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By
Cole Dorsey*

I. INTRODUCTION

Artificial intelligence ("AI") has infiltrated popular culture, most notably with the seminal 1990's blockbuster franchise, *The Matrix*. More recently, a Netflix sci-fi series, *Black Mirror,* explored an AI-dominated future. People communicate with dead loved ones, and death offers a digital afterlife guarantee.[1] These depictions of AI in the future are dramatizations that, while theoretically possible, are unlikely to be developed in our lifetime. However, artificial intelligence is rapidly evolving today in more practical areas of society, like manufacturing.[2] A wide array of manufacturing jobs are set to disappear in the next twenty years due to artificial intelligence.[3] With AI related investments well into the billions, other industries like transport, healthcare, marketing, and finance will see AI related changes in the near future.[4] AI has proved more than capable in areas ranging from medical imaging analysis to self-driving cars. In medical imaging, AI has shown "impressive accuracy and sensitivity in the identification of imaging abnormalities and promises to enhance tissue-based detection and characterization."[5] But does artificial intelligence have a place in the inherently human process of arbitration?

Predictive coding, a type of artificial intelligence ("AI"), is a tool being implemented in international arbitration.[6] Within the context of arbitration, predictive

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1. *Black Mirror* (Channel 4 and Netflix).

2. *The Impact of AI in Manufactoring*, JABIL (last visited April 26, 2021) https://www.jabil.com/blog/artificial-intelligence-in-manufacturing.html; *see also* Louis Columbus, *10 Ways AI is Improving Manufactoring in 2020*, FORBES (May 18, 2020), https://www.forbes.com/sites/louiscolumbus/2020/05/18/10-ways-ai-is-improving-manufacturing-in-2020/.

3. Oxford Economics estimates up to 20 million manufacturing jobs will be eliminated by 2030 due to automation. *How Robots Change the World,* OXFORD ECONOMICS (June 2019).

4. *The Future of AI: Industries that will be Most Effected*, GETSMARTER (Feb. 14, 2019), https://www.getsmarter.com/blog/market-trends/the-future-of-ai-4-industries-that-will-be-most-affected/.

5. Ohad Oren et al., *Artificial Intelligence in Medical Imaging: Switching from Radiographic Pathological Data to Clinically Meaningful Endpoints*, 2 THE LANCET DIGITAL HEALTH, 486, 486 (2020).

6. Claire Morel de Westgaver, Olivia Turner, *Artificial Intelligence, A Driver For Efficiency In International Arbitration – How Predictive Coding Can Change Document Production*, KLUWER ARB. BLOG (Feb. 23, 2020) http://arbitrationblog.kluwerarbitration.com/2020/02/23/artificial-intelligence-a-driver-for-efficiency-in-international-arbitration-how-predictive-coding-can-change-document-production/.

coding is the automation of document review so that an algorithm can review documents instead of a human manually reading every document.[7] A "human reviewer" first decides whether documents are relevant. Based upon the determinations of the "human reviewer," the algorithm will learn to determine the relevance of records it is given in the future.[8] Generally, AI can effectively answer binary questions when given the proper training; and can even answer certain complicated questions like completing a complicated algebraic problem.[9] However, doubts persist concerning AI's ability to perform inherently human functions that are outside the realm of numerical values, like arbitrating disputes. Arbitration is a human function that requires both "human judgment and empathy" for an arbitrator to effectively resolve a legal dispute.[10] Nevertheless, AI can replace segments of the arbitral process, like determining the relevance of documents. But questions remain on whether AI could replace every aspect of a human arbitrator.

Although AI is capable of human judgement and empathy to a degree, which will be explored at length in this article, the extent of that capability remains unclear. Going forward, it is even more unclear if an AI arbitrator would be capable of replacing the human arbitrator as the decision-maker in an arbitral dispute. A possible answer can be found in a subset of machine learning AI, known as deep learning.[11] Deep learning AI is molded after the neurological structure of the human brain.[12]

Further, AI is developing at rapid speed, and will be integral to our society as humans become more dependent on technology. AI is already seeping into the field of arbitration with predictive coding, so it is at least worth considering a world in which AI can arbitrate. The goal of this article is not to take a stance on the morality or societal implications of AI, lobby for the wholesale replacement of human arbitrators, or to condemn the development of AI arbitrators. Rather, the aim of this article is to discuss the decision-making and empathy capabilities of a hypothetical AI arbitrator, and how the empathy and decision-making capabilities compare to those capabilities found in humans.

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7. *Predicitve Coding, AI Machine Learning in Discovery*, LOGICKULL, https://www.logikcull.com/guide/predictive-coding.

8. *Id.*

9. Adam Dachas, *Google Fed a Language Algorithm Math Equations. It Learned How to Solve New Ones*, EXTREMETECH (June 5, 2019), https://www.extremetech.com/extreme/292585-google-fed-a-language-algorithm-math-equations-it-learned-how-to-solve-new-ones; *see also* Nidhal Singal, *Microsoft introduces Math Solver app, uses AI to solve problems*, BUS. TODAY (Jan. 17, 2020), https://www.businesstoday.in/technology/launch/microsoft-introduces-math-solver-app-uses-ai-to-solve-problems/story/394010.html.

10. Philippe Billiet, Filip Nordlund, *A new beginning – artificial intelligence and arbitration*, KOREAN ARB. REV. 26, 27-29 (2018).

11. Paramita (Guha) Ghosh, *The Future of Deep Learning*, DATAVERSITY (Jan. 16, 2020), https://www.dataversity.net/the-future-of-deep-learning/.

12. Terrence J. Sejnowski, *The unreasonable effectiveness of deep learning in artificial intelligence*, 117 NAT'L. ACAD. SCI. 1, 1 (2020).

The remainder of section I will provide a background to AI and the subcategories of machine learning, deep learning, and neural networks. Part II will discuss the psychology of empathy and decision-making and how these unconscious processes can impact the decisions made by arbitrators. Part III will discuss the science behind AI's ability to empathize and make decisions within the context of arbitration. Next, Part III will compare AI's empathy and decision-making capabilities to that of humans. Finally, Part IV will discuss an AI arbitrator's ability to empathize and make decisions within the context of two example international arbitration decisions.

II. A BACKGROUND ON ARTIFICIAL INTELLIGENCE

Artificial intelligence is the ability of machines to learn in a manner considered intelligent by humans.[13] Humans begin to learn as infants when taught a system of communication in the form of language.[14] Extrapolating or generalizing a set of information via language is a natural form of intelligence that requires no modification to the brain from an external source.[15] Whereas machines' ability to learn depends upon the creation, and often, modification of a learning system externally created by humans.[16] Hence, the intelligence of machines is artificial and not natural. Machine learning is a subset of AI in which algorithms are given controlled data and can learn from the data without humans.[17] Information is input into a machine learning algorithm.[18] Based on the algorithm's response to questions used to guide the algorithm, the algorithm outputs information.[19] The goal of machine learning is for the algorithm to use information from the past to predict the future.[20] Ideally, the more information fed through the algorithm, the more the algorithm learns, and the more successful its answers to a question become over time.[21]

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13. Bernard Marr, *What Is The Difference Between Artificial Intelligence And Machine Learning?*, BERNARD MARR & CO. INTELLIGENT BUSS. PERFORMANCE (Dec. 6, 2016), https://bernardmarr.com/default.asp?contentID=958.

14. Steven Pinker, *Language Acquisition in An Invitation to Cognitive Science* 135, 142-45 (Lila R. Gleitman, Mark Liberman, and Daniel N. Osherson eds., 1995).

15. *Id.*

16. Arne Wolfewicz, *A beginner's guide to how machines learn*, LEVITY (May 3, 2021), https://levity.ai/blog/how-do-machines-learn.

17. *What is Machine Learning?*, DEEPAI (last visted Apr. 13, 2021), https://deepai.org/machine-learning-glossary-and-terms/machine-learning.

18. Hai Daumé III, A COURSE IN MACHINE LEARNING 11 (2020) (ebook).

19. *Id.*

20. *Id.*

21. *Id.*

Deep learning is a type of machine learning.[22] From a surface view, the two concepts are conceptually the same. Information is entered, and the algorithm outputs a decision. Machine learning and deep learning differ in that machine learning requires human adjustments when the algorithm yields inaccurate predictions.[23] Machine learning is a direct connection between input and output, so when the output is incorrect, human adjustments are needed.[24] In comparison, deep learning algorithms can adjust independently to a human because of its multilayer, artificial neural network ("ANN") design.[25]

Further, deep learning algorithms are comprised of a multilayer system of nodes within the algorithm that function similarly to neurons firing in the human brain.[26] A node is simply a place where computation happens, and fires when it encounters sufficient stimuli like neurons in the human brain.[27] The ANN found within deep learning algorithms was inspired by the structure of the cerebral cortex.[28] Deep learning will require significant advancements to be considered a viable replacement for the human arbitrator, but is currently the most likely AI option for arbitration. The ANN allows deep learning algorithms to self-learn and solve complex and elaborate problems similar to the neurological process of humans.[29] Notwithstanding this architectural parallel to the human brain, several critical issues still exist that cast doubt on the prospect of an AI arbitrator.

B. Understanding Machine Learning

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22. Michael Copeland, *What's the Difference Between Artificial Intelligence, Machine Learning and Deep Learning?*, NVIDIA (July 29, 2016), https://blogs.nvidia.com/blog/2016/07/29/whats-difference-artificial-intelligence-machine-learning-deep-learning-ai/.

23. Brett Grossfeld, *Deep learning vs machine learning: a simple way to learn the difference*, ZENDESK (June 25, 2021), https://www.zendesk.com/blog/machine-learning-and-deep-learning/.

24. Daumé III, *supra* note 18, at 129.

25. *Id.*

26. Larry Hardesty, *Explained: Neural Networks*, MIT NEWA (Apr. 14, 2017), https://news.mit.edu/2017/explained-neural-networks-deep-learning-0414.

27. *Introduction to Deep Neural Networks | Deep Learning*, ENGINEERING ECKOVATION (Mar. 21, 2018), https://engineering.eckovation.com/introduction-deep-neural-networks-deep-learning/.

28. *Id.*

29. Matthew J. Simoneau & Jane Price, *Neural Networks Provide Solutions to Real-World Problems: Powerful new algorithms to explore, classify, and identify patterns in data*, MATHWORKS (last visited April 27, 2021), https://www.mathworks.com/company/newsletters/articles/neural-networks-provide-solutions-to-real-world-problems-powerful-new-algorithms-to-explore-classify-and-identify-patterns-in-data.html.

An algorithm is the basis for how machine learning occurs. Each algorithm uses a different process to learn a data set.[30] The central concept in machine learning is the algorithm's ability to generalize, which is its ability to produce a specific answer when provided with specific facts.[31] Generally speaking, generalizing can be described as a machine algorithm's ability to learn.[32] A machine learning algorithm learns from training data.[33] The training data is, as the name suggests, the group of data the algorithm trains itself with to produce the correct answer to a given question. The algorithm learns from the training data to create a function that will allow the algorithm to align new examples with predictions.[34] A function is the algorithm's solution to the given problem, though its solution could prove to be inaccurate. Once the algorithm has finished learning from the training data, its success can be judged based upon its predictions of the test set.[35] The test set, akin to a final exam, is a set of examples separate from the training data.[36] If the test set demonstrates the algorithm is unsuccessful in its predictions, changes must be made to the algorithm to increase its predictive success.

Machine learning is generally supervised, or unsupervised. Supervised learning is for more practical applications and means the algorithm is provided input variables and an output variable to learn the solution.[37] This type of machine learning is called supervised because the algorithm learning from the training set is comparable to a teacher supervising the learning process of a student.[38] The machine algorithm has finished learning when the human supervisor has deemed the algorithm to meet an acceptable level of performance.[39] Unsupervised learning is when the algorithm is provided input data, but no corresponding output variables.[40] Unsupervised learning aims to model the

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30. Daumé III, *supra* note 18, at 8.

31. *Id.*

32. *Id.*

33. *Id.* at 11.

34. *Id.* at 9.

35. Daumé III, *supra* note 18, at 9.

36. *Id.*

37. Jason Bronwlee, *Supervised and Unsupervised Machine Learning Algorithms*, MACHINE LEARNING MASTERY, (Aug. 20, 2020), https://machinelearningmastery.com/supervised-and-unsupervised-machine-learning-algorithms/.

38. *Id.*

39. *Id.*

40. *Id.*

underlying structure of the data in order to learn more about the data.[41] Unlike supervised learning, unsupervised learning has no correct answer and no teacher.[42] Arbitrating a dispute is far too complex for a supervised algorithm, and incongruous for the purposes of an unsupervised algorithm. However, another type of machine learning exists, called deep learning, that has the potential for arbitrating disputes.

C. Understanding Deep Learning and Neural Networks

Deep learning is a subset of machine learning that utilizes artificial neurons which loosely resembles the human brain in structure and function.[43] Comprised of a network of layered artificial neurons, the structure of deep learning algorithms is referred to as an ANN.[44] Deep learning algorithms use hidden layers to generalize patterns from a given data set.[45] The following example illustrates how a deep learning algorithm's neural network would process a matrix of pixels as inputted data:

> The first layer typically abstracts the pixels and recognizes the edges of features in the image. The [second] layer might build simple features from the edges such as leaves and branches. The [third] layer could then recognize a tree and so on. The data passing from one layer to the next is considered a transformation, turning the output of one layer into the input for the next. Each layer corresponds with a different level of abstraction and the machine can learn which features of the data to place in which layer/level on its own. Deep learning is differentiated from traditional "shallow learning" because it learns much deeper levels of hierarchical abstraction and representations.[46]

41. *Id.*

42. Brownlee, *supra* note 37.

43. Jason Brownlee, *What is Deep Learning?*, MACHINE LEARNING MASTERY, (Aug. 14, 2020), https://machinelearningmastery.com/what-is-deep-learning/.

44. Arden Dertat, *Applied Deep Learning – Part 1: Artificial Neural Networks*, TOWARDS DATA SCIENCE, (Aug. 8, 2017), https://towardsdatascience.com/applied-deep-learning-part-1-artificial-neural-networks-d7834f67a4f6.

45. *Id.*; *see also* Nicolas Bredeche et al., *Perceptual Learning and Abstraction in Machine Learning: An Application to Autonomous Robotics*, 36 *IEEE Transactions on Systems, Man, and Cybernetics* 172, 173 (2006) (the process of producing only relevant data is called abstraction. "An abstraction is a change of representation within the same formalism that hides some details and preserves some relevant properties in order to make the initial problem simpler to solve").

46. Brownlee, *supra* note 37.

Moreover, the number of layers a deep learning model contains determines the depth of the model, hence the name "deep learning."[47] The model type is called feedforward because the example is fed through each layer, evaluated based on the example, and the example is never looped back into the model.[48] Feedforward neural networks are called networks because they contain multiple functions rather than single function scenarios like yes, no questions.[49] Recall that the function in a simple machine learning model is the model's answer, whether right or wrong, to the example's given input and output. The word network denotes that each "layer" of the neural network is its independent function; therefore, neural networks can solve more complex, multidimensional problems than a simple machine learning model attempting to answer a binary yes or no question.

In addition, the hidden layers of neural networks are akin to neurons firing in the human brain.[50] Neural networks originated from a mid-twentieth century machine learning model, called perceptron, inspired by the work of Warren McCulloch and Walter Pitts; later built by Frank Rosenblatt.[51] The biological inspiration for neural networks starts with the neuron. The neural connections within the brain are responsible for the human ability to learn:

> A single neuron… might have three incoming neurons. These incoming neurons are firing at different rates (i.e., have different activations). Based on how much these incoming neurons are firing, and how "strong" the neural connections are, our main neuron will "decide" how strongly it wants to fire. And so on through the whole brain. Learning in the brain happens by neurons becoming connected to other neurons, and the strengths of connections adapting over time. The real biological world is much more complicated than this. However, our goal isn't to build a brain, but to simply be inspired by how they work.[52]

Similarly, a perceptron, and contemporary artificial neuron models make final decisions like a neuron's decision to fire based upon the strength of neural connections. In fact, a perceptron follows a relatively basic mathematical model.[53] Moreover, the perceptron and other neural networks are not replicas of the human brain, but more

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47. Ian Goodfellow et al., DEEP LEARNING 164 (2016) (ebook).

48. *Id.*

49. *Id.*

50. *Id.*

51. Tushar Gupta, *Deep Learning: Feedforward Neural Networks*, TOWARDS DATA SCIENCE (Jan. 5, 2017), https://towardsdatascience.com/deep-learning-feedforward-neural-network-26a6705dbdc7.

52. Daumé III, *supra* note 18, at 41.

53. *Id.*

simple representations.[54] However, the neural networks of today are far more complex and sophisticated than the perceptron algorithm created in 1958.[55] These contemporary algorithms can solve unconventional problems beyond the mere binary problems that the perceptron has long utilized.

Neural networks are widely regarded as the future of machine learning because a neural network can theoretically solve any problem if given enough layers of neurons and computation power.[56] Nevertheless, It remains uncertain whether the limitless potential of neural networks can be harnessed. Regardless of the potential of the power of neural networks, deep learning algorithms are capable of solving very complex problems. Today, neural networks provide sophisticated solutions to many issues in image recognition, speech recognition, and natural language processing.[57] As deep learning algorithms continue to improve in proficiency and sophistication, their neural networks will allow them to attempt historically human tasks, possibly even arbitration.

II. EMPATHY AND DECISION-MAKING PROCESSES OF HUMANS

First, the ability to empathize and to make equitable decisions are of high value when selecting an arbitrator. Inherently humans tasks are often learned from other humans.[58] Take writing a story for example; humans are not born with the ability to write a story but rather through the "natural" learning process, children are taught to write stories at a young age. No other creature in the natural world could write a story at the

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54. Myroslava Zelenksa, *Neural Networks – Relation to Human Cognition and Brain*, BECOMINGHUMAN.AI (Aug. 10, 2019), https://becominghuman.ai/neural-networks-relation-to-human-brain-and-cognition-b45575359f64; *see also* Donald M. Lauro, & John Peter Jesen, *Human Behavior and Neural Network Behavior, A Comparison*, UBIQUITY (Nov. 1, 2003), https://ubiquity.acm.org/article.cfm?id=958078.

55. Warren S. McCullough, & Walter Pitts, *A Logical Calculus of the Ideas immanent in Nervous Activity*, Bulletin of Mathematical Biophysics 115, 115-133 (1943).

56. Matteo Pasquinelli, *Three Thousand Years of Algorithmic Rituals: The Emergence of AI from the Computation of Space*, E-FLUX (June 2019), https://www.e-flux.com/journal/101/273221/three-thousand-years-of-algorithmic-rituals-the-emergence-of-ai-from-the-computation-of-space/.

57. David Fumo, *A Gentle Introduction to Neural Network Series – Part 1*, TOWARDSDATASCIENCE (Aug. 4, 2017),https://towardsdatascience.com/a-gentle-introduction-to-neural-networks-series-part-1-2b90b87795bc; *see Image Recognition with Deep Neural Networks and its Use Case*, ALTEXSOFT (Dec. 11, 2019), https://www.altexsoft.com/blog/image-recognition-neural-networks-use-cases/ (explaining image recognition technology and capabilities of deep learning AI); *see also* Derrick Mwiti, *A 2019 Guide for Automatic Speech Recognition*, HEARTBEAT (SEP. 4, 2019), https://heartbeat.fritz.ai/a-2019-guide-for-automatic-speech-recognition-f1e1129a141c (explaining speech recognition technology of deep learning AI); *The Unreasonable Progress of Deep Neural networks in Natural Language Processing*, EXXACT (June 20, 2021), https://www.exxactcorp.com/blog/Deep-Learning/the-unreasonable-progress-of-deep-neural-networks-in-natural-language-processing-nlp (explaining natural language processing technology of deep learning AI).

58. Andrew Meltzoff, *Born to Learn: What Infants Learn from Watching US*, DEPT. PSYCHOL. WASH. U. 1, 2 (2000).

kindergarten level, let alone a series of novels like *Harry Potter*, though some AI algorithms have tried.[59] But, humans now live in a world that extends into the "non-natural" realm of artificial intelligence. And though AI does not have "natural" human intelligence, humans have taught AI how to *learn*.[60] AI has the potential to even learn empathy and human judgment.[61]

Empathy is "the imaginative transposing of oneself into the thinking, feeling, and acting of another."[62] Currently, AI is unable to empathize, but empathetic AI is in development.[63] Although empathy is generally thought to be a solely human function, some animals exercise empathy.[64] However, animals do not have the capacity to empathize to the same level needed for an arbitrator to make a just decision. And as of today, AI is incapable of empathizing.[65] Humans have to learn to take the perspective of another before they can fully empathize with another person, and this is a skill that many humans struggle to practice, let alone master.[66] Effective arbitrators empathize with the

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59. *Harry Potter*, BOTNIK (2018), https://botnik.org/content/harry-potter.html. (showcasing the chapter of Harry Potter that a predictive text algorithm wrote based upon it's consumption of the entire seven book series); *see also* Jeevan Biswas, *AI Writes New 'Harry Potter' Chapter with Predictive Text Algorithm, But Can it Emulate JK Rowling's* Style, ANALYTICSINDIAMAG (Jan. 2, 2018), https://analyticsindiamag.com/ai-writes-harry-potter-chapter-predictive-text-algorithm/ (explaining how the botnik algorithm produced the chapter that loosely resembled the fictional story of Harry Potter, though the story was mostly incoherent throughout the botnik's chapter).

60. Matthew Hutson, *How Researchers are Teaching AI to Learn like a Child*, SCIENCEMAG (May 24, 2018), *https*://www.sciencemag.org/news/2018/05/how-researchers-are-teaching-ai-learn-child.

61. Michael McKenna, *How to Detect Unwanted Bias in Machine Learning Models*, TNW (June 5, 2020), https://thenextweb.com/news/how-to-detect-unwanted-bias-in-machine-learning-models#:~:text=To%20detect%20AI%20bias%20and,particular%20members%20of%20the%20class.

62. R.F. Dymond, *Personality and Empathy*, JOURNAL OF CONSULTING PSYCHOLOGY, 343, 344 (1950); *See* Julen Hernandez-Lallement, et al., *Harm to Others Acts as a Negative Reinforcement in Rats*, 30 CURRENT BIOLOGY 1, 1 (2020) (explaining through experiment that rats react negatively to harm of other rats); *see also* Yingying Han, et. al., *Bidirectional Cingulate-Dependent Danger Information Transfer Across Rats*, PLOS Biology (2019) (explaining through experiment that rats are sensitive to the emotions of other rats).

63. Esat Dedezade, *Jobs of the Future: Teaching Empathy to Artificial Intelligence*, MICROSOFT (June 13, 2019), https://news.microsoft.com/europe/more-than-a-feeling-teaching-empathy-to-artificial-intelligence/ (discussing the need for empathetic AI as AI becomes more involved in the workforce).

64. Janet Beavin Bauelas et al., *Motor Mimicry as Primitive Empathy*, *in* EMPATHY AND ITS DEVELOPMENT, 317, 331-33 (Nancy Eisenberg et al. eds. 1987).

65. Jun Wu, *Empathy in artificial Intelligence*, FORBES (Dec. 17, 2019), https://www.forbes.com/sites/cognitiveworld/2019/12/17/empathy-in-artificial-intelligence/?sh=5faa124d6327.

66. *See* Douglas LaBier, *Are you Suffering from Empathy Deficit Disorder?*, PSYCHOLOGY TODAY (Apr. 12, 2010), https://www.psychologytoday.com/us/blog/the-new-resilience/201004/are-you-suffering-empathy-

parties to a dispute. Absent significant advancements in AI, empathizing will prove challenging for an AI arbitrator.

Second, human decision-making, more commonly referred to as judgment within a judicial or arbitral context, is a process in which the conscious and unconscious parts of the mind work in concert with one another to make a decision.[67] The hypothesis that human decisions were impacted by involuntary compulsions within the brain was made famous by the often misguided Sigmund Freud in his 1923 study, *The Ego and the Id*.[68] Much of Freud's work has since been proven to be unequivocally wrong.[69] Fortunately, the existence of the unconscious mental process that Freud pioneered has developed into a major area of psychological research[70] Contemporary neuroscience has verified that the brain contains deliberative and intuitive elements.[71] These same deliberative and intuitive elements that control human judgment can be applied to decisions made by arbitrators.

A. Empathy and the Human Arbitrator

Empathy is a valuable skill, because without empathy humans would be incapable of relating to one another. With arbitration, an arbitrator's ability to empathize cognitively is a crucial skill. According to the *Encyclopedia of Social Psychology*, empathy is often defined as understanding another person's experience by imagining oneself in that other person's situation.[72] Emotional empathy requires an individual to feel the same emotion as the affected party. Cognitive empathy, also referred to as empathetic accuracy, requires an individual to have a "more complete and accurate knowledge about the contents of another

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deficit-disorder (discussing how humans can be incapable of empathy); *see also* Denise Cummings, *Why Some People Seem to Lack Empathy*, PSYCHOLOGY TODAY (April 26, 2021, 10:21 AM), (discussing humans who are able to see other's perspective but emotional overload causes them to shun the exercise of empathy).

67. Keith Frankish & Jonathan St. B. T. Evans, *The Duality of Mind: an Historical Perspective, in Two Minds: Dual Processes and Beyond*, 1-29 (Keith Frankish, J. St. B. T. Evans eds., 2009).

68. Elizabeth Lunbeck et al., *Sigmund Freud's The Ego and the ID*, JSTOR DAILY (Sep. 21, 2019), https://daily.jstor.org/virtual-roundtable-on-the-ego-and-the-id/.

69. George Dvorsky, *Why Freud Still Matters, When he was Wrong about Almost Everything*, GIZMODO (Aug. 7, 2013), https://io9.gizmodo.com/why-freud-still-matters-when-he-was-wrong-about-almost-1055800815.

70. *Id.*

71. Keith Frankish & Jonathan St. B. T. Evans, *The Duality of Mind: an Historical Perspective, in Two Minds: Dual Processes and Beyond*, 1-29 (Keith Frankish, J. St. B. T. Evans eds., 2009); *see also* Stavros Brekoulakis et al., *Arbitral Decision-Making: An Issue of Consistency and a Response to Bias*, KLUWER ARB. BLOG (June 12 2018), http://arbitrationblog.kluwerarbitration.com/2018/06/12/arbitral-decision-making-issue-consistency-response-bias/.

72. Sara D. Hodges & Michael W. Myers, ENCYCLOPEDIA OF SOC. PSYCHOL. (Roy F. Baumeister, Kathleen D. Vohs, 1st ed. 2007).

person's mind, including how the person feels."[73] Emotional empathy is a natural reaction to the plight of another, whereas cognitive empathy is a skill that allows an individual to rationally understand the plight of another without being emotionally swayed or affected by the plight of another person.[74] Knowing how another person feels without being impacted by emotions is an incredibly useful skill, especially for arbitrators who must make impartial decisions.

Humans must interact with their personal notions of self to be able to take the perspective of the other person. First, the empathetic process begins with a search for understanding of the other. When attempting to empathize with another person, we as humans do not automatically understand the other's perspective.[75] Next, the empathetic process requires a shift between "self" and "other" in which humans simultaneously consider their personal perspective and the perspective of the other person.[76] Humans tend to struggle in this shift from their own perspective to the perspective of the other, and often their own perspective inhibits a clearer understanding of the other's perspective.[77] The difficulty in setting aside a personal perspective in favor of taking on another person's perspective highlights where in the empathizing process humans generally struggle in shifting between self and other.[78]

Empathy requires one person to view a situation from the perspective of the other. So, to understand the arbitrator's role as an empathizer, the perspective of both the arbitrator and the parties' representatives must be addressed. Notably, as empathetic decision-makers, arbitrators must exercise restraint in their level of empathy with the disputing parties. Empathy is a *de facto* requirement for an arbitrator, but too much empathy can improperly bias an arbitrator's judgment. Cognitive empathy allows an arbitrator to understand the perspective of a party without being emotionally blinded by the plight of a party. As adjudicators, judges have a similar responsibility for being empathetic towards the affected parties. *The Empathy Issue,* a New York Times article by David Brooks, illustrates the judicial temperament a judge needs to make a just decision.

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73. *Id.*

74. Justin Bariso, *There Are Actually 3 Types of Empathy. Here's How They Differ--and How You Can Develop Them All*, INC (Sep. 19, 2019) https://www.inc.com/justin-bariso/there-are-actually-3-types-of-empathy-heres-how-they-differ-and-how-you-can-develop-them-all.html.

75. Adam Gerace et al., *An Exploratory Investigation of the Process of Perspective Taking in Interpersonal Situations*, 4 J. RELATIONSHIP RESEARCH 1, 2 (2013).

76. *Id.*

77. *Id.*

78. *Id.* ; *compare id. with* Jacquie Vorauer & Tamara Sucharyna, *Potential Negative Effects of Perspective-Taking Efforts in the Context of Close Relationships: Increased Bias and Reduced Satisfaction*, 104 J. PERSONALITY SOC. PSYCHOL. 70, 70 (2013).

> It is incoherent to say that a judge should base an opinion on reason and not emotion because emotions are an inherent part of decision-making. Emotions are the processes we use to assign value to different possibilities.… Supreme Court justices, like all of us, are emotional intuitionists. They begin their decision-making processes with certain models in their heads. These are models of how the world works and should work, which have been idiosyncratically ingrained by genes, culture, education, parents and events. These models shape the way judges perceive the world.[79]

Arbitrators should exercise the same temperament as judges. Professional codes of ethics act as moral guidelines for arbitrators and, at the very least, encourage arbitrators to exercise empathy, although no means exist to enforce empathy on the part of arbitrators.[80]

Often, the attorneys representing clients in arbitral disputes feel the arbitrator fails to see the dispute from their perspective.[81] Consequently, advocates usually select arbitrators that they either have a professional relationship with or that they believe will be understanding of their client's perspective. In the case of employee disputes, the advocates for the union and management may feel that an arbitrator is unwilling to view the dispute from their client's perspective.[82] Advocates for unions often believe that their client's education level, the way their client speaks, and their clients dress, among other things, are incompatible with the white-collar nature of certain arbitrators.[83] Union advocates believe this incongruity in lifestyle between their client and the arbitrator can adversely affect the outcome of the dispute for the client; management advocates often feel their clients face the same unfavorable outcome based upon an arbitrator's disrespectful or dismissive comments and a generally negative demeanor towards clients.[84]

Despite some advocates believing arbitrators fail to view a dispute from their client's perspective, arbitrators are capable of viewing a dispute from the perspective of a party with dissimilarities and backgrounds. Though advocates may think that an arbitrator loathes the personal characteristics of their client, no one can read the mind of an arbitrator

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79. Janice K. Frankman, *Ethics and Empathy: An Arbitrator's Dilemma in Crossing the Line: Ethics and Empathy*, National Academy of Arbitration 333, 334 (2012) (citing David Brooks, The Empathy Issue, N.Y. Times, May 29, 2009, available at http://www.nytimes.com/2009/05/29/opinion/29brooks.html?r=0).

80. *See International Bar Association*, https://www.ibanet.org/Publications/publications_IBA_guides_and_free_materials.aspx.

81. Frankman, *supra* note 79, at 336-37.

82. *Id.*

83. *Id.*

84. *Id.*

to know if he or she is unwilling to empathize with a particular party.[85] Advocates can reference arbitral awards that disregard the evidence and testimony supporting their client's position as the only evidence of an arbitrator's inability to empathize.[86] But ultimately, no review process is in place to determine whether an arbitrator's judgment was influenced by an inability to empathize with both sides to a dispute.

Modern neurological studies have found emotions are essential to human cognition, and that emotions play a pivotal role in rational decision-making.[87] This next subsection will discuss the human decision-making process and how that process affects arbitrators.

B. Decision-Making and the Human Arbitrator

Amos Tversky and Daniel Kahneman, psychologists revered for their work on the psychology of judgment and decision-making, established that humans make decisions with deliberative and intuitive elements of the brain.[88] Further, human judgment is primarily influenced by an intuitive process that is sometimes modified by a deliberate thought process.[89] Psychologist Stepan Puchkov in his article, *Subconscious Bias as a Factor Influencing Arbitral Decision-Making*, describes the deliberative and intuitive elements as two separate systems.[90] System 1 is the "automatic and largely unconscious" and system 2 is deliberate and analytical.[91] Legal adjudicators, arbitrators and judges alike, decisions are impacted in some degree by the intuitive element of the brain.[92]

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85. *Id.*

86. Frankman, *supra* note 79, at 336-37.

87. R.W. Pickard, *Affective Computing*, MIT Media Laboratory: Perceptual Computing Section Technical Report No. 321 (1995).

88. *See* Daniel Kahneman, THINKING, FAST AND SLOW, 19-40 (2011) (explaining the two systems that drive hoe humans think and make decisions. Kahneman along with his deceased research partner and friend Amos Tversky, are revered for their research in the psychology of judgment and decision-making. The duo along with others, established a cognitive bias for human errors that arise from biases and heuristics).

89. Edna Sussman, *Arbitrators Decision Making: Unconscious Psychological Influences and What you can do about Them*, 24 AM. REV. INTL. ARB. 487, 489 (2014) (citing Kahneman, THINKING, FAST AND SLOW, 19-105).

90. Stepan Puchkov, *Subconscious Bias as a Factor Influencing Arbitral Decision-Making* 52, 52 INTL. J. ARB., MEDIATION, DISP. MGMT. (2018).

91. Frankish, *supra* note 67 (citing Puchkov, *supra* note 90).

92. *See* Chris Guthrie et al., *Blinking on the Bench: How Judges Decide Cases*, 93 CORNELL L. REV. 101, 102-03 (2007); *see also* Dan Simon, *A Psychological Model of Judicial Decision Making*, 30 RUTGERS L. J. 1, 1 (1998).

Research regarding the cognitive process has showed that adjudicators are not immune from the intuitive element of the brain.[93] Notable members of the judiciary, such as US Supreme Court Justice Antonin Scalia, have commented on the effect the unconscious mind can have on the decision-making process for adjudicators.[94] The law attempts to bulwark adjudicators from purely intuitive decisions, and to enhance certainty and predictability with centuries of rules and procedures.[95] Nevertheless, judges and arbitrators are humans subject to intuitive biology that will impact every decision despite laws and rules.[96]

Traditionally, the dichotomy between intuitive and deliberate systems have been scrutinized using the formalist model.[97] Under the formalist model, it is believed that adjudicators apply law to fact deliberately, while under the realist model it is believed that an adjudicators' intuition has a profound effect on decisions that they later rationalize with reasoning.[98] These traditional frameworks are antiquated because it is improbable that an adjudicator would be able to strictly adhere to just a formalist model or realist model. An examination of the overlapping types of unconscious intuitive biases or "blinders" will provide a more robust understanding of how arbitrators truly make decisions. The unconscious intuitive process, also referred to as "blinders" by leading legal decision-making scholars Guthrie, Wistrich and Rachlinsk, include three categories: cognitive blinders, informational blinders, and attitudinal blinders.[99]

Cognitive blinders are patterns of deviation in decision-making that can lead to "perceptual distortion, inaccurate judgment, or illogical interpretation."[100] Cognitive blinders include heuristics, which are mental shortcuts that allow people to solve problems or make judgments quickly and efficiently.[101] The aforementioned psychologists Tversky and Kahneman heuristics research in the early 1970s revealed that people tend to "rely on a limited number of heuristic principles which reduce the complex task of assessing

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93. Edna Sussman, *Arbitrators Deliberations: The Impact of the Unconscious on Decision Making*, 7 N.Y. DISP. RESOL. L. 8, 8-12 (2014).

94. *See* Justice Benjamin Cardozo, *The Nature of the Judicial Process* 107 (2010).

95. Sussman, *supra* note 93, at 8.

96. *Id.*

97. *Id.*

98. *Id.* (citing Guthrie et al., supra note 92).

99. Sussman, *supra* note 93.

100. Sussman, *supra* note 89, at 9.

101. Sussman, *supra* note 93 (citing Amos Tversky, Daniel Kahneman, *Heuristics and Biases*, 185 SCI. 1124, 1127-28 (1974)).

probabilities and predicting values to simpler judgmental operations."[102] The duo first identified three heuristics: availability, representativeness, and anchoring.[103] However, research in decision-making has revealed a bevy of mental shortcuts that people use to make decisions.[104] When evaluating the decision-making of judges and arbitrators, the negative results of heuristics are scrutinized. Despite the negative connotation of heuristics, humans intuitively use heuristics when making everyday decisions, and heuristic shortcuts can help humans make correct decisions.

Hindsight, anchoring, framing, and confirmation are cognitive blinder types that plague the decisions of arbitrators. Described as the "most troublesome problem for judges," a hindsight blinder is as the name suggests, the knowledge of a subsequent event impacting a decision regarding a prior event.[105] Arbitration requires an evaluation of events after they occurred, so arbitrators are vulnerable to hindsight blinders.[106] Anchoring, a heuristic, is when an individual depends too heavily on an initial piece of information that anchors future decisions.[107] In the case of arbitration, numbers irrelevant to an arbitral decision can have a major impact on damages findings.[108] A 2012 survey found that many arbitrators found quantifying damages is more difficult than ascertaining liability, thus anchoring damage amounts can have a damaging effect on arbitral awards.[109]

Framing is a heuristic where individuals react differently to a choice problem based upon how the problem is presented.[110] In the case of arbitration, an arbitrator could face a framing blinder based upon the style and manner a party presents their argument.[111] Finally, confirmation blinder, commonly referred to as confirmation bias, is when an individual

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102. *Id.*

103. *Id.*

104. *See* Thomas Gilovich, *Heuristics and biases: The Psychology of Intuitive Judgment* (2002)

105. Chris Guthrie, et. al., *Inside the Judicial Mind*, 86 CORNELL L. REV. 825, 777-830 (2001).

106. Sussman, *supra* note 93, at 9.

107. *Anchoring Bias in Decision-Making,* SCIENCE DAILY (last visited April 26, 2021), https://www.sciencedaily.com/terms/anchoring.htm.

108. Sussman, *supra* note 93, at 9.

109. *Id.*

110. Amos Tversky & Daniel Kahneman, *The Framing of Decisions and the Psychology of Choice*, 211 SCI. 453, 453–58. (1981).

111. Sussman, *supra* note 93, at 9.

interprets new information as confirmation of a preexisting belief.[112] In the article, *Psychological Dynamics in International Arbitration Advocacy*, authors Waites and Lawrence conclude that early in the arbitral process an arbitrator has a single dominant story in mind and spends the rest of the arbitral process testing their hypothesis of the case.[113] The ability to empathize with both sides to a dispute can minimize damage caused by blinders.

Informational blinders concern the information used to make a decision, and in the instance of an arbitrator would concern the admissibility or inadmissibility of evidence used to award the arbitral decision.[114] A 2012 survey confirmed that arbitrators often allow the introduction of evidence that would not have been admissible in court.[115] Guthrie, Wistrich and Rachlinsk's *Misjudging* confirmed that once judges see clearly privileged evidence it has a major impact on their decision.[116] Additionally, informational blinders can cause adjudicators to focus too heavily on trivial information that should have little bearing on their decision.[117] To overcome these informational blinders, arbitrators must consciously and deliberately weigh the reliability of evidence, but as evident by the aforementioned survey and study, this task is easier said than done.[118]

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112. Raymond S. Nickerson, *Confirmation Bias: A Ubiquitous Phenomenon in Many Guises*, 2 REV. GEN. PSYCHOL. 175, 177 (1988).

113. Richard C. Waites & James E. Lawrence, *Psychological Dynamics in International Arbitration Advocacy*, *in* THE ART OF ADVOCACY IN INTERNATIONAL ARBITRATION 69, 74 (Doak Bishop ed., 2d ed. 2010).

114. Sussman, *supra* note 93, at 8-9.

115. Sussman, *supra* note 86, at 8. The survey conducted by the author Edna Sussman was distributed in the U.S. and abroad with 401 responses.

116. Sussman, *supra* note 93, at 8-9 (citing Chris Guthrie, *Misjudging*, 7 NEV. L. J. 420, 420-456 (2007)).

117. Elaine W. Shoeben, *Evidentiary Wisdom and Blinders in Perspective: Thoughts on Misjudging*, 7 NEV.L J. 502, 500-12 (2007) (citing George Lakoff, *Don't Think About the Elephant!: Know your Values and Frame the Debate* 3 (2004)), The elephant example Lakoff uses refers to the inability of people to think about an elephant once the idea has entered their brain. Lakoff, a retired professor of Cognitive Science and Psychology, would test the elephant phenomenon on his students:

> When I teach the study of framing at Berkeley, in Cognitive Science 101, the first thing I do is I give my students an exercise. The exercise is: Don't think of an elephant! Whatever you do, do not think of an elephant. I've never found a student who is able to do this. Every word, like elephant evokes a frame, which can be an image or other kinds of knowledge: Elephants are large, have floppy ears and a trunk, are associated with circuses, and so on. The word is defined relative to that frame. When we negate a frame, we evoke the frame.

118. Sussman, *supra* note 93, at 8-9.

Attitudinal blinder concerns opinions formed from background and experience that can predispose adjudicators to make certain decisions.[119] Attitudinal blinders include the "affinity effect" which occurs when arbitrators are "influenced by their cultural backgrounds, their prior experiences, and their personal associations in formulating their understanding of and judging the behavior they must consider in reaching their decisions."[120] The "expectancy effect" which causes "beliefs about the world and preconceived notions about the likely credibility of particular types of witnesses" affect how decision-makers evaluate evidence" and causes arbitrators to be more "likely to reject information that is inconsistent with their beliefs and expectations."[121]

With attitudinal blinders, an overlap between an arbitrator's decision-making process and empathizing process arise. As previously discussed, arbitrators need to cognitively empathize with both parties to a dispute to make the fairest decision. An arbitrator's ability to empathize, or lack thereof, can subconsciously alter the final arbitral decision. If arbitrators employed empathy, they could mitigate the negative effect of attitudinal blinders. Ultimately, background and experience will impact every decision made by a human. Decisionmakers such as arbitrators, who are able to identify their attitudinal blinders and empathize, are much more likely to make just decisions.

III. EMPATHY AND DECISION-MAKING PROCESSES OF DEEP LEARNING AI

AI is feared because of the many ways AI is inherently different from humanity.[122] Yet, emotionally conscious AI is being developed based upon the neuroscience and psychology used to understand human emotions.[123] In this way, AI is and will be inherently human in the future. Emotion-based AI, also referred to as affective computing or artificial emotional intelligence, is a subset of AI in which scholars are attempting to develop AI that "measures, understands, simulates, and reacts to human emotions."[124]

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119. Guthrie, *supra* note 116, at 438.

120. Shari Seidman Diamond, *The Psychological Aspects of Dispute Resolution, International Commercial Arbitration: Important Contemporary Questions*, ICCA Congress Series, No. 11, 631-633, London 2002 (Albert Jan van den Berg ed., 2003).

121. *Id.*

122. Mindy Weisberger, *Why Does Artificial Intelligence Scare Us so Much?*, LIVESCIENCE (2018), https://www.livescience.com/62775-humans-why-scared-of-ai.html.

123. *See generally* BECOMING HUMAN AI, https://becominghuman.ai/ (last visited April 26, 2021). Becoming Human AI is a website that explores what it means to be human and how humanity is reflected in the development of artificial intelligence.

124. Meredith Somers, *Emotion AI, Explained*, MIT MGMT. SLOAN SCH. (Mar. 8 2019), https://mitsloan.mit.edu/ideas-made-to-matter/emotion-ai-explained; *see also* Pickard, *supra* note 82 (The 1995 MIT article responsible for the origins of Emotion AI).

Deep learning is making progress in detecting emotion through image recognition, language recognition and natural language processing but the question remains, can a deep learning algorithm go beyond mere emotional recognition and empathize competently? By having the capabilities to detect emotions, a deep learning algorithm's neural network could assign values to certain emotional qualities, and based upon emotional parameters, produce seemingly emotionally conscious answers.[125] However, it is unlikely that mere emotional recognition will be sufficient for an algorithm to accurately value human emotion. Taking the perspective of others is critical in the evolution of human empathy. For a deep learning algorithm to properly empathize when making a decision that require empathetic consciousness such as arbitration, the algorithm would likely need to cross the emotional recognition threshold into the realm of empathetic perspective taking.

AI decision-making is currently without an intuitive element.[126] When making decisions, a deep learning algorithm relies on a deliberative process. Deep learning AI simply follows the algorithm provided to make a decision. If the human supervisor finds an issue with how the deep learning AI is generalizing data, or making a decision, the deep learning AI will adjust its decision based upon how the human supervisor has altered the makeup of the neural network. Advancements in AI could see the advent of an AI system capable of empathy and intuitive decision-making, though it is more likely AI will be used as a tool to augment human decision-making.[127] Despite these possible advancements in empathy, deep learning algorithms today makes decision using a deliberative process instead of intuition. Despite these differences in decision-making between human and AI, similarities can be drawn regarding the blinders that quietly impact the decisions of humans and AI.

A. Empathy and the AI Arbitrator

Today, the market for empathetic machines is growing.[128] Because emotions are an integral piece of the human cognitive process and machines are becoming an integral piece of our daily lives, advancements in AI have begun focusing on emotion

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125. Özge Nilay Yalçın, Steve DiPaolo, *Modeling Empathy: Building a Link between Affective and Cognitive Processes*, 53 ARTIFICIAL INTELLIGENCE REV. 2983, 2995 (2019).

126. Mohammad Hossein, Jarrahi, *Artificial intelligence and the future of work: Human-AI Symbiosis in Organizational Decision Making*, 61 ELSEVIER BUSS. HORIZONS 1, 3 (2018).

127. *Id.*

128. *Empathetic Machines Favored by Skeptics but Might Creep Out Believers*, EUREKALERT (Oct. 31, 2018), https://www.eurekalert.org/pub_releases/2018-10/ps-emf103118.php; *see also* Jillian Kramer, *Empathy Machine: Humans Communicate Better after Robots Show Their Vulnerable Side*, SCIENTIFIC AM. (Mar. 2017, 2020), https://www.scientificamerican.com/article/empathy-machine-humans-communicate-better-after-robots-show-their-vulnerable-side/.

recognition.[129] For example, Affectiva, an advertising research AI, analyzes facial expression, speech, and body language to understand a user's moods.[130] With a data set of approximately 6 million faces in 87 countries, Affectiva's deep learning algorithms are 90 percent accurate in their assessments of user's moods.[131] Other examples include Telemedicine Chatbots and Virtual Call Centre and Tactron 2 by Google. Telemedicine attempts to simulate human emotions in virtual assistants.[132] Tactron 2 by Google is using synthetic speech technology, so that virtual services such as Telemedicine sound less robotic and more human to increase emotional connection with users.[133] But emotion recognition and mimicry simply allows AI to identify the emotions of people without being able to see the situation from their perspective.

As previously discussed, successful arbitrators must view the dispute from the perspective of both parties. Empathy within the context of arbitration is a large ask for artificial intelligence. Historically, AI has been skilled at doing single, specific tasks, such as solving algebraic equations.[134] This type of AI would be categorized as narrow artificial intelligence, which is an AI system whose abilities are limited to a narrow range of tasks.[135] When confronted with a task outside their narrow range of abilities, narrow AI systems falter.[136] For example, the AI that solves algebraic equations would be incapable of recognizing emotion like Telemedicine. Learning emotions has been arduous for AI because emotions require artificial general intelligence, which is parallel to humans

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129. *Compare* to Ben Virdee-Chapman, *Empathy in AI Series: Part 2, Empathetic Machine Creating Jobs?*, KAIROS (AUG. 30, 2016), https://www.kairos.com/blog/empathy-in-ai-series-part-2-empathetic-machines-creating-jobs *with* Bert Baumgaertner & Astrid Weiss, *Do Emotions Matter in the Ethics of Human-Robot Interaction? - Artificial Empathy and Companion Robots*, SOC. STUD. ARTIFICAL INTELLIGENCE SIMULATION BEHAV. (Jan. 1, 2014), http://doc.gold.ac.uk/aisb50/AISB50-S19/AISB50-S19-Baumgaertner-paper.pdf (arguing that emotions are not "directly relevant in the ethics of human-robot interaction, particularly in the context of robot care-givers and human care-receivers").

130. AFFECTIVA, (last visited Apr. 26, 2021), https://blog.affectiva.com/topic/deep-learning; *see also* Olivia Brookhouse, *Can Artificial Intelligence understand emotions?*, TELEFONICA (Apr. 17, 2020), https://business.blogthinkbig.com/can-artificial-intelligence-understand-emotions/.

131. *Id.*

132. Olivia Brookhouse, *Telemedicine, the New Age of Healthcare*, TELEFONICA (Jan. 17, 2020), https://business.blogthinkbig.com/telemedicine-the-new-age-of-healthcare/.

133. *Tacotron 2: Generating Human-like Speech from Text*, GOOGLE AI BLOG (Dec. 19, 2017), https://ai.googleblog.com/2017/12/tacotron-2-generating-human-like-speech.html.

134. Rajat Sahay, *Solving Equations Using Neural Networks: Exploring AI's Latest Research Effort*, HEARTBEAT (Mar. 9, 2020), https://heartbeat.fritz.ai/solving-equations-using-neural-networks-exploring-facebook-ais-latest-research-effort-2056610b1279.

135. Ben Dickson, *What is Artificial Narrow Intelligence (Narrow AI)?*, TECHTALKS (Apr. 9, 2020), https://bdtechtalks.com/2020/04/09/what-is-narrow-artificial-intelligence-ani/.

136. *Id.*

carrying out multiple cognitive tasks simultaneously.[137] To humans, emotions are essentially an automatic process, without a goal or value in mind. AI attempts to emulate these natural and automatic process, but developers have yet to create artificial general intelligence capable of empathizing.[138]

Arbitration is not one skill but several skills, many of which are difficult to qualify as an algorithm would, like the ability to judge effectively and successfully empathize with both sides to a dispute. A party to a dispute would likely want an arbitrator who possesses several desirable skills and who can exercise each of these skills in concert with the others when resolving a dispute. A party to a dispute would likely want the same general intelligence from an AI arbitrator.

Deep learning algorithms follow the direction of people who collect the training data, synthesize the training data, and enter the training data. The algorithm can only generalize answers from the data provided. In other words, the output is only as strong as the directed training data provided by their human counterpart. Deep learning algorithms are malleable and when biases are found in an algorithm, adjustments can be made either to the algorithm itself or the data to alleviate the damage incurred from bias.[139] However, an AI arbitrator's effectiveness as an empathizer is dependent upon the effectiveness of the humans controlling the AI's training data. Even with proper management of the training data, the AI of today is only capable of mimicking emotions, and not having real emotions itself.

Emotion contagion is an evolutionary antecedent to empathy in which an animal is able to share its emotions but is incapable of understanding the emotions of other animals.[140] Motor mimicry is overt behavior by an observer in a manner that is appropriate or mimetic of another person's situation.[141] The observer behaves as if they were taking the

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137. Brookhouse, *supra* note 130.

138. *Id.*; *see also* Dickson, *supra* note 126; William Douglas Heaven, *Artificial general intelligence: Are we Close, and Does It Even Make Sense to Try?*, MIT TECH. REV. (Oct. 15, 2020), https://www.technologyreview.com/2020/10/15/1010461/artificial-general-intelligence-robots-ai-agi-deepmind-google-openai/.

139. Michael McKenna, *How to Detect Unwanted Bias in Machine Learning Models*, TNW (June 5, 2020), https://thenextweb.com/news/how-to-detect-unwanted-bias-in-machine-learning-models#:~:text=To%20detect%20AI%20bias%20and,particular%20members%20of%20the%20class; Nicol Turner Lee et al.,, *Algorithmic Bias Detection and Mitigation: Best Practices and Policies to Reduce Consumer Harms*, BROOKINGS (May 22, 2019), https://www.brookings.edu/research/algorithmic-bias-detection-and-mitigation-best-practices-and-policies-to-reduce-consumer-harms/.

140. Janet Beavin Bauelas et al., *Motor Mimicry as Primitive Empathy*, *in* EMPATHY AND ITS DEVELOPMENT, 317, 331-33 (Nancy Eisenberg et al. eds. 1987); *compare to* Minoru Asada, *Affective Developmental Robotics: How can we design the development of artificial empathy?*, Dept. of Adaptive Machine Systems Graduate School of Engineering, Osaka University (2014), http://www.macs.hw.ac.uk/~kl360/HRI2014W/submission/S7.pdf.

141. Bauelas, *supra* note 64.

place of the other person.[142] For example, the observer would wince at the other person's pain, smile at their joy, or duck in an effort to avoid the other person's danger.[143] By exercising motor mimicry, an observer experiences motor resonance which is simply brain activity similar to that of the person whose actions were observed.[144]

In summation, if an animal can exercise emotional contagion in concert with motor mimicry, the ability to empathize can be developed in AI. Despite the lack of an organic and physical body similar to that of animals, AI and neuroscience researchers agree that current AI can mimic empathy, but contemporary AI is incapable of having its own emotions.[145] AI can recognize the emotions of humans, and mimic emotional reactions as an observer. However, without emotions of its own, AI is incapable of empathizing, and taking the perspective of another person it interacts with or observes.

An emotionally capable AI system of today could recognize the emotions of both sides to a dispute using facial recognition and voice recognition technology. An emotional AI could also mimic the emotions of a party to the dispute. For example, the AI arbitrator could mimic the tone of the voice a party representative uses. But mere recognition and mimicry are not enough for an arbitrator to empathize with parties to a dispute. Without its own emotional identity, and the artificial general intelligence needed to empathize with the perspective of parties to a dispute, an AI arbitrator's decisions would falter. Parties to an arbitral dispute use arbitration for dispute resolution because they feel their perspective will be heard, and duly considered by an arbitrator. A party would not feel heard or validated by an arbitrator if the arbitrator was only capable of blindly mimicking emotions detected in their facial expressions and speech patterns.

It remains to be seen if AI will have the emotional capacity needed for jobs requiring empathy, such as arbitration. The empathetic awakening that humans have experienced through evolution is the only standard that is available to compare to AI's empathetic development. But it is important to note that the emotional development of AI is fundamentally different than the emotional development of humans. Human empathy developed via organic evolution which began approximately 6 million years ago.[146] AI has evolved artificially over the course of a meager seven decades.[147] After 6 million years

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142. *Id.*

143. *Id.*

144. Sebo Uithol et al., *Understanding Motor Resonance*, 6 SOC. NEUROSCIENCE 388, 388-89 (2011).

145. Affectiva, *supra* note 130.

146. *Introduction to Human Evolution*, SMITHSONIAN NATIONAL MUSEUM OF NATURAL HISTORY (Oct. 27, 2020),.

147. Tanya Lewis, *A Brief History of Artificial Intelligence*, LIVESCIENCE (Dec. 4, 2014), https://www.livescience.com/49007-history-of-artificial-intelligence.html#:~:text=But%20the%20field%20of%20AI,%22artificial%20intelligence%22%20was%20coined.&text=But%20achieving%20an%20artificially%20intelligent%20being%20wasn't%20so%20simple.

humans can effectively take the perspective of others. After approximately 65 years, AI is learning to recognize emotions and mimic the emotion of others. Affective computing is developing at a staggering rate. Although AI is ill-equipped at the moment, the possibility remains that empathetic AI-based arbitration will exist.

B. Decision-Making and the AI Arbitrator

A deep learning algorithm's decision-making process can be described as the inverse of a human's. Tversky and Kahneman's work has shown that an arbitrator, just as all humans, would adjudicate a dispute primarily using an intuitive process that is modified by a separate deliberate process.[148] A deep learning arbitrator would instead settle an arbitral dispute using primarily the deliberate process engineered by humans, its algorithm. The algorithms that are the very structure of the deep learning arbitrator would determine its every decision. Unlike human arbitrators whose decisions are generally unreviewed, algorithms decisions are reviewed regularly to ensure the algorithm is making the correct decision.

Humans actively review and adjust the algorithms to address mistakes in decision-making, though the preference is for as little human intervention as possible when machine learning and deep learning algorithms make decisions.[149] For example, if a deep learning algorithm is making poor decisions, aspects of the neural network can be adjusted until the algorithm's decision is accurate. By monitoring and updating the space between a deep learning arbitrator's initial input and final output, a deep learning arbitrator's deliberate system will surpass that of a human arbitrator.

This is not to say that a deep learning arbitrator's deliberate decision-making process would be without blinders. Contemporary machine learning algorithms are not without informational or cognitive blinders. Informational blinders in a deep learning AI would be similar to that of a human arbitrator. Algorithms have a tendency to focus too heavily on trivial information, similar to the judge who is unable to forget the elephant that they were told not to think about.[150] But unlike the judge or arbitrator who throughout their career unknowingly concentrates on inadmissible "elephants," a deep learning arbitrator can have "elephants" deleted from their input or have red herrings devalued by human supervisors.[151]

Heuristics are ingrained into algorithms as well as humans. In the world of mathematical optimization and computer science, a heuristic function estimates the cost of getting from the current state to the goal state, with a simple example being the straight

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148. *See* Daniel Kahneman, THINKING, FAST AND SLOW (2011).

149. Michael Middleton, *Deep Learning vs. Machine Learning – What's the Difference?*, FLATIRON SCHOOL (Feb. 8, 2021), https://flatironschool.com/blog/deep-learning-vs-machine-learning.

150. Shoeben, *supra* note 117.

151. *Id.*

line distance on a map.[152] When an algorithm is in the decision-making process, a heuristic function attempts to make the best choice from a list of possibilities.[153] Recall the nodes found within a neural network. By pointing the algorithm towards a goal, the algorithm can make an informed guess as to which neighbor of a node will lead to the goal state.[154] A heuristic will choose the path most likely to lead the algorithm to the goal state. Thus, the best move is the move that costs the least to go from the current state to the goal state.[155] A heuristic function is an algorithm taking a shortcut comparable on a surface level to the heuristics used by humans. Similar to humans, heuristics can be responsible for mistakes made by algorithms. If the heuristics employed by algorithms result in a systematic error, then the results can be categorized as cognitive bias or blinder.

A prime example of a cognitive blinder for machine learning is known as "weak spots."[156] Weak spots are comprised of two categories, "known unknowns" and "unknown unknowns." A known unknown is when a machine learning algorithm is unsure how to classify a data point.[157] The solution is simple: feed the algorithm the information it is confused about with human labels.[158] For example, if a model is uncertain about whether or not a photo contains a dog, a person will verify the photo.[159] If the model is certain the photo is a dog, then the model will not ask for verification. The model's confidence is correlated with performance and therefore a human observer can see what the model doesn't know.[160] When a human cannot see what the model does not know, the weak spot

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152. *Strategies and Tactics for Intelligent Search*, STANFORD ENGINEERING AND COMPUTER SCIENCE (last visited Apr. 27, 2021), https://cs.stanford.edu/people/eroberts/courses/soco/projects/2003-04/intelligent-search/intro.html.

153. *Id.*

154. David Poole & Alan Mackworth, ARTIFICIAL INTELLIGENCE: FOUNDATION OF COMPUTATIONAL AGENTS 3.6 (2nd ed., 2017) (ebook) https://artint.info/html/ArtInt_56.html.

155. Sayali Bagwe, *Define heuristic function. Give an example heuristics function for Blocks World Problem.*, QUES10 (last visited Apr. 27, 2021), https://www.ques10.com/p/13530/define-heuristic-function-give-an-example-heuristi/.

156. *Uncovering Unknown Unknowns in Machine Learning*, GOOGLE AI BLOG (Feb. 11, 2021), https://ai.googleblog.com/2021/02/uncovering-unknown-unknowns-in-machine.html.

157. *Id.*

158. *Id.*

159. *Id.*

160. *Id.*

is an unknown unknown.[161] In other terms, the model is confident about its answers but is in fact wrong. [162]

With unknown unknowns, the model is negatively impacted by heuristics. However, with unknown unknowns, it is uncertain what heuristics, if any, caused the incorrect decision. This is the worry with AI decision-making. As AI begins to advance and becomes more complicated, it could be difficult to pinpoint what aspect of the algorithm is causing a cognitive blinder.[163]

Humans are incapable of reconfiguring their neurological system to address heuristic issues, and few humans in decision-making roles are even aware of the heuristics or cognitive blinders negatively affecting their decisions. Additionally, human arbitrators don't review past awards and try to pinpoint heuristics they used that could have resulted in an improper award. Human arbitrators don't have a team of people working towards making the arbitrator the optimal dispute resolver. A deep learning arbitrator would not be without its flaws. But human arbitrators at the very least could hope to emulate algorithms in that algorithms learn from past decisions and their decisions are constantly being evaluated for improvements.

While human arbitrators can choose to be more deliberate and analytical in their decisions on arbitral awards, humans are unable to be as methodical in their decisions as a finely tuned deep learning arbitrator. However, the intuition of human decision-making is an aspect of human cognition that AI is presently unable to emulate. AI as a whole is without the intuitive systems that Daniel Kahneman and Amos Tversky found to be so crucial to human cognition.[164] The core of AI requires machines to learn using already created algorithms from data sets provided by human creators. Intuition is independent from intelligence in that intuition allows humans to understand something instantaneously without a need for conscious and deliberate reasoning. [165] Absent the development of more intuitive artificial intelligence, a deep learning arbitrator cannot operate independent of conscious algorithmic reasoning and will have to rely on deliberative processes to render decisions for arbitral disputes.[166]

IV. APPLYING THE EMPATHY AND DECISION-MAKING CAPABILITIES OF AN AI ARBITRATOR TO EXAMPLE ARBITRATION DISPUTES

161. *Uncovering Unknown Unknowns in Machine Learning*, *supra* note 156.

162. *Id.*

163. *Id.*

164. Kahneman, *supra* note 88.

165. *Intuition – It's More Than a Feeling*, ASSOC. PSYCHOLICAL SCI. (April 21, 2016), https://www.psychologicalscience.org/news/minds-business/intuition-its-more-than-a-feeling.html.

166. *See* Peter Rudin, *AI and Decision-making, What about Intuition?* SINGULARITY 2030 (May 10, 2019), https://singularity2030.ch/ai-and-decision-making-what-about-intuition/.

The following sections feature two arbitral disputes, the *Chamber of Arbitration of Milan Award No. 7813* and the *'Enrica Lexie' Incident (Italy v. India)*. The former will apply the empathy capabilities of an AI arbitrator and the latter will apply the decision-making capabilities of an AI arbitrator.

A. Chamber of Arbitration of Milan Award No. 7813 and the not-so Empathetic Arbitrator

In June of 2013, an Italian company, the claimant, initiated arbitration against a German company, the respondent.[167] The Italian company was seeking restoration of alleged damages suffered as the consequence of the alleged breach of a manufacturing and supply agreement entered by the claimant and respondent in 2011.[168] Italian substantive law applied to the agreement, and a sole arbitrator ruled on the early termination of contract and exclusion of liabilities clauses.[169] According to the claimant, the respondent failed to fulfill the agreed upon amount of the agreed product within an agreed upon time limit.[170] As a result of the alleged failure of the respondent to fulfill its contractual duty within the agreed upon time limit, the claimant alleged it lost a customer who cancelled the orders already given to the claimant.[171]

As a consequence of the respondent's alleged failure, the claimant terminated the contract with the respondent and claimed inter alia to be entitled to a refund of the price claimant paid to purchase ingredients used to manufacture goods provided to respondent who was responsible for packaging the final product and sending it to the claimant.[172] Additionally, claimant claimed to be entitled to a refund for the loss of sale from the customer.[173]

The respondent objected to the claims citing a lack of any factual and legal grounds and as a counterclaim requested the claimant to pay the cost the respondent incurred to purchase the packaging materials.[174] The respondent further argued that it had not been informed of the "new time limits" for the delivery of the packaged product from

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167. Chamber of Arbitration of Milan Award No. 7813, (2014), http://www.camera-arbitrale.it/Documenti/lodo_10ottobre2014.pdf.

168. *Id.*

169. *Id.*

170. *Id.*

171. *Id.*

172. Chamber of Arbitration of Milan Award No. 7813, *supra* note 167.

173. *Id.*

174. *Id.*

the claimant to the customer, and that the orders contained no information in this regard.[175]

The sole arbitrator found that the respondent's behavior was in compliance with the standard good faith standards acceptable in the circumstances.[176] Taking into account both parties' contractual obligations, evidence presented by the parties and the expert's report, the sole arbitrator deemed that respondent proved to have made its best efforts to try and package the goods.[177] The claimant did not demonstrate that it actually performed the activities which were necessary to put respondent in the condition to package in case of urgency, not only pursuant to the agreement but also according to the standard practices of the field.[178]

Further, the claimants did not (1) state expected delivery dates, (2) failed to make all reasonable efforts to ship the goods to respondent timely, and (3) the goods to be received by respondent arrived late (this fact was undisputed between the parties).[179] In spite of allegations made by the claimant, the respondent was not aware that the packaging was due by the end of December in order to allow claimant's customer to launch on new markets.[180] Most important to the arbitrator, there was no evidence that the parties modified the deadline agreed upon in their contract.[181]

The sole arbitrator held that respondent was not liable for the failure to package the goods it received because the respondent did not wave any contractual obligation, the respondent acted in good faith, as the respondent agreed to package in the conditions described with the goal to help claimant's need for urgency and the respondent offered alternative solutions when problems arose.[182] As a result, the claimant's decision to terminate the contact because of the respondent's failure to package the goods was not grounded. Thus, all claims made by the claimant were rejected.[183] Additionally, the sole arbitrator considered the respondent's counterclaims to be well-grounded, pursuant to Article 1281 of the Civil Code, because of claimant's unfair termination of the contract.[184]

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175. *Id.*

176. *Id.*

177. Chamber of Arbitration of Milan Award No. 7813, *supra* note 167.

178. *Id.*

179. *Id.*

180. *Id.*

181. *Id.*

182. Chamber of Arbitration of Milan Award No. 7813, *supra* note 167.

183. *Id.*

184. *Id.*

Chamber of Arbitration of Milan Award No. 7813 illustrates the type of arbitral award that a deep learning AI could presumably adjudicate with efficiency and accuracy. The key issue underlying *Chamber of Arbitration of Milan Award No. 7813* is the contract at issue between the claimant and respondent. A deep learning arbitrator could thrive in the arbitral dispute illustrated here because the need to empathize for a contractual dispute is minimal. Perspective taking on the part of an arbitrator for a contractual dispute would still be beneficial. By viewing the dispute from the perspective of both the claimant and the respondent, the arbitrator can understand the intentions of both sides and how those intentions would affect the makeup of the contract. Once the arbitrator has viewed the contract from both the perspective of the claimant and respondent, the arbitrator could then interpret whether either party to the dispute broke the terms of the contract within the context of the given facts.

For example, in *Chamber of Arbitration of Milan Award No. 7813,* an empathetic arbitrator would make a legitimate effort to understand the contract form the perspective of the claimant and respondent. From the perspective of the claimant, the arbitrator would understand that the respondent failed to fulfill the agreed upon amount by the agreed upon deadline. Further, an arbitrator would understand from the claimant's perspective that the claimant lost a customer who cancelled the order as a result of the respondent's failure to fulfill the order in the agreed upon time. With this version of facts, the claimant would be entitled to terminate the contract as well as receive compensation for the money lost from the respondent's failure. From the perspective of the respondent, the arbitrator would understand that the respondent was never informed of a new time limit for the claimant's order to its customer, and that order itself contained no information in regard to a new time limit. Therefore, the respondent would be entitled to payment from the claimant for the cost that the respondent incurred to purchase the packaging materials.

By taking the time to fully immerse themselves in the perspective of both parties, the arbitrator in *Chamber of Arbitration of Milan Award No. 7813* would ensure the claimant's and respondent's perspective on the broken contract are understood and duly considered. By empathizing, the arbitrator ensures not only that both arguments are given fair consideration but also increases the likelihood that the arbitrator makes the correct decision.

Once the arbitrator has empathized, all pertinent evidence can be considered, and the arbitrator can apply the correct version of the facts to the contract. Based upon the evidence provided in *Chamber of Arbitration of Milan Award No. 7813*, the arbitrator rejected all of the claimant's claims, and found the counterclaims to be well grounded, pursuant to Article 1281 of the Civil Code, because of the claimant's unfair termination of the contract. No evidence was provided that the parties modified the deadline agreed upon in their contract. The fact that the respondent wrote emails saying that it would have done its best to get the product ready for shipment does not entail an amendment to the said contract and its obligations, and therefore the claimant was erroneous in terminating the contract with the respondent.

Chamber of Arbitration of Milan Award No. 7813 is used as an example dispute to underscore (1) the importance of empathetic arbitrating and (2) that certain types of arbitration, such as contracts, require less empathy on the part of an arbitrator and therefore would be more suitable for a deep learning arbitrator.

B. The 'Enrica Lexie' Incident (Italy v. India) and the Shortcomings of an AI Arbitrator's Decision-Making Abilities

This dispute concerns the "Enrica Lexie," an oil tanker flying the Italian flag.[185] The dispute between India and Italy arose during an incident that occurred on February 15, 2012, approximately 20.5 nautical miles off the coast of India.[186] The "Enrica Lexie" incident concerned the alleged killing of two Indian fishermen on board an Indian vessel named the "St. Antony" by the two Italian marines, and India's subsequent exercise of jurisdiction over the "Enrica Lexie" and the two Italian marines.[187] The arbitral proceedings were instituted under the United Nations Convention on the Law of the Sea ("UNCLOS") on June 26, 2015, when Italy served India a "Notification under Article 287 and Annex VII, Article 1 of UNCLOS and Statement of Claim and Grounds on Which it is Based."[188]

After a series of pleadings, petitions, counter-petitions, objections regarding jurisdiction and admissibility of claims, counterclaims, replies, and rejoinders, the hearing commenced on July 8, 2019, and was held at the Permanent Court of Arbitration at the Peace Palace in The Hague, Netherlands. ("PCA")[189] The hearing addressed the arbitral tribunal's jurisdiction and the merits of Italy's claims and India's counterclaims.[190] On July 2, 2020, the arbitral tribunal issued its award to the parties.[191] The court found that (1) the arbitral tribunal had jurisdiction over the dispute, (2) that India did not breach UNCLOS, (3) the Italian marines are entitled to immunity in regard to acts committed during the "Enrica Lexie" Incident, (4) India needed to cease criminal jurisdiction over the Italian marines, (5) Italy did not violate India's sovereignty, (6) by interfering with navigation of the St. Anthony, Italy breached UNCLOS, and (7) India is entitled to payment of compensation in connection with loss of life, physical harm, material damage to property and moral harm suffered by the captain and other crew members of the "St. Antony", which by its nature cannot be made good through restitution.[192]

The 'Enrica Lexie' Incident illustrates a complicated international dispute requiring an arbitrator to make decisions regarding six jurisdictional and admissibility

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185. *Italy v. India*, PCA Case No. 2015-28, 22-33 (2020), https://pcacases.com/web/sendAttach/16500.

186. *Id.*

187. *Id.*

188. *Id.* at 1*; see also* United Nations Convention on the Law of the Sea, Ind.-Itl, Dec. 10, 1982, Dec. 7 1984.

189. *Italy v. India*, PCA Case No. 2015-28, 301 (2020), https://pcacases.com/web/sendAttach/16500.

190. *Id.*

191. *Id.* at 321.

192. *Italy v. India*, PCA Case No. 2015-28, 307-09 (2020), https://pcacases.com/web/sendAttach/16500.

issues, and another six issues concerning the merits of the parties' claims under "UNCLOS." Unlike the *Chamber of Arbitration of Milan*, an arbitrator cannot simply interpret the facts within the terms of a contract. Here, an AI arbitrator would need the general artificial intelligence to weigh multiple cognitive tasks, chief among them, the tribunal's jurisdiction and the merits of the two countries' claims under UNCLOS. As a deliberative being, an AI arbitrator would need to have previously analyzed a large sample of data related to *The 'Enrica Lexie' Incident* at issue. This sample data would need to (1) include disputes between countries concerning both jurisdiction and interpretations of UNCLOS and (2) be a large enough sample that the AI arbitrator could confidently predict the correct outcome for each of the twelve issues presented to the tribunal.

The 'Enrica Lexie' Incident is a unique dispute between Italy and India involving a plethora of issues including but not limited to: flag state jurisdiction, immunity, freedom of navigation under UNCLOS, and rights of other States in the exclusive economic zone under UNCLOS.[193] Human arbitrators would have a distinct advantage in decision-making capability compared to an AI arbitrator when resolving niche and multi-faceted disputes like the *'Enrica Lexie' Incident.* First, a human arbitrator can use a level of intuition to make decisions regarding the *'Enrica Lexie' Incident*. Here, an effective arbitrator would likely use the appropriate law, specifically the UNCLOS treaty, and any relevant precedent in international law to inform their decision as it pertains to the fact of the case.

Applying these legal authorities to the facts of the *'Enrica Lexie' Incident* would entail a deliberate process that would ultimately drive the arbitrator's decision. Ultimately, an arbitrator for the *'Enrica Lexie' Incident* would have to employ some manner of intuition when making their decision on each individual issue. The UNCLOS treaty and precedent do not cover every detail of every claim either India or Italy has made regarding the *'Enrica Lexie' Incident.* Without an intuitive decision-making process, an AI arbitrator would struggle to make a just decision in examples like the *'Enrica Lexie' Incident* where every detail cannot be fed through the algorithm when the AI arbitrator is learning from the sample data.

Further, a niche dispute, such as one country sinking the vessel of another, could prove difficult for an AI arbitrator to learn.[194] It is unlikely that there is a large enough set of example disputes similar to that of *'Enrica Lexie' Incident* for an AI arbitrator to learn from.[195] A deep learning AI arbitrator would have the benefit of humans updating the AI

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193. *Id.*

194. Heaven, *supra* note 138.

195. While there are a bevy of arbitral disputes initiated under UNCLOS, disputes are specific to regions, and often between a unique combination of countries, making it difficult to establish a lineage of disputes that are similar or parallel to one another. *Compare Italy v. India*, PCA Case No. 2015-28, 307-09 (2020) *with* Robert Williams, *Tribunal Issues Landmark Rullling*, LAWFARE (July 12, 2016) https://www.lawfareblog.com/tribunal-issues-landmark-ruling-south-china-sea-arbitration. (explaining the result of an arbitral dispute initiated under PCA and UNCLOS, between the Philipeans and China regarding maritime claims in the South China Sea).

arbitrators features to ensure it is appropriately generalizing information about article 94 of UNCLOS for example, which concerns the duties of flag states. But without enough data for the AI arbitrator to learn from, not even the adaptability of a deep learning algorithm can quell the inability of an AI arbitrator to generalize from a small sample data set.

In regard to cognitive blinders, a dispute like the *'Enrica Lexie' Incident* could present a number of issues for an AI arbitrator. As it pertains to cognitive blinders, the complexity of the *'Enrica Lexie' Incident* could create weak spots as the facts of the dispute are filtered through the algorithm of the AI arbitrator. Human supervisors will be able to adjust the features of the algorithm to account for known unknowns.[196] For example, prior to arbitrating the *'Enrica Lexie' Incident,* the AI arbitrator could be incorrectly interpretating the rights of other States in the exclusive economic zone under UNCLOS while learning from a sample set. Human supervisors can adjust features in the feedforward network that focus on interpreting UNCLOS rules on exclusive economic zones.

However, if human supervisors make adjustments and the issue within the algorithm persists, then the weak spot becomes an unknown unknown. If this were to occur, especially in an area as crucial to the *'Enrica Lexie' Incident* as criminal jurisdiction, then the AI would be unfit to arbitrate. Human supervisors must be able to identify the heuristic path an algorithm takes through the neural network of the deep learning algorithm. Otherwise, humans would have a difficult time understanding if an AI arbitrator made the correct decision for the correct reasons. For these reasons, an expansive and nuanced dispute like the *'Enrica Lexie' Incident* could prove difficult for an AI arbitrator in the realm of cognitive blinders and heuristics.

As it pertains to informational blinders, an AI arbitrator could struggle with focusing on irrelevant information with such an expansive case, as evident by the 326-page award document.[197] However, the issue of being swayed by inadmissible evidence is mitigated by the likely oversight an AI arbitrator would receive from a human supervisor. Unlike human arbitrators who cannot unremember inadmissible evidence, a human supervisor could ensure the AI arbitrator for the *'Enrica Lexie' Incident* is not considering inadmissible evidence.[198] And even if the AI arbitrator did mistakenly consider inadmissible evidence when making its decision, a human supervisor could remove the inadmissible evidence from the inputted data if aware of its inadmissibility.[199] Thus, the AI arbitrator could unremember the inadmissible evidence. Though, this assumes human supervisors are filtering the admissibility of the evidence the AI arbitrator is using to

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196. Brett Grossfeld, *Deep learning vs machine learning: a simple way to learn the difference*, ZENDESK (Jan. 23, 2020), https://www.zendesk.com/blog/machine-learning-and-deep-learning/.

197. Sussman, *supra* note 93, at 9; *compare to* Avrim L. Blum & Pat Langley, *Selection of Relevant Features and Examples in Machine Learning*, 97 ARTIFICIAL INTELLIGENCE 245 (1997).

198. Sussman, *supra* note 93, at 8-9.

199. Daumé III, *supra* note 18, at 11 (2020) (ebook).

make its decision. In order to assure an AI arbitrator is not considering inadmissible evidence, human supervisors would need to be diligently studying the data set to ensure inadmissible evidence is not inputted into the algorithm. Or, perhaps as AI advances, algorithms will be sophisticated enough to filter out inadmissible evidence independently of a human supervisor.

V. CONCLUSION

The *Chamber of Arbitration of Milan Award No. 7813* and the *'Enrica Lexie' Incident* display the challenges an AI arbitrator could face without the ability to empathize and make intuitive decisions.[200] Absent these two cognitive skills, it remains possible that an AI arbitrator could effectively arbitrate a small scale, straightforward, contract driven dispute like the *Chamber of Arbitration of Milan Award No. 7813.* However, without the ability to view the dispute from the perspective of each party involved, an AI arbitrator could even struggle arbitrating a small-scale case with contested facts. Additionally, the inability to make intuitive decisions will hinder an AI arbitrator's ability to arbitrate a niche and intricate dispute like the *'Enrica Lexie' Incident*.

Yet, AI technology continues to develop. Empathetic and intuitive AI decisionmakers are in development and could become a reality, though augmentation of segments of the arbitral process by AI seems far more likely than wholesale replacement. However, today's iteration of AI is without these two essential skills needed to arbitrate. The deficiencies of the hypothetical AI arbitrator should not give the real, human arbitrator cause to celebrate their job security. Human arbitrators stand to learn from the theoretical AI arbitrator's shortcomings in the areas of empathy and decision-making. Arbitrators effectiveness would improve if they deliberately empathized with parties to a dispute and were conscious of their own unconscious blinders.

This seemingly incongruous pairing of AI and arbitration has revealed a key fact – AI is inherently human. Not only are deep learning algorithms made by humans, but they are made in the image of the human brain and are being made to learn similar to humans. When this model is applied to arbitrators, empathy and decision-making become that which AI arbitrators should seek to emulate in ideal versions of human arbitrators. The mere notion of a full-scale AI arbitrator would more than likely be dismissed by contemporaries and experts in the field. And while this dismissal is likely warranted, exploring the possibility is nonetheless a necessary exercise for two reasons. First, AI is an immoveable force that will be increasing intertwined with society as the technology improves in efficiency. Arbitration is likely not an area of society that will be replaced by AI in the future, but the possibility still exists despite the findings in this article. Second, AI decision-making and empathy is a reflection of human decision-making and empathy. By building the framework for decision-making and empathy in an AI arbitrator, we are simultaneously doing the same for human arbitrators. And, by theorizing the ideal model for an algorithm, we hopefully can remember what ideals we hope for in an arbitrator.

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200. Chamber of Arbitration of Milan Award No. 7813; Italy v. India, PCA Case No. 2015-28 (2020).