last few years alone, the United States Supreme Court has on many occasions considered the scope and application of terms seemingly well defined by federal statute.").

[17] *Id.* at 1051 ("In a perfect world, we would expect definitions that are 'crisp enough to apply and . . . flexible enough to deal with new situations.' "); Scherer, *supra* note 5, at 373 ("Creating a working definition of AI will be difficult, to be sure, but coming up with precise legal definitions for imprecise terms is hardly a challenge unique to AI."); *see also infra* Part I.

the legal field. Further, this note will explain what AI is, and its future developments. These explanations will help us outline computer science developments and the philosophical distinction between strong AI and weak AI. The distinction between strong AI and weak AI is useful in making distinct legal definitions concerning AI. In addition, this note will analyze a few current examples of definitions and discern their shortcomings. Finally, this paper will propose two possible methods for developing a definition for strong AI using the descriptive and prescriptive methods of legal definition drafting.

I. WHY THIS MATTERS

Artificial intelligence is pervasive in our lives, whether we realize it or not.[18] One of the most public uses of AI is in driverless cars—which have been approved for road operation in five states as well as the District of Columbia—and there are no signs of that growing industry slowing down.[19] New developments, such as these cars, have prompted an AI arms race in the private sector, and AI could have as much as a $50 trillion economic value by 2025.[20] This race toward better and more versatile AI has called for relegations and restrictions.[21] Wanting to regulate new technology is nothing new, but what is surprising is the fact that so many tech industry leaders have voiced dire concerns about AI.[22] For example, Elon Musk stated that we are "summoning a demon" and that AI is probably our biggest existential threat.[23] People can question whether Musk is being hyperbolic, but Stephen Hawking,[24] Bill

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[18] *See* Scherer, *supra* note 5, at 354 ("It may not always be obvious, but we are living in the age of intelligent machines. Artificial intelligence ("AI") permeates our lives in numerous subtle and not-so-subtle ways, performing tasks that, until quite recently, could only be performed by a human with specialized knowledge, expensive training, or a government-issued license.").

[19] *Id.*; Aaron M. Kessler, *Law Left Behind as Hands-Free Cars Cruise*, STARTRIBUNE (May 3, 2015, 12:21 PM), http://www.startribune.com/law-left-behind-as-hands-free-cars-cruise/302322781/ [https://perma.cc/3K7A-TVV7].

[20] *See* Scherer, *supra* note 5, at 354; Charles Mizrahi, *The Economic Impact of AI Projected to Be Over $14 Trillion*, BANYAN HILL (Jan. 24, 2019), https://banyanhill.com/economic-impact-ai-14-trillion/ [https://perma.cc/X6YS-BZYZ].

[21] John Frank Weaver, *We Need to Pass Legislation on Artificial Intelligence Early and Often*, SLATE (Sept. 12, 2014, 3:53 PM), https://slate.com/technology/2014/09/we-need-to-pass-artificial-intelligence-laws-early-and-often.html [https://perma.cc/UUF3-Q86F].

[22] Scherer, *supra* note 5, at 355 ("The potential for further rapid advances in AI technology has prompted expressions of alarm from many quarters, including some calls for government regulation of AI development and restrictions on AI operation.").

[23] Aileen Graef, *Elon Musk: We Are 'Summoning a Demon' with Artificial Intelligence*, UPI (Oct. 27, 2014, 7:50 AM), https://www.upi.com/Business_News/2014/10/27/Elon-Musk-We-are-summoning-a-demon-with-artificial-intelligence/4191414407652 [https://perma.cc/U2ET-BAWX].

[24] Rory Cellan-Jones, *Stephen Hawking Warns Artificial Intelligence Could End Mankind*, BBC (Dec. 2, 2014), http://www.bbc.com/news/technology-30290540 [https://perma.cc/D857-B8LZ].

Gates,[25] and other scientists have expressed similar concerns.[26] While some might dismiss these worries as exaggerations, there are nevertheless issues, legal or otherwise, that arise out of the use and expansion of AI.

There are also a number of legal questions that are being discussed today.[27] For instance, who is liable when a self-driving car causes an accident?[28] Or to what degree can physicians let AI systems diagnose illnesses?[29] Who is liable when an AI algorithm is trying to advertise to anti-Semitic groups?[30] What happens if the AI system starts discriminating against women?[31] Few states have laws to address these issues, and if they do, the laws are limited to drones or driverless cars.[32] This lack of regulation may stem from the fact that traditional methods of regulation (tort liability, strict liability, or product licensing) are inadequate to cover AI.[33] Because AI—in at least some part—is automatic, foreseeability and control are a major issue for liability and restrictions.[34] While these are relatively new questions, it may be difficult to foresee future uses of AI, and thus future problems.

AI had humble beginnings. But nowadays, it has innumerable applications that were unforeseeable when it was a nascent technology. One of the first applications of AI was its use as an opponent in a game of chess.[35] Chess has

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[25] Peter Holley, *Bill Gates on Dangers of Artificial Intelligence: 'I Don't Understand Why Some People Are Not Concerned'*, WASH. POST (Jan. 29, 2015), https://www.washingtonpost.com/news/the-switch/wp/2015/01/28/bill-gates-on-dangers-of-artificial-intelligence-dont-understand-why-some-people-are-not-concerned/?utm_term=.1fea36ca0a6d [https://perma.cc/CMF5-2XDZ].

[26] *Risks from Artificial Intelligence*, CTR. FOR STUDY EXISTENTIAL RISK, https://www.cser.ac.uk/research/risks-from-artificial-intelligence/ [https://perma.cc/CZW9-GCUR] (last visited Mar. 11, 2019).

[27] Brian Hall, *Top 5 Legal Issues Inherent in AI and Machine Learning*, TRAVERSE LEGAL (Nov. 15, 2017), https://www.traverselegal.com/blog/top-5-legal-issues-inherent-in-ai-and-machine-learning/ [https://perma.cc/L2SD-XSM7].

[28] *See* Scherer, *supra* note 5, at 356.

[29] *Id.*

[30] Aarti Shahani, *Facebook Enabled Ads Targeting Anti-Semites*, NPR (Sept. 15, 2017, 5:06 AM), https://www.npr.org/2017/09/15/551163392/facebook-enabled-ads-targeting-anti-semites [https://perma.cc/8VNW-WV73].

[31] Jeffrey Dastin, *Amazon Scraps Secret AI Recruiting Tool that Showed Bias Against Women*, REUTERS (Oct. 9, 2018, 8:12 PM), https://www.reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G [https://perma.cc/9H46-66TA].

[32] *See* Ryan Calo, *Robotics and the Lessons of Cyberlaw*, 103 CALIF. L. REV. 513, 515–16 (2015); Rachel Charney, Book Note, *Can Androids Plead Automatism?*, *A Review of* When Robots Kill: Artificial Intelligence Under the Criminal Law *by Gabriel Hallevy*, 73 U. TORONTO FAC. L. REV. 69, 72 (2015).

[33] *See* Scherer, *supra* note 5, at 356.

[34] *Id.* at 357.

[35] Mike Murphy, *An AI Computer Learned How to Beat Almost Anyone at Chess in 72 Hours*, QUARTZ (Sept. 16, 2015), https://qz.com/502325/an-ai-computer-learned-how-to-beat-almost-anyone-at-chess-in-72-hours/ [https://perma.cc/US4C-PA6N].

clearly defined rules and a finite number of moves, so a computer can run through all of the possibilities and pick the best one.[36] But we have come a long way since Deep Blue beat Kasparov in chess over two decades ago.[37] For example, I.B.M.'s Watson destroyed Jeopardy champions,[38] and more recently, Google's DeepMind beat the world champion in Go, which is considered to be the most complex game.[39] However, the capabilities of artificial systems are quickly going beyond games.

AI is no longer limited to computational or statistical tasks and operations.[40] AI is now being used to make investments on Wall Street, and it is capable of making 193,000 trades a day.[41] Furthermore, the consumer behavior predictions used by online retail marketers are generated by an AI algorithm with great precision.[42] AI is used in the medical field to predict heart attacks and heart disease or to detect Alzheimer's, and more recently, AI is being used to spot colorectal cancer tumors before they become malignant with 86 percent accuracy.[43] AI is also extremely good at computer tasks and can not only enhance pictures by increasing a photo's resolution,[44] but it can create realistic fake people to fill those photos.[45] Even tasks that we assume require human

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[36] Garry Kasparov, *Garry Kasparov: There's No Shame in Losing to a Machine*, FORTUNE (Sept. 25, 2017), http://fortune.com/2017/09/25/garry-kasparov-chess-strategy-artificial-intelligence-ai/ [https://perma.cc/JV7W-EDT6].

[37] *Id.*

[38] John Markoff, *Computer Wins on 'Jeopardy!': Trivial, It's Not*, N.Y. TIMES (Feb. 16, 2011), http://www.nytimes.com/2011/02/17/science/17jeopardy-watson.html?pagewanted=all [https://perma.cc/AZ7R-2EC4].

[39] Nature Video, *The Computer That Mastered Go*, YOUTUBE (Jan. 27, 2016), https://www.youtube.com/watch?v=g-dKXOlsf98 [https://perma.cc/2MZ4-ZXFY]; *see also* Vincent, *supra* note 2 (describing additional AI abilities now being employed by big tech companies).

[40] *See* Vincent, *supra* note 2.

[41] Joe Ciolli, *The Stock Market's Robot Revolution is Here*, BUS. INSIDER AUSTL. (Oct. 21, 2017, 9:02 AM), http://www.businessinsider.com.au/ai-powered-equity-etf-stock-aieq-market-robot-revolution-2017-10 [https://perma.cc/9TLX-45C2].

[42] *Meet Genie*, GREY JEAN TECHS., http://gjny.com/meet-genie/ [https://perma.cc/D5GR-FEPP] (last visited Mar. 12, 2019).

[43] Drew Harwell & Carolyn Y. Johnson, *In Our Eyes, Google's Software Sees Heart Attack Risk*, WASH. POST (Feb. 19, 2018), https://www.washingtonpost.com/news/the-switch/wp/2018/02/19/google-used-artificial-intelligence-to-predict-heart-attacks-with-the-human-eye/?noredirect=on&utm_term=.3dea14a86c12 [https://perma.cc/W9W3-RMCA]; Swapna Krishna, *An AI Detected Colorectal Cancer with 86 Percent Accuracy*, ENGADGET (Oct. 30, 2017), https://www.engadget.com/2017/10/30/ai-colorectal-cancer-detection/ [https://perma.cc/W23S-DHCP]; Press Release, Radiological Soc'y of N. Am., Artificial Intelligence May Aid in Alzheimer's Diagnosis (July 6, 2016), https://press.rsna.org/timssnet/media/pressreleases/14_pr_target.cfm?ID=1890 [https://perma.cc/QKB2-F6FB].

[44] Camille Charluet, *This New AI Can Make Your Low Resolution Photos Great Again*, THE NEXT WEB (Oct. 31, 2017), https://thenextweb.com/artificial-intelligence/2017/10/31/ai-can-make-low-resolution-photos-great-again/ [https://perma.cc/RN9H-R7QX].

[45] Roger Cheng, *AI Can Create Fake Celebrity Photos so Real It's Scary*, CNET (Oct. 30, 2017, 9:05 AM), https://www.cnet.com/news/ai-can-create-fake-celebrity-photos-so-real-its-scary/?part=propeller&%3Bsubj=news&%3Btag=link [https://perma.cc/3SEW-BSDY].

creativity are being tackled by AI—such as writing horror stories,[46] creating music videos,[47] or developing black metal albums.[48] While these applications might seem presumably helpful and not harmful, the applications do stop there.

There are also a fair share of science fiction applications already in the works, including: mind reading,[49] predicting one's death,[50] creating computer voice generations that are indistinguishable from humans,[51] and conducting surveillance for the Pentagon via drones and satellites.[52] Last but not least, AI systems are being programed to be able to build other AI machines.[53] The uses and functions of AI by no means end there, but it is becoming increasingly clear that AI systems will be able to do most tasks that humans can do, and do them better. It is also difficult to predict future uses for AI, especially since AI systems will most likely be the ones inventing new uses.[54]

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[46] Swapna Krishna, *AI Can Write Surprisingly Scary and Creative Horror Stories*, ENGADGET (Oct. 31, 2017), https://www.engadget.com/2017/10/31/shelley-ai-writes-horror-stories-on-twitter/ [https://perma.cc/8YAT-3E53].

[47] Jon Fingas, *Intel AI Helped Create a Music Video*, ENGADGET (Oct. 28, 2017), https://www.engadget.com/2017/10/28/intel-ai-helped-create-music-video/ [https://perma.cc/ER7N-87NT].

[48] Mark Austin, *A.I. Bots Just Dropped a Black Metal Album that Will Make Your Head Explode*, DIGITAL TRENDS (Dec. 5, 2017, 10:04 AM), https://www.digitaltrends.com/music/dadabots-ai-death-metal-album/ [https://perma.cc/2CG6-ESGK].

[49] Catherine Clifford, *Japanese Scientists Just Used A.I. to Read Minds and It's Amazing*, CNBC (Jan. 8, 2018, 11:21 AM), https://www.cnbc.com/2018/01/08/japanese-scientists-use-artificial-intelligence-to-decode-thoughts.html [https://perma.cc/QKX2-H4AR].

[50] Catherine Clifford, *These Scientists Are Using A.I. to Predict When People Will Die for Better Access to Medical Care*, CNBC (Jan. 25, 2018, 9:15 AM), https://www.cnbc.com/2018/01/24/ai-used-to-predict-when-people-may-die-for-better-medical-care.html [https://perma.cc/DUY4-VWMQ].

[51] Dave Gershgorn, *Google's Voice-Generating AI is Now Indistinguishable from Humans*, QUARTZ (Dec. 26, 2017), https://qz.com/1165775/googles-voice-generating-ai-is-now-indistinguishable-from-humans/?utm_source [https://perma.cc/HGY2-GFHN].

[52] Gregory C. Allen, *The Pentagon is Using AI to Fight ISIS but It's Not Quite the 'Terminator'*, CNN (Dec. 30, 2017, 10:01 AM), https://www.cnn.com/2017/12/29/opinions/pentagon-is-using-artificial-intelligence-not-quite-the-terminator-opinion-allen/index.html [https://perma.cc/8ELX-ZXD5].

[53] Cade Metz, *Building A.I. that Can Build A.I.*, N.Y. TIMES (Nov. 5, 2017), https://www.nytimes.com/2017/11/05/technology/machine-learning-artificial-intelligence-ai.html [https://perma.cc/AN48-BBQB].

[54] *Id.* Just the period between the first draft of this paper in March 2018 and the second draft in July 2018, there have been impressive developments. AI can now perform a variety of human tasks. *See, e.g.*, Aaron Brown, *The Creepy AI that Can Predict the Future: Machine That Anticipates Your Movements Several Minutes in Advance Could Pave the Way for Next-Level Big Brother Surveillance*, DAILYMAIL.COM (June 15, 2018, 8:58 AM), http://www.dailymail.co.uk/sciencetech/article-5847767/Creepy-AI-predict-moves-advance-lead-level-Big-Brother-surveillance.html [https://perma.cc/FX8J-8ADE] (noting AI can predict human's movements before they do them); Andrew Liszewski, *MIT's New AI-Powered Software Can Extract Individual Instruments from Videos with a Single Click*, GIZMODO (July 5, 2018, 4:40 PM), https://gizmodo.com/mits-new-ai-powered-software-can-extract-individual-ins-182737

Given the plethora of applications of AI, it seems like we should have a clear definition of what qualities make all of these "AI." What was once considered AI no longer qualifies as artificially intelligent technology and applications advance. However, despite this evolution, scientists, programmers, philosophers, and lawyers do not have a clear understanding of what AI is. Attempting to define AI is nothing new, but what is different now is the necessity of a definition, and specifically a legal definition. In order to be able to define it, however, the legal field needs to understand what AI is, as well as what makes it unique from other technological advances, including what is currently being called "AI."

2032 [https://perma.cc/J35Q-69DE] (noting AI can extract a single instrument from a song); Sam Machkovech, *This Wild AI-Generated Film Is the Next Step in "Whole Movie Puppetry,"* ARS TECHNICA (June 11, 2018, 9:01 AM), https://arstechnica.com/gaming/2018/06/this-wild-ai-generated-film-is-the-next-step-in-whole-movie-puppetry/ [https://perma.cc/34LP-J5VT] (noting AI can create films); Andy Meek, *It's a Little Scary How Smart Google's DeepMind Just Got*, BGR (June 15, 2018, 2:58 PM), https://bgr.com/2018/06/15/google-deepmind-render-3d-objects-from-2d-images/ [https://perma.cc/DR78-D4ZT] (noting AI can crush players in video games); Stephanie Mlot, *Artificial Intelligence Can Sense Humans Through Walls*, GEEK.COM (June 14, 2018), https://www.geek.com/tech/artificial-intelligence-can-sense-humans-through-walls-1743205/ [https://perma.cc/SEE2-4PRF] (noting AI can sense humans through walls); Jack Morse, *Watch Out Google Duplex: Microsoft Just Demoed Its Own AI Having a Full-On Phone Call*, MASHABLE (May 22, 2018), https://mashable.com/2018/05/22/microsoft-ai-demo-xiaoice/#SS_dCtrMVgqS [https://perma.cc/V3S4-D92H] (noting AI systems can now make full on phone calls); Angela Moscaritolo, *IBM Artificial Intelligence Takes on Human Debate Champs*, PCMAG.COM (June 19, 2018, 12:25 PM), https://www.pcmag.com/news/361938/ibm-artificial-intelligence-takes-on-human-debate-champs [https://perma.cc/MPE3-KBYJ] (noting AI can debate people); Brian Resnick, *How Data Scientists Are Using AI for Suicide Prevention*, VOX (June 9, 2018, 7:22 AM), https://www.vox.com/science-and-health/2018/6/8/17441452/suicide-prevention-anthony-bourdain-crisis-text-line-data-science [https://perma.cc/85BX-SMNY] (noting AI can help prevent suicide); Phil Stewart, *Deep in the Pentagon, a Secret AI Program to Find Nuclear Missiles*, REUTERS (June 5, 2018, 3:07 AM), https://www.reuters.com/article/us-usa-pentagon-missiles-ai-insight/deep-in-the-pentagon-a-secret-ai-program-to-find-hidden-nuclear-missiles-idUSKCN1J114J [https://perma.cc/3HCM-KQEW] (noting AI can find hidden nuclear missiles); James Vincent, *This Japanese AI Security Camera Shows the Future of Surveillance Will Be Automated*, VERGE (June 26, 2018, 7:31 AM), https://www.theverge.com/2018/6/26/17479068/ai-guardman-security-camera-shoplifter-japan-automated-surveillance [https://perma.cc/8TGY-88C9] (noting AI can provide video surveillance); Kyle Wiggers, *Google's DeepMind Developed an IQ Test for AI Models*, VENTUREBEAT (July 11, 2018, 10:52 AM), https://venturebeat.com/2018/07/11/googles-deepmind-developed-an-iq-test-for-ai-models/ [https://perma.cc/A9FJ-D2DW] (noting AI can even develop a test to measure other AIs); Kyle Wiggers, *Google's DeepMind Develops AI That Can Render 3D Objects from 2D Pictures*, VENTUREBEAT (June 14, 2018, 12:13 PM), https://venturebeat.com/2018/06/14/googles-deepmind-develops-ai-that-can-render-3d-objects-from-2d-pictures/ [https://perma.cc/6BXQ-4V4N] (noting AI can render 3D objects from 2D pictures). There will be countless other applications by the time this paper even goes to print.

II. WHAT IS ARTIFICIAL INTELLIGENCE?

"What is Artificial Intelligence?" is not only a difficult question in and of itself, but it is particularly difficult because it is not clear who can or should answer the question.[55] Philosophers, computer scientists, and cognitive scientists are just a few of the groups who have attempted to answer this very question.[56] Although they disagree about what constitutes AI, they tend to acknowledge the relevance and significance of the question.[57] While this question may not be any easier to answer, it does raise the consideration of whether the legal field even cares what intelligence is in this context. Although, the court does care about intelligence when pertaining to people.[58] A legal definition may not turn on whether something qualifies as intelligent, but it is certainly a starting point.

A. The Development of Artificial Intelligence

Before there can be suitable regulation, legislation, or implementation, there must be a definition-based conceptual understanding.[59] The hang-up in defining AI is, in large part, because of the ambiguity of "intelligence."[60] We recognize intelligence in ourselves, so we link our understanding of intelligence to human characteristics.[61] One understanding of intelligence is tied to the ability to perform intellectual tasks.[62] However, as technology advances, so too do the tasks computers can accomplish.[63] As machines accomplish more tasks, we tend not to consider them as reaching intelligence, but instead we move the threshold of intelligence farther away and then treat that specific task as unindicative of intelligence.[64] The history of artificial machine development has certainly made this point clear.

Intelligent machines have been a serious focus of research since the mid-1950s, when computer scientists began developing programs that could solve

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[55] *See* Scherer, *supra* note 5, at 373, 396.

[56] *See generally* STUART J. RUSSELL & PETER NORVIG, ARTIFICIAL INTELLIGENCE: A MODERN APPROACH xii (3d ed. 2016); John R. Searle, *Minds, Brains, and Programs*, BEHAV. & BRAIN SCIS. 417, 417 (1980); John E. Laird et al., *A Standard Model of the Mind: Toward a Common Computational Framework Across Artificial Intelligence, Cognitive Science, Neuroscience, and Robotics*, AI MAGAZINE, Winter 2017, at 13, 14.

[57] *See generally* sources cited *supra* note 56.

[58] Brady v. United States, 397 U.S. 742, 756 (1970); Boykin v. Alabama, 395 U.S. 238, 242 (1969) (holding that for guilty pleas to count the court must find that the defendant made it intelligently). This is one of the many examples where intelligence is a critical condition.

[59] *See generally* Scherer, *supra* note 5, at 359; John McCarthy, *What is Artificial Intelligence?* STAN. FORMAL REASONING GRP. (Nov. 12, 2007), http://www-formal.stanford.edu/jmc/whatisai/node1.html [https://perma.cc/PR7N-YGD4].

[60] *See* Scherer, *supra* note 5, at 359 ("The difficulty in defining artificial intelligence lies not in the concept of artificiality but rather in the conceptual ambiguity of intelligence.").

[61] *Id.* at 359–60; *see generally* McCarthy, *supra* note 59.

[62] Scherer, *supra* note 5, at 360.

[63] *Id.* at 360–61.

[64] *Id.* at 361.

problems previously thought to require intelligence.[65] From there, computer scientists developed systems with the ability to play chess, action-plan, schedule tasks, and other complex tasks.[66] However, it became clear that these systems were developed to mimic the behavior of human intelligence, not necessarily to exercise human intelligence.[67] And this clarity highlights the distinction between sophisticated programs and machines actually capable of thinking and decision making.[68] Despite this distinction, researchers continued to develop more sophisticated machines capable of data-mining or creating train and airline schedules.[69] As machines became more capable, the question still remained whether this was human intelligence.[70]

The Turing test has been a common method used to ascertain if human intelligence has been reached.[71] In the test, a person has a conversation with an unknown thing on the other end, either an AI system or an actual person.[72] If the person is conversing with a machine but thinks he or she is communicating with a person, then the machine is said to exhibit at least some intelligence.[73] This test is by no means conclusive, but it is still a common test to run. Although recently, it is worth mentioning that Google's AI has more or less conquered the Turing test.[74] Still, if the question is whether or not something has intelligence, there needs to be some form of measurement.[75]

The Turing test has withstood the advancement of technology because it forces the computer to imitate human behavior, giving it a strong anthropocentric bias.[76] For instance, what we consider simple questions—like "what is your oldest memory?" or "what was your most painful moment?"—quickly expose that one is speaking to a machine.[77] There are other assessments and thought experiments that highlight the complication of discerning a machine from a

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[65] ARLINDO OLIVEIRA, THE DIGITAL MIND: HOW SCIENCE IS REDEFINING HUMANITY 87–88 (2017).

[66] *Id.* at 88.

[67] *Id.*

[68] *See* discussion *infra* Section II.D; *see generally* Searle, *supra* note 56, at 417.

[69] *See* OLIVEIRA, *supra* note 65, at 89.

[70] *Id.*

[71] *Id.* at 90; *see also* RUSSELL & NORVIG, *supra* note 56, at 2.

[72] OLIVEIRA, *supra* note 65, at 90.

[73] *Id.*

[74] David Gewirtz, *Google Duplex Beat the Turing Test: Are We Doomed?*, ZDNET (May 14, 2018, 6:29 PM), https://www.zdnet.com/article/google-duplex-beat-the-turing-test-are-we-doomed/ [https://perma.cc/6EL8-HYQS]; Andrew Tarantola, *Pretty Sure Google's New Talking AI Just Beat the Turing Test*, ENGADGET (May 8, 2018), https://www.engadget.com/2018/05/08/pretty-sure-googles-new-talking-ai-just-beat-the-turing-test/ [https://perma.cc/Z3EC-53DW].

[75] *See generally* HANDBOOK OF INTELLIGENCE 3 (Robert J. Sternberg ed., 2000).

[76] *See* OLIVEIRA, *supra* note 65, at 90–91.

[77] *Id.* at 91.

human.[78] Nevertheless, the central focus of AI research has been in determining and mimicking human intelligence.[79] There are countless advancements and techniques that aim to reach the level of human intelligence,[80] such as through the use of pattern recognition, complex communication, and machine learning.[81] However, all of this research and development has led to varying definitions of what qualifies as AI, each of which focus on different attributes that are deemed to be "intelligence."

B. Computer Science Approaches to Artificial Intelligence

Stuart Russell and Peter Norvig outline various definitions of "artificial intelligence" that fall into four categories: acting humanely, thinking humanely, thinking rationally, and acting rationally.[82] The goal of these definitions is to point to the attribute that necessarily signifies intelligence.[83] First, the Turing test is meant to demonstrate that if an AI system is acting human, then it is intelligent. This is an operational definition of "intelligence."[84] While acting humanly may be a sign of intelligence, it is certainly not the only condition.[85] The cognitive modeling approach focuses on whether the machine thinks humanly. Under this approach, intelligence is a product of how humans think, and thus, an artificial intelligence system must match the human-mode of thinking in order to be considered intelligent.[86] Comparatively, thinking rationally involves following the logician tradition of formalizing informal knowledge into logical notation, which is rule following.[87] Finally, the rational agent approach focuses on acting rationally. Under that approach, an agent is one who perceives and acts, and to act rationally is to act "so as to achieve one's goals, given one's beliefs."[88]

These approaches are by no means exclusive of one another, and each approach has its faults and counter arguments as to why the other is not intelli-

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[78] *See generally* RUSSELL & NORVIG, *supra* note 56, at 1–4; JOHN SEARLE, MINDS, BRAINS AND SCIENCE 28–41 (1984); Searle, *supra* note 56, at 417.

[79] *See generally* OLIVEIRA, *supra* note 65, at 87–97.

[80] *Id.* at 94–95.

[81] *See* ERIK BRYNJOLFSSON & ANDREW MCAFEE, THE SECOND MACHINE AGE 17–18, 20, 22 (2014).

[82] *See* RUSSELL & NORVIG, *supra* note 56, at 2–4.

[83] *See id.*

[84] *Id.* at 2.

[85] *See id.* at 3.

[86] *Id.* However, there is still the issue of figuring out how one thinks. Castelfranchi, *supra* note 2, at 298 (noting that in an interview Turing said, "The whole thinking process is still rather mysterious to us, but I believe the attempt to make a thinking machine *will help us greatly in finding out how we think ourselves*.").

[87] *See* RUSSELL & NORVIG, *supra* note 56, at 4.

[88] *See* STUART J. RUSSELL & PETER NORVIG, ARTIFICIAL INTELLIGENCE: A MODERN APPROACH 7 (1st ed. 1995).

gence.[89] Acting humanly can be accomplished by mimicking human responses.[90] Figuring out how we think is difficult, but it seems as if three separate methods of thinking could still reach the level of intelligence.[91] Humans oftentimes do not think rationally.[92] And acting rationally is circular because to act toward goals, one must have beliefs, and to have beliefs one must be intelligent. However, modern AI is based on the rational agent's theory outlined by John von Neumann.[93] Although there is no settled characteristic or mode of intelligence, these definitions highlight what we consider attributes of intelligence, and it is these attributes that legal definition should incorporate.[94] Each of these definitions, whether explicitly stated or not, point to a critical attribute of intelligence: autonomy. Each of these approaches acknowledges autonomy, regardless of which is indicative of intelligence.

C. Autonomy

The most distinct characteristic of intelligence is autonomy.[95] Autonomy is considered to be a condition of thinking.[96] This autonomy allows for the attribution of thinking or intelligence to children and animals, but not machines, as machines just do as they are told.[97] However, as machines are becoming more advanced, AI systems are beginning to exhibit and exercise autonomy—making decisions free from outside input.[98] This is by design, as machine learning systems need to be free from human input, otherwise AI systems simply could not learn or function as intended.[99] To be clear, there was human input in the form of the initial programming, but the purpose of the system is to learn and to provide unprogrammed outputs.

There are multiple benefits to AI machines having autonomy. Humans tend to think in a certain way, a way in which machines may not be bound by. Thus, AI systems are able to come up with unconventional solutions that humans

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[89] *See* RUSSELL & NORVIG, *supra* note 56, at 1–2.

[90] *See id.* at 2.

[91] *Id.* at 3 (describing introspection, psychological experiments, and brain imaging as three separate methods of thinking).

[92] *See id.* at 2 n.1.

[93] Steve Omohundro, *A Turning Point in Artificial Intelligence*, *in* WHAT TO THINK ABOUT MACHINES THAT THINK 12 (John Brockman ed., 2015).

[94] *See* Scherer, *supra* note 5, at 360. The legal field need not, and probably should not, be the one that determines what approach is the most indicative of intelligence. What matters is that when creating a statutory definition, for any word or phrase, that the definition is as accurate and functional as it needs it be.

[95] *Id.* at 363.

[96] *See* Castelfranchi, *supra* note 2, at 298.

[97] *Id.*

[98] Torben Friehe, *How Much Autonomy Is Too Much for AI?*, NEXT WEB (Nov. 18, 2017), https://thenextweb.com/contributors/2017/11/18/much-autonomy-much-ai/ [https://perma.cc/TEW3-JSBK].

[99] *Id.*; Murphy, *supra* note 35; Vincent, *supra* note 2.

cannot come up with.[100] Currently, AI machines acting unpredictably means that they design something in a unique way or that they perform an unexpected move in chess or Go.[101] In the future, however, AI systems' unpredictability will be able to come up with solutions not only to problems we cannot solve, but also to problems we are not even aware of, and this will happen more frequently.[102] This is one of the major appeals of these types of systems: the ability to learn and surpass our problem-solving abilities.[103] Therefore, we need AI systems to have some autonomy, which makes the distinction between autonomous decision making systems and non-autonomous systems even more critical.

Yet, with AI systems acting autonomously, there is going to be a question about control.[104] Building autonomous AI is the goal, which means that developers could lose control of the systems they create.[105] Of course developers are the ones who program the objectives of the system; however, objectives could be vague or ambiguous and the AI system could use undesirable means to carry out that objective.[106] Moreover, AI systems might not want to give up control.[107] These are a few potential considerations that highlight the distinction between systems capable of making their own decisions and other systems that function in prescribed parameters. Because of the potential problems, it is important to distinguish between autonomous and non-autonomous AI.

D. Strong AI & Weak AI

There is a helpful distinction from the field of philosophy of mind that sheds light on this difficult concept: strong AI and weak AI. Although, it should be mentioned that like most, if not all, philosophical theories, there are people who disagree. However, this distinction is useful for semantic and pragmatic purposes. Weak AI is the concept that whatever the program is meant to do, it is merely trying to replicate or duplicate that function, and for most tasks that is sufficient.[108] Whereas strong AI is an actual instantiation of that thing, which in this case is intelligence.[109] Simply put, weak AI simulates, whereas strong AI just is.

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100 *See* Scherer, *supra* note 5, at 365.

101 *Id.*; Nature Video, *supra* note 39.

102 *See* Scherer, *supra* note 5, at 365 ("The AI's solution thus may not have been foreseeable to a human—even the human that designed the AI . . . . AI behavior will crop up with increasing frequency and that the unexpectedness of AI behavior will rise significantly.").

103 *Id.*

104 *Id.* at 366; *see also* Friehe, *supra* note 98.

105 *See* Scherer, *supra* note 5, at 367.

106 *Id.*

107 *Id.* at 368.

108 Searle, *supra* note 56, at 417.

109 *Id.*

Weak AI is nothing new, it is the simulation of decision making. For example, the system that beat Kasparov at chess was calculating the best possible outcomes and making moves according to an algorithm.[110] Here, we can say that the system was imitating intelligence by "thinking" about which move to make and then making it.[111] The system is actually playing chess, but it is not actually thinking or deliberating about which move to make like people might.[112] This is far different than strong AI, which is closer to decision making based on intelligence. Google's Deepmind system utilizes machine learning to learn from experience and makes autonomous decisions much like what we consider intelligence.[113] Thus, it is strong AI, or at least close.[114]

There are a lot of questions about how fine the line is between strong AI and weak AI, as well as questions about what qualifies as either form and how we would know. But this distinction still highlights an important and useful difference. Colloquially, our typical use of the phrase "artificial intelligence" does not differentiate between strong AI and weak AI, and the two are conflated and treated equally,[115] which could mean equal legal treatment. This distinction matters because there is a difference in autonomy, which could result in unequal legal treatment. An analogous legal example would be the difference between treatment of a minor and of an adult. Parents can be liable for the actions of their minor children, whereas parents are not liable for the actions of their adult children.[116] Or, in the case of criminal justice, minors are usually given lesser sentences than adults.[117] Similarly, weak AI systems (i.e., systems where the developer has control) would make the developer liable just as a parent would be liable for the actions of a minor. Whereas strong AI may be treated as an adult, weak AI would be treated as a minor. To be clear, strict liability may be the best solution for both strong AI and weak AI, but the distinction is still helpful. We would still need the distinction between adults and minors even if parents were strictly liable for their children. Therefore, my argument is that we need a legal definition that both separates the weak AI and strong AI, regardless of whether the legal system treats them similarly or differently.

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110 Kasparov, *supra* note 36.

111 *See* Murphy, *supra* note 35.

112 This would be the "thinking humanly." *See* RUSSELL & NORVIG, *supra* note 56, at 3.

113 James Vincent, *DeepMind's Go-Playing AI Doesn't Need Human Help to Beat Us Anymore*, VERGE (Oct. 18, 2017, 1:00 PM), https://www.theverge.com/2017/10/18/16495548/deepmind-ai-go-alphago-zero-self-taught [https://perma.cc/RD2Y-Q3RF].

114 It may be difficult to tell when the hard AI threshold met, yet that does not undermine that the distinction is still there. If there is a legal difference, say in liability, between strong AI and weak AI, this threshold question will become significant as attorneys will argue for the one that best suits them.

115 *See* Vincent, *supra* note 2; *see also* discussion *supra* Part I.

116 *See* Larry Cunningham, *A Question of Capacity: Towards a Comprehensive and Consistent Vision of Children and Their Status under Law*, 10 U.C. DAVIS J. JUV. L. & POL'Y 275, 321, 333 (2006); Arthur T. Spence, *Parental Liability*, 309 INS. L.J. 787, 788 (1948).

117 Cunningham, *supra* note 116, at 277, 279.

This section covered several fundamental conceptions and attributes of AI, which in our current usage may or may not be part of what people mean when they say "artificial intelligence." The strong AI/weak AI distinction is useful in teasing out one conception of AI from another: complex algorithmic systems and systems that exhibit autonomous intelligence and decision making. Defining strong AI will necessarily define weak AI because setting parameters for the former will exclude the latter. Many jurisdictions already incorporate weak AI in their statutes because it often falls under computer codes, programs, software, or algorithms, and thus, is already covered by some definition or provision if necessary.[118] However, because of the fundamental difference between strong AI and weak AI, a distinct legal definition is needed for strong AI. Thus, the distinction and attributes mentioned above should be considered when formulating a legal definition.

III. CURRENT STATE OF AI DEFINITIONS

Some jurisdictions that have been proactive and have defined AI in one form other another.[119] However, these definitions either lack a fundamental understanding or are entirely too broad as to provide any help at all. Furthermore, if a jurisdiction even has a definition it will likely limit the definition to specific contexts.[120] There are many different places where a lawyer or judge can look to for guidance when attempting to discern if a system qualifies as AI. A dictionary is a common source,[121] as well as statutes from other jurisdictions;[122] so, it can be useful to look at other sources to determine how other jurisdictions are currently defining artificial intelligence.

A. Black's Law Dictionary

Black's Law Dictionary is a commonly referred to source of terms and definitions. The definition of artificial intelligence in Black's Law Dictionary is "software used to make computers and robots work better than humans. The systems are rule based or neutral networks. It is used to help make new products, robotics, human language understanding, and computer vision."[123] Significant problems exist with this definition, which run contrary to understanding what AI is considered today, especially when juxtaposed with machine learn-

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118 *See* sources cited *supra* note 8.

119 *See supra* Part III.

120 *See supra* Part III; *see also* NEV. REV. STAT. § 482A.020 (repealed 2013) (limiting the definition to autonomous vehicles).

121 *See Artificial Intelligence*, MERRIAM-WEBSTER, https://www.merriam-webster.com/dictionary/artificial%20intelligence?utm_campaign=sd&utm_medium=serp&utm_source=jsonld [https://perma.cc/ZM9X-EAKG] (last visited Mar. 15, 2019) (defining artificial intelligence as "the capability of a machine to imitate intelligent human behavior").

122 *See infra* Sections III.B–III.C.

123 *Artificial Intelligence*, THE LAW DICTIONARY, https://thelawdictionary.org/artificial-intelligence/ [https://perma.cc/5BPN-YBTE] (last visited Mar. 15, 2019).

ing.[124] However, this definition limits AI to only two forms: rule based or neural networks.[125] So, for something to qualify as AI under the first two prongs, it: (1) must be software, which does not seem controversial, although what qualifies as software might carry with it a loaded meaning or ambiguity;[126] and (2) the systems must be rule based or neural networks.[127] While this is a good start that provides some guidance, the latter part of the definition is unhelpful.

Black's characterizes AI as a tool, which in and of itself is not wrong. The primary focus of development is to better our lives or to become more efficient in some way. However, when contrasted to what we currently call "tools," such as hammers, books, or Westlaw, these tools seem incomparable to a software that acts on its own. It would be wrong to say that there are not autonomous tools in some form (e.g., automated factories), but there is a difference between following pre-registered actions to construct a car and learning to make better autonomous decisions on what stock to invest in.[128] Put another way, it does not seem like a tool if it is doing the entire job on its own. In addition, the latter part of the definition is just too broad. It includes digital watches because those are better than people at tracking time and are rule-based software. But digital watches are far from AI. It is the last part of the definition which confuses and misleads.

The phrase "used to help make new products, robotics, human language understanding, and computer vision," is also problematic as it makes it seem as if the point of AI is limited to these things. This definition binds the qualification to just these few uses. This is problematic because AI's uses are by no means limited, and thus, the definition focuses on narrow uses. Primarily, this definition ignores the autonomy. These are just a few of the many problems that arise out of this definition. While Black's Law Dictionary is neither a statute nor binding precedent, it is a common tool used by the legal community and could be a place that lawyers, judges, or policy makers may look to for guidance; however, in this case, that guidance is unsatisfactory.

B. Nevada

Nevada does not have a standalone definition for AI, but they did attempt to define it in terms of a specific application: autonomous vehicles.[129] While this statute was ultimately repealed, it demonstrates both an approach to defining AI, and a significant modern development in AI that states will have to con-

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[124] *See* discussion *supra* Part I.

[125] *See Artificial Intelligence*, *supra* note 123.

[126] *Software*, BLACK'S LAW DICTIONARY (10th ed. 2014). We tend to think of software as non-autonomous and self-driving cars are more than just software.

[127] *See Artificial Intelligence*, *supra* note 123.

[128] *AI News: Artificial Intelligence Trends and Leading Stocks*, INV. BUS. DAILY, https://www.investors.com/news/technology/ai-news-artificial-intelligence-trends-and-leading-stocks/ [https://perma.cc/8WQL-AZRL] (last updated Feb. 25, 2019).

[129] NEV. REV. STAT. § 482A.020 (repealed 2013).

front. The Nevada statute states, "'Artificial intelligence' means the use of computers and related equipment to enable a machine to duplicate or mimic the behavior of human beings."[130] While this definition seems overly broad, the definition only applies to self-driving vehicles, which narrows its scope. This narrowing is not necessarily bad, but it does require the existence of definitions for each application, which could be problematic with the increasing uses of AI.

While this definition conflates strong AI and weak AI (i.e., it treats autonomous AI the same as rule-based systems), it does so for good reason. Because driving is such a complicated task that requires numerous capabilities happening simultaneously, there are countless systems working together to create one AI machine capable of driving.[131] These machines are performing the innumerable functions and making the necessary perceptions and decisions required for driving: perceiving everything in sight such as cars, bikers, signs, etc.; utilizing the motor skills involved, such as accelerating, steering, braking, or shifting gears; and engaging in the cognitive functions that go into navigating, knowing when to stop, or changing lanes. Driving is far more complex than analyzing data, making probable predictions, and making decisions based on those predictions. Every task involved in driving a car needs to be broken down into smaller, more manageable systems.

The process is broken into subparts for each AI system to control and then put them together to create a self-driving car.[132] This is an explanation as to why Nevada's definition is very broad. "The use of computers and related equipment" does not outline a very clear list or necessary conditions to qualify.[133] AI, under this definition, would include even the small things, such as a text-to-speech systems for GPS. The overbreadth is not a bad thing in this context because of how goal- and function-oriented the definition is. The goal is to have driver-less cars that can function as if a person was doing the operation, and the systems or software needed to accomplish such a task is necessarily included in the definition. This definition can be broad because it is already confined by the scope of what statute it is defined under.

Therefore, while this definition may work for this specific purpose, it does not provide a lot of guidance on how to define AI generally. Because of the complexity of autonomous vehicles, the AI involved is on multiple levels and that create an AI system overall. Here, the autonomy is built into the function. So, while it may be difficult to pinpoint which system inside this conglomerate

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130 *Id.*

131 Ashish, *Autonomous Cars and Artificial Intelligence (AI)*, CODEMENTOR (July 30, 2017), https://www.codementor.io/ashish1dev/autonomous-cars-and-artificial-intelligence-ai-adzk2yk4x [https://perma.cc/XP3R-F69G]; Chris Giarratana, *How AI is Driving the Future of Autonomous Cars*, READWRITE (Dec. 20, 2016), https://readwrite.com/2016/12/20/ai-driving-future-autonomous-cars-tl4/ [https://perma.cc/B5SE-X9PL].

132 *See* Giarratana, *supra* note 131.

133 NEV. REV. STAT. § 482A.020 (repealed 2013).

system is truly autonomous, from one end being the air-conditioning system to the other end being the system navigation, we would call the whole thing "autonomous." Thus, the generality in which "AI" is defined is excusable because the goal is to create a composite system within the context and scope of the statute.

C. Louisiana

A Louisiana statute focuses on defining "electronic agents" in regards to autonomation, but notably, an annotation for this statute contemplates the future developments of AI and how there could be a relevant distinction between weak AI and strong AI.[134] Under Louisiana's property, contracts, and financial services code, Louisiana law accounts for electronic commerce and the electronic agents that could be used to carry out such transactions.[135] The Louisiana Uniform Electronic Transaction Act includes an annotation demarcating between different types of electronic agents:

> 5. "Electronic agent."
> (a) This definition establishes that an electronic agent is a machine. As the term is used in this Chapter, it is limited to the function of a tool. The effect on the party using the agent is addressed in the operative provisions of this Chapter (e.g., Section 2614).
> (b) An electronic agent, such as a computer program or other automated means employed by a person, is a tool of that person. As a general rule, the employer of a tool is responsible for the results obtained by the use of that tool since the tool has no independent volition of its own. However, an electronic agent, by definition, is capable within the parameters of its programming, of initiating, responding or interacting with other parties or their electronic agents once it has been activated by a party, without further attention of that party.
> (c) While this Chapter presupposes that an electronic agent is capable of performing only within the technical strictures of its preset programming, it is conceivable that in the future, electronic agents may be created with the ability to act autonomously, and not just automatically. That is, through developments in artificial intelligence, a computer may be able to "learn through experience, modify the instructions in their own programs, and even devise new instructions." If these developments occur, the courts may construe the definition of electronic agent accordingly, to recognize such new capabilities.[136]

This statute's annotation articulates the differences between weak and strong AI. The former is explained in sections (a) and (b) as nothing more than a tool, and such, that tool is confined to its functions outlined by its programming parameters.[137] The annotation goes as far as to assign liability to the user of the computer, even if the computer communicates with other parties or

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134 LA. STAT. ANN. § 9:2602 (2018).
135 *Id.*
136 *Id.*
137 *Id.*

agents autonomously.[138] Here, the statute recognizes the difference between automation and autonomy even though in this circumstance they go hand in hand, yet the user is still liable because the program is acting within its own parameters. However, the annotations go one step further and acknowledge strong AI as a possibility.

Section (c) recognizes that AI can learn and develop as it has experiences, exhibiting functions of machine learning.[139] Furthermore, the annotation categorizes AI as something that can devise new instructions and change its own programing, further highlighting the similarities between human and AI.[140] The Louisiana statute also explicitly states that it may need to modify this statute as technology advances, demonstrating how this technology might evolve.[141] This statute denotes legislative intent for how to qualify computer agents as either strong AI or weak AI machines. This definition is at least on the right track, although it might still run into the same problem present within the Nevada statute as only being applicable to a specific context.

Although these examples are not all of the definitions out there, they provide a good lay of the land. Definitions can either be overly broad and include a wide array of systems, or they can be field specific and define AI for a specific application. The difference in approach can lead to different problems. Creating a definition for each application is burdensome and will nevertheless skirt the issue of defining AI. With the ever-expanding applications of AI, each field or subset of laws will need to include a definition for AI for that particular use. However, if jurisdictions wish to define AI specifically for each application, then every new application still begs the question, "does this specific instance qualify as 'AI'?" While this is not necessarily problematic, it is certainly cumbersome and frustrating. A general definition for AI can be applied across the board to all fields if written properly.

IV. METHODS FOR WRITING A GENERAL DEFINITION

Creating a functioning legal definition is difficult enough, but there is the added issue of who should determine definitions and regulations—the courts, legislature, or other government agencies?[142] As Justice Alito mentioned, the legislature might have done the research and formulated a particular law or definition, so they might be in a good position for their given circumstances.[143] As mentioned above, Nevada's legislature only sought fit, at least at the moment, to define AI in terms of its function in self-driving cars.[144] Statutes can be

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138 *Id.*

139 *Id.*; *see also* Vincent, *supra* note 2.

140 *See* discussion *supra* Parts I–II.

141 LA. STAT. ANN. § 9:2602 (2018).

142 *See* Scherer, *supra* note 5, at 356.

143 *See* Brown v. Entm't Merchs. Ass'n, 564 U.S. 786, 806 (2011) (Alito, J., concurring).

144 *See supra* Section III.B.

preemptory or reactionary, but nonetheless, policy makers need to understand AI, specifically strong AI. Without comprehension there cannot be a sufficient legal definition.[145] Furthermore, this requires understanding how "AI" functions as a phrase to be able to define it pragmatically.

Despite the common use of words or phrases, "shared words need not have shared meanings," and "legal systems can ascribe whatever meaning(s) they desire to the words that they borrow, inherit, or invent."[146] Although the words "artificial intelligence" are shared words, they do not have a shared meaning. Part of the legislature's and judiciary's role is to define the "meanings of words to reflect the unique priorities, preferences, and goals of a judicial, political, or social system."[147] These goals might include legal regulation or economic considerations that will certainly arise.[148] For certain words, it is possible to discern a common meaning from its variant meanings;[149] however, because "AI's" meaning is all over the place, a common meaning is difficult to discern, and perhaps unnecessary.[150] "Traffic," for instance, is an ordinary term that has a couple definitions, but 18 U.S.C § 2320 defines it purposely for the section.[151] This is standard—codes and acts are going to have these definitions out of necessity.[152] Thus, stipulating a definition can rid "AI" of the ambiguity in which the phrase is used.

Ridding terms of ambiguity is essential because terms have functions and effects.[153] The major function is to tell people what a term or phrase means in particular contexts, or put simply, to clarify.[154] However, the second function is to empower, or to give a particular status to something or someone.[155] These

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[145] *See supra* Parts I–II.

[146] Thomas O. Main, *The Word Commons and Foreign Laws*, 46 CORNELL INT'L L.J. 219, 222, 225 (2013) ("Because words have more than one meaning, we can discern from those variant meanings what we might call a common meaning.").

[147] *Id.* at 222.

[148] *See id.* at 219; *see also* discussion *supra* Part I.

[149] *See* Main, *supra* note 146, at 222.

[150] *See* Price, *supra* note 11, at 1005–06 ("But other definitions of familiar but context-dependent terms impose unexpected restrictions on the scope of word meaning.").

[151] 18 U.S.C. § 2320(f)(5) (2012) ("[T]he term 'traffic' means to transport, transfer, or otherwise dispose of, to another, for purposes of commercial advantage or private financial gain, or to make, import, export, obtain control of, or possess, with intent to so transport, transfer, or otherwise dispose of"). In this example, "traffic" is used in a sense far different than "traffic violation." 49 U.S.C. § 31301 (2012). This is similar to how AI was defined for autonomous cars. *See* Section III.B.

[152] *See* Section III.B.

[153] *See* Price, *supra* note 11, at 1026–51.

[154] *Id.* at 1026 ("Statutory definitions even more emphatically illustrate the two levels on which legal language operates. On the one hand, statutory definitions tell us what terms mean in particular contexts; they are meant to clarify the message conveyed by the legislature in the statute's normative clauses.").

[155] *Id.* at 1027 ("On the other hand, legislative definitions can also empower; they may confer a particular status on individuals, entities, or situations, and invest those agents and states of affairs with obligations, benefits, privileges, and rights.").

two functions are critical for understanding how "AI" should be statutorily defined. The particular issue when keeping such functions in mind is that "our language is built by its speakers," and so meanings change overtime as people use terms.[156] Compare how AI was being used to play chess as opposed to where AI is now—no longer following an algorithm but making its own decisions.[157] Another reason for clarity and precision in statutory definitions is due process.[158] A law must be clear enough to be easily understandable by every citizen to ensure it is just,[159] and with the conflation of different types of systems, it could be difficult to identify one's legal status, responsibility, or exposure. Hence, it is all about proving context to eradicate ambiguity,[160] and there is plenty of ambiguity in technology, let alone with intelligent systems.

Altogether, defining terms without a valid and well-identified intention risks complication.[161] "[D]efinition[s] can provide information and direction on how a particular term is to be understood."[162] No matter the purpose, definitions ought to be simple and succinct.[163] The defining process is never complete, and unforeseen situations and changes are inevitable. Thus, it is especially important to devise cogent definitions for terms which describe subjects that are continuously evolving.[164] Even if there is no static definition for AI, "it ought to simplify clarify the legislative intention."[165] The determination must be made whether it is a prescriptive or descriptive definition, in order to determine the definition's scope. Thus, it is critical for the judiciary and legislative branches to formulate the definition specific.

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[156] *Id.* at 1031 ("Underlying nearly all discussions of language and communication is the idea of community. Our language is built by its speakers."); *see also* Peter R.A. Gray, *The Language of Statutes: Laws and Their Interpretation: Lawrence M. Solan (2010)*, 19 INT'L J. SPEECH, LANGUAGE & L. 135, 139 (2012) (book review).

[157] *See* Section II.A–II.C.

[158] *See* Price, *supra* note 11, at 1031 ("Due process considerations certainly require that generally applicable statutes should have a meaning that is clear 'enough' to those to whom it applies.").

[159] *Id.*

[160] *Id.* ("Context's role in clarifying meaning is obvious: context allows disambiguation . . . .").

[161] *Id.* at 1051 ("Defining without a valid and well-identified purpose risks complicating the statute and creating the potential for unforeseen questions unrelated to the statute's purpose.").

[162] *Id.* at 1052.

[163] *Id.* ("No matter what purposes it serves, however, the definition ought to be simple and succinct in its statement.").

[164] *Id.* at 1053 ("[T]he legislative drafter would do well to realize that definition is a process that is always incomplete.").

[165] *Id.*

A. Ambiguity & Descriptors

Statutes commonly define ordinary terms that could be ambiguous.[166] In "Wagging, Not Barking: Statutory Definitions," by Jeanine Frazier Price, Professor Price outlines two modes of defining terms: ambiguous terms and descriptor terms,[167] both of which are applicable to artificial intelligence. Ambiguous terms, such as "artificial intelligence," have a scope issue, and the point of a statutory definition is to pick out or stipulate which of the many definitions apply.[168] However, when a term functions as descriptor, it refers to a group or set that shares well-recognized characteristics (for example, "child" does not pick out one thing, but rather a group that resembles one another).[169] This distinction between ambiguous types and descriptor types is important. Ambiguous terms have one referent. Conversely, descriptor terms have more than one referent sharing common characteristics, rather than the term itself.[170]

Applying this distinction to "artificial intelligence" is critical because it either has one referent, what artificial intelligence actually is, or the shared characteristics for everything called "artificial intelligence." Though the latter still requires those characteristics to be defined, it can explain why many different things are commonly referred to as "artificial intelligence." However, there are ways to attempt to define these types of terms.[171] One option for a definition is to list what is included in the scope.[172] For example, "livestock" is defined as "cattle, swine, and lambs."[173] This mode of defining is helpful in outlining what specifically falls under a given definition. Here, the definition has the option of listing off systems, software, programs, or modes of computer functions that qualify as "artificial intelligence." This would be a descriptive definition, as opposed to a prescriptive definition that focuses on key characteristics or features that are present in all artificial systems. Both methods can be suitable for defining artificial intelligence so long as the drafters have an understanding of the characteristics of artificial intelligence, and the distinction between strong AI and weak AI.

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166 *Id.* at 1005 ("Sometimes those definitions clarify what sense of the word is intended, and place limits on the term's application for purposes of the statute.").

167 *Id.* at 1006–07.

168 *Id.* at 1005–07; *see also* discussion *supra* Parts I–II.

169 *See* Price, *supra* note 11, at 1007.

170 *See id.*

171 *See id.* at 1010–11.

172 *See id.* at 1010.

173 *See* 7 U.S.C. § 1635a (5) (2012).

B. Descriptive Definition

Descriptive definitions describe a term in a way that typically reflects "the actual use of [the] word or phrase."[174] The list could include radically different things, but they are unified by common characteristics. For example, "nuclear science" is defined as including "(1) nuclear science; (2) nuclear engineering; (3) nuclear chemistry; (4) radio chemistry; and (5) health physics."[175] It is pretty obvious by this definition that health physics is different than nuclear engineering. Price argues that descriptive definitions create "fuzzy categories" in which they are not bound by necessary or sufficient conditions, but rather by the closeness of resemblance to the original instance.[176] So for AI, this categorical approach allows for its definitions to have loose conditions based on common characteristics.[177] Thus, a descriptive definition for artificial intelligence would be a list of several uses of artificial intelligence, such as machine learning, natural language, virtual agents, and reactive machines.[178]

For example, "artificial intelligence includes (1) Reactive machines, (2) Limited Memory machines, (3) Theory of Mind systems, and (4) Self-awareness systems, or include other systems that utilize autonomous deep learning." This definition would rely on the current scientific consensus of the existing types of AI systems, and the current existing types may not consider certain attributes. This is not inherently problematic, but it creates equality between different systems that have contrasting functions and different levels of autonomy.

Furthermore, this method has a few problems. One major problem is that this method shifts to the debate to which systems count as AI systems. Second, the "fuzzy category" allows for argumentation, which may not necessarily be a bad thing, but it is less definitive. Although this might complicate the legislature's work, it does allow for there to be a clear distinction between strong AI and weak AI, and thus, this method has some merit.

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[174] Price, *supra* note 11, at 1010–11 ("Descriptive definitions, not surprisingly, describe the meaning of a term. And, that description usually reflects or depends upon the actual use of a word or phrase, although the definition itself may enlarge or contract ordinary usage.").

[175] 42 U.S.C. § 16532 (2012).

[176] Price, *supra* note 11, at 1011 ("Descriptive definitions often depict either a cluster of attributes of what is defined or typical uses of the term.").

[177] *Id.* ("That definition could encompass radically different objects and instances . . . but each of those instances share some characteristics . . .").

[178] Arend Hintze, *Understanding the Four Types of Artificial Intelligence*, GOV'T TECH. (Nov. 14, 2016), http://www.govtech.com/computing/Understanding-the-Four-Types-of-Artificial-Intelligence.html [https://perma.cc/WT6R-LC64]; *see also* RUSSELL & NORVIG, *supra* note 56, at 2–3.

C. Prescriptive Definition

Comparatively, prescriptive definitions can outline a set of necessary conditions that must be satisfied to fall within the scope of the definition.[179] For example, the definition of "aircraft" outlines necessary conditions that must all be satisfied in order to be an aircraft: it must be "a civil, military, or public contrivance invented, used, or designed to navigate, fly, or travel in the air."[180] This definition outlines several necessary conditions that must be satisfied to qualify as an aircraft, albeit with multiple ways to satisfy each condition. Prescriptive definitions are precise but rely on the designation of essential characteristics, which can establish features that distinguish members of the set.[181]

Artificial intelligence would then be defined by its characteristics (such as those mentioned above) and could specifically outline two separate definitions for strong AI and weak AI.[182] Using this method, a definition for strong AI might look like: "artificial intelligence is a system, program, software, or algorithm that acts autonomously to think rationally, think humanely, act rationally, act humanely, make decisions, or provide outputs."[183] To change this definition to a weak AI definition, the words "acts autonomously" can be substituted for something similar such as "follows instructions." This method allows for a definition with some flexibility to include various or key characteristics; however, the list relies on determining the appropriate set of characteristics.

These two methods offer different benefits for the term or phrase in question.[184] For terms with multiple meanings, descriptive definitions can specify which sense applies, but this can change the meaning by what is included or excluded.[185] The definition is going to be under-or over-inclusive,[186] and this creates an additional consideration when determining whether prescriptive or descriptive methods should be used.[187] Clearly these are not the only two methods of creating statutory definitions, but they are two methods that are conducive to defining complex terms. Either of these methods accomplish the goal of subjecting the definition of "AI" to normative rules,[188] and having a precise

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[179] *See* Price, *supra* note 11, at 1012 ("Prescriptive definitions may consist of a set of conditions, compliance with each one of which is necessary to fall within the definition's scope . . . .").

[180] 18 U.S.C § 31(a)(1) (2012).

[181] *See* Price, *supra* note 11, at 1013 ("They may assign meaning to a term by designating a broader class and then establishing features that distinguish members of the defined term.").

[182] *See id.* at 1009–13.

[183] *See supra* Section II.A–II.B.

[184] *See* Price, *supra* note 11, at 1013–15.

[185] *Id.* at 1015 ("For terms of many meanings, descriptive definitions can quickly and efficiently indicate which sense of the word or phrase applies.").

[186] *See* Scherer, *supra* note 5, at 373.

[187] *See* Price, *supra* note 11, at 1010–17.

[188] *Id.* at 1018 ("Falling within a statutory definition results in becoming subject to normative rules.").

definition can narrow uncertainty as well as promote predictability.[189] Either of these methods can accomplish the goal of removing ambiguity and making a statutory distinction between strong AI and weak AI. Thus, the definition can account for the unique characteristics of a new technology.

CONCLUSION

Despite the lack of consensus as to what artificial intelligence is, it is being developed at an alarming rate and will without a doubt be one of the world's most significant developments.[190] There is going to be a legal vacuum within the next decade or two where courts and legislatures will struggle to get a handle on how to deal with AI.[191] Rather than being reactive, courts, legislatures, or any legal body for that matter, will be better off navigating these new waters with some guidance from a statutory definition.

However, these new waters are going to be best traversed if we understand the distinction between autonomous systems and systems following a given algorithm or specified procedure. Current definitions only seem to regulate and portray an understanding of weak AI. Typically, because technological advancements are unforeseeable to a certain extent, and because most regulations are put in place after problems arise, definitions clarifying these advancements will come after. But with AI, the advancement—at least to the development of autonomy—is foreseeable. This autonomy will accelerate the development of AI and autonomy at a staggering rate.[192]

We will greatly benefit from systems that are able to operate outside of our input and free from our human biases. Artificial intelligence will undoubtedly move in the direction of autonomy exclusive of humans because computers are just better at making decisions than people.[193] Of course arguments can be made about whether or not these decisions should be left to machines; however, with proper regulation and statutory guidelines, we can at least understand how the current technology is different than past technology. Nevertheless, people will happily allow an AI system to diagnose them if it means surviving, or happily embrace an investment system able to make them money. Companies are

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189 *See* REED DICKERSON, THE FUNDAMENTALS OF LEGAL DRAFTING 145 (2d ed. 1986).

190 *See supra* Part I.

191 *See* Scherer, *supra* note 5, at 391–92.

192 Louis Columbus, *10 Charts That Will Change Your Perspective on Artificial Intelligence's Growth*, FORBES (Jan. 12, 2018, 1:55 AM), https://www.forbes.com/sites/louiscolumbus/2018/01/12/10-charts-that-will-change-your-perspective-on-artificial-intelligences-growth/#ed8f65947583 [https://perma.cc/TKH5-6QDU]; *The Evolution of Artificial Intelligence: AI's Coming of Age*, UBS, https://www.ubs.com/microsites/artificial-intelligence/en/ai-coming-age.html [https://perma.cc/9R9A-YNGF] (last visited Mar. 16, 2019); *see also supra* Parts I–II.

193 Lance Whitney, *Are Computers Already Smarter Than Humans?*, TIME (Sept. 29, 2017), http://time.com/4960778/computers-smarter-than-humans/ [https://perma.cc/7FJU-6UAB]; *see also supra* Part I.

already investing billions of dollars in this industry, and rather than being reactive to the situations and consequences that arise, it is far better to be prepared for the inevitable legal, legislative, and judiciary discussions to come. One way to do this is by having a legal definition for "AI" to untangle the current ubiquitous use of the phrase now.

The definition needs to make clear the distinction between strong AI and weak AI, as different legal questions arise out of the distinction.[194] These definitions can be done for particular applications, such as the Nevada statute for driverless cars.[195] However, a general definition that could be applied across multiple applications could be beneficial so long as the distinction between strong AI and weak AI is understood, even if they end up being treated similarly. Nevertheless, the definitions need to be flexible because of expansive and innumerable ways in which artificial intelligence can be utilized.[196] The meanings of words are determined by use,[197] and one word can have multiple meanings; further, meanings can change over time.[198] "Artificial intelligence" already has a lot of uses, and it is necessary for the legal field to stipulate a workable definition in order to save itself time and resources. "New ideas and concepts spawn new words,"[199] and AI is a field that will undergo rapid and exponential advancement, even beyond what we can consider now. This is why there needs to be language in place to handle this influx. However, ambiguity and vagueness are inescapable; so, a definition must be revisited whenever necessary, and specifically with this type of advancement, revising the language should happen often.[200] Because cases can turn on the definition of a term, courts need to settle on a definition and give it legal weight and authority.[201] I have offered some examples of definitions, and I do not pretend to think they are anywhere near perfect; however, they demonstrate how one could write definitions that can account for autonomous machines.

Once again, I am not saying that the law needs to treat strong AI and weak AI differently, just that the distinction needs to be understood because they are in fact very distinct from one another. To go back to the parent-child analogy, we legally treat minors differently than adults.[202] It did not have to be this way, there could be a world where minors are just as legally accountable as adults, but we understand how minors, and if taken to the extreme, how babies, are not

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194 *See* discussion *supra* Section II.D.

195 *See supra* Section III.B.

196 *See* discussion *supra* Parts I, IV.

197 Main, *supra* note 146, at 228 ("These terms are defined so that we can use them in later parts to explore the overlap and interaction of meanings that result when different legal systems use the same words.").

198 *Id.* at 230–31.

199 *Id.* at 231.

200 *See id.* at 234.

201 *Id.* at 233–34 ("Social conventions recognize and accept judicial authority to declare the meaning of words, albeit for a limited purpose and for a particular discourse community.").

202 *See* Cunningham, *supra* note 116, at 277–78.

autonomous, and thus we should treat them differently. We could only do this if we understand the difference in intelligence between someone who is adult and someone who is a minor. The United States draws its line in the sand at 18 years of age, and I draw the line in the sand at autonomy.[203]

An upcoming machine age is on its way and it will be led by AI.[204] This technology will change the world, and that means the legal profession should be ready and prepared to account for those changes. There are two outcomes from AI, a utopian one and a dystopian one.[205] Either the plot of *Terminator* unfolds, or we learn to live with machines and respect their artificial capacities.[206] Depending on our understanding and capabilities to deal with AI, legal or otherwise, we can hope to achieve the better of the two outcomes.

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[203] I understand that my line is not a bright red one, but I think that could have its benefits and allow for some malleability, just as sometimes the United States charges children as adults. *See* Nicole Scialabba, *Should Juveniles Be Changed as Adults in the Criminal Justice System?*, A.B.A. (Oct. 3, 2016), https://www.americanbar.org/groups/litigation/committees/childrens-rights/articles/2016/should-juveniles-be-charged-as-adults.html [https://perma.cc/2SY5-B2JC].

[204] *See* BRYNJOLFSSON & MCAFEE, *supra* note 81, at 256.

[205] *Id.* at 254.

[206] *Id.* at 255.

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