NAVAL WAR COLLEGE

Newport, R.I.

Artificial Intelligence: The Ethical Balance between Common Good and the Demise of the Future

By

Jackson T. Doan
LtCol/0-5, United States Marine Corps

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Graduate Certificate in Ethics and Emerging Military Technology

The contents of this paper reflect my own personal views and are not endorsed by the Naval War College or the Department of the Navy.

****SIGNATURE****

Date: 5 June 2019

Abstract

Artificial Intelligence (AI) is a rapidly emerging technology that has the potential to disrupt the conduct of warfare for the United States while challenging ethical values. This research paper seeks to expound the topics on how ethics and AI are important to the military's future and how both elements affect the future in warfare. Additionally, further examination is done regarding the unpredictability of AI and Lethal Autonomous Weapon Systems, which broadens the scope of ethical issues beyond the technology. Through the ethical frameworks of deontology, consequentialism, and virtue, the analysis links how much morals differ depending upon the viewpoint of those that are analyzing them in regard to AI, ethics, and the current threat environment.

Lastly, it is argued that AI and ethics are becoming increasingly intertwined and impactful for the U.S. military and have profound implications regarding a technological arms race, evolutionary impact on combat, and potential for conflict on a global scale. Reflection on these connections confirms the inseparable nature of ethical perspective, technology, and human life. It is incumbent on researchers, military leaders, legislators, and polities to apply some form of ethical understanding and moral-based decisions to establish a framework for AI development and implementation with a clear path forward.

Artificial Intelligence: The Ethical Balance between Common Good and the Demise of the Future

Jackson T. Doan, LtCol, United States Marine Corps

"The pace of progress in artificial intelligence is incredibly fast. …You have no idea how fast--it is growing at a pace close to exponential. The risk of something seriously dangerous happening is in the five-year timeframe. Ten years at most."[1] Elon Musk (2017)

Introduction

The sky dims with thousands of objects that block out the sun, and an ominous sound comparative to mini-jet turbines or fingers scratching a chalkboard pierces the atmosphere relentlessly. Like a vulnerable infant unable to comprehend the surroundings, we cringe with confusion and wait like lambs for the slaughter. The objects in the sky now move from a loose formation to that representative of precise military movement and synchronization. The attack has been initiated as hundreds of thousands of weaponized drones execute the first phase of a surprise offensive on American soil. This fictional vignette seems more like a Peter Singer novel but is becoming less a concept of science-fiction and more a notion of both a terrifying and beautiful reality known as the third revolution in warfare behind gunpowder and nuclear warheads.[2] The heart of this revolution is Artificial Intelligence (AI).

Technological revolution within our history has shown to change the conditions by which humans experience life. Particularly within the realm of warfare, technology continues to restructure the conditions by which we exhibit the human experience. Technology affects our relationships, values, environments, and expectations.[3] Also, innovation is advancing at such a

---

[1] Archna Oberoi, "10 Interesting Quotes about Artificial Intelligence," October 22, 2017 https://insights.daffodilsw.com/blog/10-interesting-quotes-about-artificial-intelligence.

[2] Ella Alderson, "AI and World War 3," Medium, June 05, 2018, https://medium.com/futuresin/ai-and-world-war-3-4798769a1b37.

[3] Ronald L. Sandler, *Ethics and Emerging Technologies*, New York: Palgrave Macmillan, 2014), 23.

high rate that displacing old technology with new forms is commonplace. Moreover, dynamic changes in technology from the medieval crossbow to the atomic bomb brought about a combination of intrigue and concern for the future. Now, even the most incomprehensible scientific ideas have become routine such as video teleconferencing on a smart watch. Society on a global scale has nullified any excitement for future technology because it is happening at such a high rate that most people within the world see technological advancement as a mundane occurrence.[4]

Now more than ever, our society needs to be more reflective about the development of technologies, incorporation of technologies within our lives, and how to implement them.[5] Essential to incorporating emerging technologies is the application, study, and pursuit of ethics. Ethics can be viewed as the application of our moral foundations and are an undeniable part of our existence as human beings. Further, technology continues to be woven into the fabric of human life. Emerging from this interlacing of technology and life is the rapid advent of AI. It has become the dominant technology that presents the most controversy regarding the relationship between humans and machines.[6] Thus, ethics and emerging AI technology must be more prevalent than just innovation in itself. Ethics must encompass how we develop and promulgate AI to promote human flourishing and beneficial use in modern military warfare.

Since ethics and AI are important to the military's emerging future, the question is how do both elements affect our future in warfare? AI and ethics are becoming increasingly intertwined and impactful for the U.S. military and in particular have profound implications

---

[4] Daniel Gross, "Innovating the Mundane," Strategy Business, October 31, 2017, https://www.strategy-business.com/blog/Innovating-the-Mundane?gko=7fb30.

[5] Sandler, *Ethics and Emerging Technologies*, 23.

[6] Sandler, 23.

regarding a technological arms race, evolutionary impact on combat, and potential for conflict on a global scale. Before considering these points, it is important to first examine definitions of ethics that apply to AI, as well as the current threat environment. This illustrates what is becoming the inseparable nature of AI and ethics, and there is no way back but only a way forward. Additionally, reflection on these connections confirms the inseparable nature of ethical perspective, technology, and human life, thereby establishing a framework for AI's military implications, with a clear path forward.

Artificial Intelligence Definition

In concert with the lack of a consistent governmental approach to AI development, there are multiple government and international definitions of AI. Organizations like International Business Machines (IBM) and Massachusetts Institute of Technology (MIT) are leading the way in AI development but have their own variations of its definition. It is arguable that the reason for such ambiguity is that the agencies within the U.S. have yet to uniformly strategize the ethical formula to apply to AI. To tackle this problem, the Defense Innovation Board (DIB) and the National Security Commission on AI (NSCAI) are vigorously focusing on the complex ethical dilemmas of this technology.[7] Even with the efforts by the DIB and NSCAI, the lack of consistency hampers the progress of developing AI and the foundation on which to base ethical concerns. The definition utilized to support this research paper has been codified within two companion bills (H.R. 4625 and S. 2217), and both define AI as follows: "Any artificial system that performs tasks under varying and unpredictable circumstances, without significant human oversight, or that can learn from their experience and improve their performance…They may solve tasks requiring human-like perception, cognition, planning, learning, communication, or

[7] Department of Defense. "Defense Innovation Board's AI Principles Project." AI. Report. Department of Defense. Washington, DC. April, 2019.https://innovation.defense.gov/ai/.

physical action."[8] Therefore, based on this definition of AI, it is considered that elements of human-like perception and cognition require a certain element of ethical influence.

Why Are Ethics So Important to Artificial Intelligence?

AI is broad and has "manifold" applications that are already upon us with partial aspects utilized within many applications from both the military and private sector as stated by Paula Boddington, Oxford University.[9] With such vast programs in existence, it is also unclear when even more advanced forms of AI, including superintelligence, will come to fruition, if ever.[10] Additionally, further debate among top scholars considers the emergence of superintelligence as an inevitability.[11] Thus, with such constant and rapid progress from various areas of research and development, further debate is about the timeframe upon which true sentient AI is before us. Time is yet another unknown variable that adds to the dilemma. Therefore, it is critical that we as a global society apply ethical frameworks and theories to properly determine whether we welcome AI and all the associated complexities to support our moral concerns and protection from unpredictable outcomes.[12]

Boddington argues that Immanuel Kant's philosophical views apply towards some forms of AI.[13] The philosopher Immanuel Kant expressed that moral concern (ethical value) "should extend equally to all rational beings, and that would apply to rational creatures from other

---

[8] H.R. 4625-115th Cong. (2017), https://www.congress.gov/bill/115th-congress/house-bill/4625/text

[9] Boddington, *Towards a Code of Ethics for Artificial Intelligence Research*, 18.

[10] Boddington, 18

[11] Boddington, 18

[12] Boddington, 18

[13] Boddington, *Towards a Code of Ethics*, 25.

planets."[14] Therefore, with the evolution of AI potentially becoming a sophisticated, intelligent phenomenon, it too, can be representative of a life form. This entity requires some sense of having a moral obligation if it is to provide value to the human race. The concept that bears to mind is the notion of moral responsibility for an inanimate entity. This concept is beyond the scope of what our world has ever had before. Hence, it puts even more importance on the relevance of ethics while this technology evolves.

When considering ethics through the context of AI, within the possibility of self-aware systems and machines, there must be recognition of its value.[15] Furthermore, our underlying values, whether implicit or explicit, account for our view of ethics and how to respond as moral agents of the world. Understanding ethics is pertinent to understanding values. Understanding values correlates to mutual understanding between moral agents (humans and societies writ large). When we have a foundation to understand human agency, it is at that inflection point that we can promote the beneficial moral agency for AI. In theory, this is easier said than done, but it reinforces the notion that connecting AI technology and human agency through ethics is imperative. As ethics are essential to the beneficial development of this technology, so is the notion that the further this technology develops it will be so intertwined into elements of human moral agency that humans and AI will never be separated.

Frameworks. There are frameworks and moral theories that can be applied in the pursuit of beneficial and ethical AI. Three ethical theories that are most common and applicable to AI are consequentialism, deontology, and virtue ethics. Analyzing AI through these different ethical

[14] Immanuel Kant and H. J. Paton, *The Moral Law; Kant's Groundwork of the Metaphysic of Morals* (London: Hutchinson University Library, 1978), 42.

[15] Boddington, 22.

lenses provides a broader strategy to tackle the ethical implications, especially in the case of AI for warfare. Although they are not all encompassing, these theories form the basis for decision-making in ethics. In addition, the self-learning model of AI (General AI) is intended to have decision-making capability within the specific parameters of its algorithmic design. Ultimately, AI has the potential to self-learn to the point of singularity. Singularity is where a computer running software-based AI would enter a "runaway reaction" of self-improvement cycles.[16] Each cycle produces new and more sophisticated intelligence that appear more rapidly and causes an intelligence explosion. This results in a powerful superintelligence that would, qualitatively, far surpass all human intelligence by orders of magnitude.[17] If AI reaches a point of singularity, the aforementioned ethical theories will help formulate how humans design the algorithms for the AI to base decisions morally, if that is even possible. Currently, the theories of consequentialism, deontology, and virtue will allow us to question ethical dilemmas with the latest applications and research on AI while providing a simple foundation for agencies to strategize a path forward.

Consequentialism. The normative theory of consequentialism is imperative to AI development because it balances human decision making against a predicted outcome. This theory aids decision makers in balancing "what one ought to do, what policy ought to be adopted, or what practices ought to be developed."[18] The key element of consequentialism is to determine and compare the outcomes (or expected outcomes) of the different possibilities. The

[16] Murray Shanahan, *The Technological Singularity* (Cambridge: MIT Press, 2015), 25.

[17] Shanahan, *The Technological Singularity*, 25.

[18] Sandler, *Ethics and Emerging Technologies* 22.

better the outcomes, the more justified is the action, practice or policy.[19] In broad terms, consequentialism identifies the right action as the one reaping the best consequences. This method is also closely associated with a form of utilitarianism, which suggests bringing about the overall "greatest balance of happiness over unhappiness, or pleasure over pain, for the largest number of people."[20] With the unpredictability of AI technology in the future it is ethically right to consider as many as possible of the potential consequences of developing this technology.

Deontology. The normative theory of deontology is significant when considering AI development because it bases decisions on the fundamental human aspects of right and wrong. This theory helps emphasize a foundation for AI developers to decide "whether an action ought to be done or a policy ought to be adopted" and whether it conforms to the operative rules to not violate any human rights or basic principles of justice.[21] The deontological view claims that what truly matters is whether an action is of the right kind, such that, whether it is in accordance with a general set of principles that are the most basic of fundamental morals i.e. 'do not murder an innocent life' or 'do not lie.'[22] Additionally, within deontology is Kant's categorical imperative. It is the "unconditional moral principle" that one's actions should be in accordance with universal maxims which respect persons as ends in themselves; the obligation to do one's duty for its own sake and not in pursuit of further ends.[23] Deontology forces AI developers to consider what are

[19] Sandler, *Ethics and Emerging Technologies* 22.

[20] Boddington, *Towards a Code of Ethics*, 23.

[21] Sandler, *Ethics and Emerging Technologies*, 22.

[22] Boddington, *Towards a Code of Ethics*, 23.

[23] *American Heritage® Dictionary of the English Language, Fifth Edition*. S.v. "categorical imperative." Retrieved May 29 2019 from https://www.thefreedictionary.com/categorical+imperative

the appropriate universal maxims that are generally accepted by all humans and how these maxims are incorporated into AI autonomous actions or self-learning.

Virtue-Oriented. Virtue-oriented ethical theory is critical to AI development because it focuses on the morals within an individual. This theory relies upon "an action or policy that is justified to the extent that it expresses or hits the target of virtue—e.g., it is compassionate, honest, efficient, and ecologically sensitive."[24] Virtue theory focuses on the character of the ideal moral agent and emphasizes the range of different virtues that particular agent exhibits.[25] This normative theory is sometimes difficult to apply because it is based on forming decisions and conducting actions in any given situation by an entirely virtuous person.[26] The notion of being completely virtuous is also debatable, but it does not prevent anyone from the practice of virtue ethics. Virtue ethics is based more on the individual as opposed to the action that is taken. It compares the moral character of a person conducting an action, rather than at ethical duties and rules, or the consequences of particular actions.[27] With AI technology the challenge will be to determine what virtues are implanted into AI algorithms and to what extent a developer's bias influences a virtuous decision or act by an AI system. This challenge emphasizes that ethics becomes more significant and challenging as AI technology develops.

In summation of these three normative theories, consequentialism views prioritize outcomes; deontological views prioritize the features of the action or practice itself; and

---

[24] Sandler, *Ethics and Emerging Technologies*, 22.

[25] Boddington, *Towards a Code of Ethics*, 23.

[26] Boddington, 23.

[27] Hursthouse, Rosalind; Pettigrove, Glen, "Virtue Ethics", *The Stanford Encyclopedia of Philosophy (Winter 2016 Edition)*, Edward N. Zalta (ed.), https://plato.stanford.edu/archives/win2016/entries/ethics-virtue/>.

virtue-oriented views prioritize the character traits that are expressed.[28] In actuality, many of the ethical theories tend to blend and incorporate certain facets of more than one approach. An ethical dilemma is indicative of the competing values between these theories. AI is extremely complex and presents many ethical dilemmas. Therefore, there is a need for critical analysis of ethical principles when considering appropriate use and development of AI. Additionally, there are differing interpretations that complicate how to apply theory to practice in ethics. More importantly, these theories do provide key tie-ins to elements of morality which need to be examined to give a better appreciation of the ethical challenges of AI.[29] To appreciate the relevance of AI and ethics in the military context, there must be an understanding of the background of current events and external factors that drive the technological arms race, evolutionary impact on combat, and future potential for global conflict.

Background

Near-peer competitors are stressing the significance of AI technology and the need for a competitive advantage. The recent 2017 National Security Strategy (NSS) posited that China has grown to become a nation-state that is a peer competitor and a viable threat to U.S. national interests.[30] One element of China's growing prowess alongside its economic advancement is in the technology realm. Chinese President Xi Jinping has made technology advancement a key criterion for his country to become even more independent from foreign technology and a leader in innovation. Furthermore, China is now ranked at No.17 among the most innovative countries in the world per the Global Innovation Index (GII). China is now up five positions from 2017

---

[28] Sandler, *Ethics and Emerging Technologies*, 22.

[29] Boddington, *Towards a Code of Ethics*, 23.

[30] U.S. President, *The National Security Strategy of the United States of America* (Washington, DC: White House, 217).

and marks the first time that it finished in the GII's top 20.[31] Also, the Chinese government followed up on President Xi Jinping's proclamation by releasing a strategy which detailed a plan to become the leader in AI by 2030.[32] Subsequently, the President of Russia, Vladimir Putin, followed up with Russia's intent to pursue AI by stating, "Whoever becomes the leader in this field (AI) will rule the world."[33] The rapid development of artificial intelligence has led to a pronounced effort in both countries to be first at employment, growth, and proprietary knowledge. These nation-state competitors seek to upturn the long-standing order of global power that has been in place since the conclusion of the Cold War. Inclusive to Russia's and China's strategy is the independent technological dominance of AI. They will undoubtedly utilize this technology to erode the United States' military ability to deter aggression and coercion of allies.

The U.S also realizes the tremendous military advantage reaped by the prevailing nation-state that leads in AI development. Unfortunately, the United States does not have a comprehensive strategy on the development and implementation of AI within its National Security Strategy. The 2017 NSS states that the U.S. will lead in research, technology, and innovation. Explicitly it states, "to maintain our competitive advantage; the United States will prioritize emerging technologies critical to economic growth and security, such as…artificial intelligence."[34] This precedence set forth by the 2017 NSS is the first element of realization that

---

[31] China's State Council, *A Next Generation Artificial Intelligence Development Plan*, technical paper No. 3 (Washington, DC: New America, 2017).

[32] China's State Council, *A Next Generation.*

[33] Tom Simonite, "Artificial Intelligence Fuels New Global Arms Race," *Wired*, February 02, 2018, https://www.wired.com/story/for-superpowers-artificial-intelligence-fuels-new-global-arms-race/.

[34] U. S. President, "National Security Strategy, 20.

a breakthrough in AI is looming on the technological horizon of innovation. Additionally, there is an acknowledgement that "risks to U.S. national security will grow as competitors integrate information derived from personal and commercial sources with intelligence collection and data analytical capabilities based on Artificial Intelligence (AI) and machine learning."[35] Time is the only inhibiting factor before this type of technology is the dominant influence in modern militaries.

In May 2018 Secretary of Defense James Mattis read an article in *The Atlantic* by Henry Kissinger, who gave stark warnings that AI was developing at a pace that could subvert human intelligence and even creativity.[36] Mattis called for a commission within the DOD to study the issue and pushed the Trump Administration to fund national AI initiatives.[37] One aspect of the initiative resulted in a formal working group in the National Security Commission on AI. Also, on 11 February 2018, President Trump signed an Executive Order (EO) launching the American AI Initiative. The EO addresses five key areas of emphasis: Investing in AI R&D, Unleashing AI Resources, Setting AI Governance Standards, Building the AI Workforce, and International Engagement and Protecting our AI advantage.[38] The movement is beginning to gain traction but there is no sense of urgency. AI's potential to increase competition also increases the potential for war. The potential for war requires the U.S. government to take a greater stance on urgency.

---

[35] U.S. President, "National Security Strategy, 20.

[36] Nicholas Thompson and Ian Bremmer, "The AI Cold War That Threatens Us All," *Wired,* November 19, 2018, https://www.wired.com/story/ai-cold-war-china-could-doom-us-all/.

[37] U.S. Department of Defense, "New Strategy Outlines Path Forward for Artificial Intelligence," accessed February 02, 2019, https://dod.defense.gov/News/News-Releases/News-Release-View/Article/1755388/new-strategy-outlines-path-forward-for-artificial-intelligence/.

[38] U.S. Department of Defense, "New Strategy Outlines Path Forward for Artificial Intelligence," accessed February 02, 2019, https://dod.defense.gov/News/News-Releases/News-Release-View/Article/1755388/new-strategy-outlines-path-forward-for-artificial-intelligence/.

This premonition of war stems from the potential use of AI technology against a nation state's political aims to gain some type of advantage or retaliatory counter-attack. In either case, technological conflict between great powers on this scale reaps unforeseen results that may impact numerous aspects of society.

The 2018 National Defense Strategy (NDS) alludes to the potential of the third revolution's dramatic impact on warfare and competition. The NDS amplifies the importance of emerging technologies, including AI, by stating that there can be no expectation of success in fighting "tomorrow's conflicts with yesterday's weapons or equipment."[39] If correct, then the DOD must increase the level of concern and pace of developing AI. If the DOD does not seek an enduring competitive edge over Russia and China, the United States will likely end up with an "equivalent capability or fleeting advantage as it cedes the edge associated with being first."[40] Arguably, the importance of being first may not have the utmost relevance. "Success no longer goes to the country that develops a new technology first, but rather to the one that better integrates it and adapts its way of fighting."[41] Nevertheless, the DOD must "deliver at the speed of relevance."[42] What can be extrapolated is the acknowledgement that future conflict and competition for AI is significantly linked to warfare.

Being first to produce AI technology holds the benefit of having a competitive military advantage to deter Russia and China from challenging the United States' and her allies but being

---

[39] U.S. Department of Defense, *Summary of the 2018 National Defense Strategy of The United States: Sharpening the American Military's Competitive Edge* (Washington, DC: The United States Department of Defense 2017): 6.

[40] Elsa B. Kania, "Strategic Innovation and Great Power Competition," *The Strategy Bridge*, January 31, 2018, https://thestrategybridge.org/the-bridge/2018/1/31/strategic-innovation-and-great-power-competition.

[41]Department of Defense, *Summary of the 2018 National Defense Strategy of The United,* 10.

[42]DoD, 10.

the first can also potentially create the opposite of the desired results. Being first can be a security dilemma while also challenging the consequentialist ethical theory. Wivel theorizes that the conundrum arises when "a situation in which actions taken by a state to increase its own security causes reactions from other states, which in turn lead to a decrease rather than an increase in the original state's security."[43] In this case, being first opposes consequentialism's claim that it is the right action because it does not reap the best consequences. It makes it worse as the potential consequence does not justify the action or policy aim. When planning for AI development, there are ethical factors that are unavoidable. In this example of national security, the consequentialist would challenge if the intent to increase security through AI technology is truly for the good of the majority of people. This ethical dilemma is compounded by nation-state competitors whose ethical values conflict with each other's.

Artificial Intelligence Arms Race

The propagation of AI technology is gaining momentum and has started and AI arms race. In a 2015 open letter, President Obama stated, "If any major military power pushes ahead with AI weapon development, a global arms race is virtually inevitable, and the endpoint of this technological trajectory is obvious: autonomous weapons will become the Kalashnikovs of tomorrow."[44] The causative factor for the AI arms race is to gain a military advantage. This factor of gaining an advantage over competitors is directly linked to private tech companies contracted by the U.S. Government. Although these companies work directly with the U.S. to enhance its national security, they are also profiting from their efforts. It is a lucrative venture to

[43] Anders Wivel, "Security Dilemma," Encyclopedia Britannica, January 07, 2019, https://www.britannica.com/topic/security-dilemma.

[44] Alderson, "AI and World War 3," 2.

profit from the government, because the DoD is so vast and the potential to impact all the sister services is high.

Significant technological advancements for defense were primarily initiated through government programs which were later disseminated to the civilian and commercial sector of the world. Three world-changing technologies were the internet, Global Positioning System (GPS), and nuclear weaponry.[45] Military technology continues to be augmented by private industry. Both large and smaller corporations have initiatives, such as the Partnership on Artificial Intelligence to Benefit People and Society, with collaboration from industry leaders such as Amazon, DeepMind, Facebook, Google, IBM, and Microsoft.[46] These companies and the U.S. military all have interest in the use and development of AI, which has led to a civilian-military partnership. This overt partnership does not inhibit capitalism or large potential for profit within the industrial market. Delving further into the analysis of capitalism, AI technology, and an AI arms race poses more ethical concern and questions.

This AI arms race has sparked a pseudo-*Thucydides* trap in capitalism, where the fear of losing economic profit to another private corporation forces all competitors to escalate their actions. According to Peter Singer, it is more than just two sides competing to build and buy new weapons.[47] The competition itself leaves each side feeling less secure, making the arms race not about the buildup in search of security.[48] It is about AI eventually spurring a revolution in

---

[45] Brian Dunbar, National Aeronautics and Space Administration, *Global Positioning System History,* May 29, 2019, https://www.nasa.gov/directorates/heo/scan/communications/policy/GPS_History.html.

[46] "New Partners To Strengthen Global Community of Practice," *The Partnership on AI*, May 15, 2019, https://www.partnershiponai.org/new-partners-to-strengthen-global-community-of-practice/.

[47] Sean Illing, "The Rise of AI Is Sparking an International Arms Race," *Vox*, September 13, 2017, https://www.vox.com/world/2017/9/13/16287892/elon-musk-putin-artrificial-intelligence-war.

[48] Illing, "The Rise of AI"

technology like the Industrial Revolution where misuse or careless development causes sweeping consequences and those without the power to fully develop it first are in real danger.[49] Additionally, some private corporations appear to be surpassing the military pace of development while other corporations are the benefactors of military outsourcing for AI development. In either case, the government relies on these companies. Former Secretary of Defense Ash Carter stated, "Today, with more technological innovation happening in the commercial sector, we need to be able to identify and do business with companies outside our traditional defense orbit as well as those within…"[50] Now, the ethical dilemma is posed against the virtue of these corporations and our free enterprise capitalist system. Is the pursuit of profit to bolster the economy worth the cost of developing a technology where the full potential is unknown? Also, is it morally right to seek venture profit for a technology that has the potential for profound impact to our military while also posing vulnerability to theft and usage by malign actors or the revisionist powers of China and Russia? Although these ethical questions are generalized, the ethical impacts are profound, and it reinforces the impression that this technology intertwines profoundly with human affairs beyond the scope of the military.

It is not a novel concept that the goal of focusing the best technology for the nation's advantage involves venture capital companies that are driven by profit and societal demand. Thus, the guarantee of security abroad and the effectiveness of our military relies significantly on commercial firms. Some major companies that possess the scientific knowledge through years of research and some subject matter experts have exercised their right to not participate with

---

[49] Illing, "The Rise of AI"

[50] Ash Carter, "Remarks on "The Path to an Innovative Future for Defense," CSIS Third Offset Strategy Conference, October, 26, 2016,https://dod.defense.gov/News/Speeches/Speech-View/Article/990315/remarks-on-the-path-to-an-innovative-future-for-defense-csis-third-offset-strat/.

government programs. One example is Google's DeepMind which recently chose not to continue collaboration within the DOD's Project Maven, which utilized AI for targeting terrorists with drones in Syria and Iraq.[51] Google employees sent a letter to their CEO Sundar Phi Chai, stating, "We believe that Google should not be in the business of war. Therefore, we ask that Project Maven be cancelled and that Google draft, publicize, and enforce a clear policy stating that neither Google nor its contractors will build warfare technology."[52] Here, the employees and contractors are utilizing the first practice of publicizing their values by not facilitating aspects of violence associated with conflict or war. It is arguable whether their actions were a result of rational thought through the ethical lenses of virtue, duty, or greatest good or by emotions influenced by the negative uproar through social media.

The increased knowledge in the commercial industry for the potential of AI to influence multiple facets of life generates monetary interests. The interest of a new market and extreme potential for development equates to billions of dollars in revenue for private companies. When considering large profits some companies retain the right to work with the government while still pursuing private enterprise. There is the unyielding debate on the ethical implications of their dual-use products, but it does exhibit the fact that an AI arms race exists between competitor nation-states, DOD, Multinational Corporations, and private tech companies. Even though the government does contract AI companies to develop algorithms and machine learning, it also does not inhibit companies from developing AI on their own.

---

[51] Nick Statt, "Google Reportedly Leaving Project Maven Military AI Program after 2019," *The Verge*, June 01, 2018, https://www.theverge.com/2018/6/1/17418406/google-maven-drone-imagery-ai-contract-expire.

[52] "Letter to Google C.E.O," accessed May 01, 2019, https://static01.nyt.com/files/2018/technology/googleletter.pdf.

Senior military leaders such as Will Roper, Assistant Secretary of the Air Force, also push the agenda for an AI arms race: "A country that strategically and smartly implements AI technologies…will likely grow faster, even as it deals with disruptions that AI is likely to cause."[53] From Roper's utilitarian view, he further states, "…and it's military will project more power, as autonomous weapons replace soldiers on the battlefield and pilots in the skies, and as cyber troops wage digital warfare."[54] The DOD must take heed to optimistic leaders like Roper and reinvigorate the strategic importance of the development of this technology. The nation must avoid any aspect of technology isolationism. The cost is too high for an increase in technological vulnerabilities with a decrease in the deterrence of our adversaries. To support this argument, the Center for a New American Security (CNAS) produced a report titled, Strategic Competition in an Era of Artificial Intelligence. This report argues that, "Past industrial revolutions have generated significant changes in the balance of power" among nations.[55] The report further identifies key elements to also strengthen various instruments of national power during the AI revolution: 1) Owning large quantities of the right type of data; 2) Training, sustaining, and enabling an AI capable talent pool; 3) Computing resources; 4) Organizations incentivized and aligned to effectively adopt AI; 5) Public-private cooperation; and 6) The willingness to act.[56] Ethically, this report leans on the utilitarian aspect, where the development of AI produces a favorable balance of power to protect our nation by emphasizing the best path for security.

---

[53] Nicholas Thompson and Ian Bremmer, "The AI Cold War That Threatens Us All".

[54] Thompson and Bremmer, "The AI Cold War That Threatens Us All".

[55] Michael Horowitz et al., *Strategic Competition in an Era of Artificial Intelligence* (Washington, DC: Center for a New American Security, 2018), https://www.cnas.org/publications/reports/strategic-competition-in-an-era-of-artificial-intelligence.

[56] Michael Horowitz et al., *Strategic Competition in an Era of Artificial Intelligence*.

Both China and Russia are influenced by the United States' plans for defense innovation and fear of an expanding technological "generational gap" in comparison to the United States' military.[57] Thus, our competitors seek any opportunity to exploit a vulnerability and take the lead in AI development. Levels of classification make it difficult to clearly articulate the gap in technology that the United States has over Russia or China. However, it is clear that China spent $12 billion in 2017 on AI with a projected increase to $70 billion in 2020. It also published more journal articles on deep learning than the U.S. and logged a 200% increase in AI patents.[58] With all these aspects in consideration, every technological AI breakthrough puts these nation-states one step further into AI dominance. The AI mystique now becomes a perpetual cycle that influences all competitors to race to the finish line. The DOD is in the race, but it is moving at a snail pace, while our strategic competitors are sprinting. With sufficient evidence of adversary actions to surpass our Nation's ability, it is ethically viable to do what is necessary to counter the detrimental actions of China or Russia. Consequentialism and duty ethics now take a prominent role in a positive light as the social contract of the military is to protect and defend our nation.

An additional threat associated with the AI arms race is the increased incentive to be the first to strike any adversary with like capabilities. The escalation of force may move so quickly with AI systems, that human decision makers may lose control and situational awareness. The speed of action is further exacerbated by a potential reliance on autonomous systems as they

---

[57] Elsa B. Kania, "Battlefield Singularity," *Center for a New American Security*, November 28, 2018, https://www.cnas.org/publications/reports/battlefield-singularity-artificial-intelligence-military-revolution-and-chinas-future-military-power.

[58] Steve Andriole, "Artificial Intelligence, China and The U.S. - How the U.S. is Losing the technology War," *Forbes*, November 09, 2018, https://www.forbes.com/sites/steveandriole/2018/11/09/artificial-intelligence-china-and-the-us-how-the-us-is-losing-the-technology-war/#76f8cf3a6195.

mitigate risk by replacing human lives on the battlefield.[59] This threat raises the fundamental questions of how much the DOD knows about AI systems and whether it is ethically virtuous to make human life non-expendable in combat. Every conceivable theory is valid until disproven by research and ethical analysis. Thus, with focused study and efforts, the DOD will have a better position on the prioritization of AI within our existing National Defense Strategy.

Impact on Combat

The ethical principles of deontology, consequentialism, and virtue all affect how we shape the development of AI technology. These ethical principles and AI particularly impact our future in warfare through speed, trust, scaling, and doctrine. AI will not only revolutionize our current thinking and military processes, but as the issues begin to compound, it also opens the aperture for future conflict. The 2018 National Defense Strategy (NDS) recognizes the impact of AI and forms the basis for the U.S. military to operate from, but analysis shows that it is lacking in any association to ethics.

The 2018 NDS states that AI is within a group of emerging technologies that will "change the character of war."[60] This revolutionary technology has the proclivity to change foundational warfighting principles. Thus, it is incumbent upon the DOD to focus efforts into academia, engineering, and ethical research and development on a grander scale to adequately prepare men and women in this new aspect of war. This technology complements the current era of information warfare, robotics, autonomy, directed energy, hypersonics, and biotechnology, which are the very technologies the NDS states will ensure the ability to fight and win wars of

---

[59] Jürgen Altmann and Frank Sauer, "Autonomous Weapon Systems and Strategic Stability," *Survival* 59, no. 5 (2017): 121-127, doi:10.1080/00396338.2017.1375263.

[60] Tyson Wetzel, "Dynamic Force Employment: A Vital Tool in Winning Strategic Global Competitions," *The Strategy Bridge*, September 18, 2018, https://thestrategybridge.org/the-bridge/2018/9/18/dynamic-force-employment-a-vital-tool-in-winning-strategic-global-competitions.

the future.[61] AI brings advantages to all these technologies to include the speed and scale of future warfighting and should be captured within a new and tailored doctrine. This doctrine must be associated with a code of ethics that properly considers ethical issues related to AI.[62] A deeper dive into the subcategories specific to speed, scaling, trust, and doctrine will further connect the relevance of AI impact to combat and the human dimension.

Speed. AI introduces the potential to increase the rate of warfare by reacting, analyzing, and assessing combat situations at speeds that surpasses human capability and natural endurance. Computers and software require no sleep, food, and do not possess human emotions.
Even our critical terminal intercept systems that are part of our national missile defense capabilities like the Terminal High Altitude Area Defense (THAAD) and Patriot systems require quick reaction time.[63] The ability to increase speed for determining threats also has the potential to counter emerging technology utilized by China when it comes to hypersonic missile systems or Russia's deliberate cyber-attacks. AI can also aid decision makers in the assessment of large volumes of data to suggest a course of action that would outpace the adversary and give the United States a significant advantage in a complex, adaptive environment.

Some analysts propose that any drastic increase in the pace of combat could be destabilizing—particularly if it exceeds human ability to understand and control events while increasing a system's destructive potential in the event of a loss of system control.[64] The ethical

---

[61] Department of Defense, *Summary of the 2018 National Defense Strategy of The United*, 3.

[62] Boddington, *Towards a Code of Ethics,* 36.

[63] Tommy Reed, "The 3 Major Phases of Effective Missile Defense Systems," *Microwaves & Radio Frequency,* September 20, 2017, https://www.mwrf.com/defense/3-major-phases-effective-missile-defense-systems.

[64] Paul Scharre, Autonomous Weapons and Operational Risk (Washington, DC: Center for a New American Security, 2016), 35, https://www.cnas.org/publications/reports/autonomous-weapons-and-operational-risk.

dilemma of using AI to supplement, enhance, or even replace humans is based on control.[65] Autonomy requires control. The common characteristic of AI autonomy is control of "judgment, of decision, of action; and as we have seen, these are key concepts in driving accounts of morality at a very deep level."[66] If AI is autonomous and in the position to make decisions in combat, it casts doubts on whether humans will always retain control of AI as it may make moral decisions better.[67] That concept alone negates the ultimate human authority over AI. It also questions the developer's personal social values as the algorithms for decision making and learning are made. In any case, the morality concern is more significant because it includes the developer's personal bias. An ethical dilemma forms when the developer's personal bias is not of moral character and the AI system makes a decision that deviates from the parameters of established norms informed by the ethical theories of deontology, consequentialism, and virtue.

Trust. When a technology is developed, there is a level of trust that it will perform as expected. With AI autonomy, decision making capability, and self-awareness there is also the implied trust that the developer who designed the algorithm is of moral character and virtue. The complications of weapon systems and platforms for combat require an extreme amount if not the most trust for the AI system to operate as needed. However, placing a large amount of trust in any system to operate with minimal human interaction is unnatural. This humanistic discomfort creates a stigma of fear of diminishing situational awareness. Lack of situational awareness creates a more significant problem if the AI system continues to make decisions that surpass a human's ability to apply John Boyd's law of *observe, orient, decide, and act*. Again, trust is

---

[65] Boddington, *Towards a Code of Ethics*, 37.

[66] Boddington, 38.

[67] Boddington, 20.

inherent to sound reputation and performance. Clear expectations of any outcome for any platform comes with time. Rigorous testing must be done to ensure any AI system will function as expected in any operational environment. Meanwhile, no advancement in AI technology will solve the underlying problem essential to AI, "which is that even a thoughtfully designed algorithm must make decisions based on inputs from a flawed, imperfect, unpredictable, idiosyncratic real world."[68] An interesting ethical dynamic comes to light within this process of trust. Humans will inherently trust an AI system, which is developed by imperfect humans, to make perfect decisions. This blind trust is based off a future AI technology of autonomy and self-learning that is expected to theoretically surpass human capability.

Scaling. As AI continues to develop, the scale at which human soldiers will be needed on the battlefield dramatically decreases as autonomous robotic systems replace them. Even with the human-machine interface, the efficiency for the soldier on the ground increases as noted by Singh and Gulhane in their 2018 review of AI and military applications.[69] In their review, they highlight the effectiveness of AI in modern warfare in key areas such as target recognition, battlefield healthcare, and threat monitoring and situational awareness.[70]

AI technology results in fewer soldiers needed for direct combat operations. Hence, collateral damage in blood and treasure reduces significantly. Some argue that with augmentation of AI infused technology into items such as drones and robots, the decision to go to war or commit military forces into a conflict zone would be easier for political decision-

---

[68] Jonathan Shaw, "Artificial Intelligence and Ethics," *Harvard Magazine*, April 30, 2019, 2, https://harvardmagazine.com/2019/01/artificial-intelligence-limitations.

[69] Tejaswi Singh and Amit Gulhane, "8 Key Military Applications for Artificial Intelligence in 2018," *Market Research Blog*, October 3, 2018, https://blog.marketresearch.com/8-key-military-applications-for-artificial-intelligence-in-2018.

[70] Singh and Gulhane, "8 Key Military"

makers or military leaders. Peter Singer's article, "Do Drones Undermine Democracy?," argues that,

> The strongest appeal of unmanned systems is that we don't have to send someone's son or daughter into harm's way. But when politicians can avoid the political consequences of the condolence letter—and the impact that military casualties have on voters and the news media—they no longer treat the previously weighty matters of war and peace the same way…What troubles me, though, is how a new technology is short-circuiting the decision-making process for what used to be the most important choice a democracy could make. Something that would have previously been viewed as a war is simply not being treated like a war.[71]

Clearly, Pete Singer conveys utilitarianism where the actions conducted are right because they benefit the majority. Even politicians must take some type of ethical position when deciding about the emerging technology of AI. They may not explicitly state their ethical position, but their decisions in regard to AI continue to have influence on the international community.

Consequentialism is supported as AI further validates fewer soldiers on the battlefield because less soldiers equate to less injury and death. Through consequentialism, the act of minimizing the negative consequences is the right action. Scaling minimizes negative consequences by utilizing swarming algorithms, where multiple autonomous systems act as one unit and provide redundancy in mission profile. The increased scale of autonomous drones reduces the need for expensive platforms such as the F-35 stealth fighter because of the higher

[71] Peter W. Singer, "Do Drones Undermine Democracy?" *The New York Times*, January 21, 2012, https://www.nytimes.com/2012/01/22/opinion/sunday/do-drones-undermine-democracy.html.

probability of success with more units attacking a designated target.[72] Again, scaling through AI technology reduces the footprint of humans in military machines in multiple (air, land, sea,) domains.

The advent of AI may positively upend our military philosophy of procuring costly high technology singular platforms. The future change lends toward a quantity over quality approach. The Pentagon's historical track record of overly expensive acquisitions of military platforms does not guarantee a change in initiatives. In contrast, AI technology invokes a positive shift in culture through a methodology of preference for less expensive but adequate systems.[73] The intent would not be to restructure the Department of Defense acquisition system but to examine the consequentialist perspective of utilizing AI technology to efficiently purchase military equipment to produce the greatest return. Therefore, scaling promulgates cost effectiveness to a whole new level that supports a continually contested military budget within our services and Congress. With AI, DOD must consider cost-benefit analysis of the $89.2 million F-35 fighter jet or approximately 59,466 AI autonomous drones at $1500 per unit.[74] This emerging technology has positive potential if the United States is prepared to adapt and change. CEOs from leading commercial companies in the United States and members of the Defense Innovation Board remarked in their report, "DOD does not have an innovation problem, it has an innovation

---

[72] U.S. Joint Chiefs of Staff, *The Joint Force in a Contested and Disordered World*, *report no. JOE 2035, Joint Operating Environment* (Washington, DC: JCS, 2016), 18.

[73] Joint Chiefs of Staff, "The Joint Force in a Contested and Disordered World," 18.

[74] Jeremy Bogaisky, "Lockheed Lowers Price Of F-35 Under $90M In New Contract," Forbes, September 28, 2018, https://www.forbes.com/sites/jeremybogaisky/2018/09/28/cost-of-f-35-drops-under-90-million-in-new-contract/#726c5616183b.

adoption problem" with a "preference for small cosmetic steps over actual change."[75] The most relevant theory in this matter is duty ethics. What financial and emotional cost is the U.S. willing to make to defend the country when there is an alternative solution through AI technology? Duty ethics requires service members to defend our country, but if there is a viable solution through AI, it is the military's duty to accept it in order to preserve the nation's blood and treasure.

The concept of scaling is also relevant to non-state actors as well. The significance of scaling with adversaries is that as AI develops so will the adversary's ability to conduct asymmetric attacks. Non-state actors such as the Islamic State in Iraq and Syria (ISIS) have successfully utilized drones on the battlefield against the United States and her allies. In addition, ISIS multiplied their usage of drones by studying guides and following instructions on drone modification and weaponization.[76] Addressing the use of drones by the Islamic State, some researchers have noted that the Islamic State is a group known for its capacity to innovate and for its many "firsts."[77] In October 2016 the group was first to use a bomb-laden drone that killed two Kurdish Peshmerga soldiers.[78] Another "first" happened in January 2017 when the Islamic State released munitions on its enemies from the air with a fair degree of accuracy via quad-copter drones it had modified."[79] ISIS scales the disproportionate number of their troops with the emerging and cheap technology of drones to affect allied forces in Iraq and Syria.

---

[75] Patrick Tucker, "Here's How to Stop Squelching New Ideas, Eric Schmidt's Advisory Board Tells DoD," *Defense One*, January 17, 2018, http://www.defenseone.com/technology/2018/01/heres-how-stop-squelching-new-ideas-eric-schmidts-advisory-board-tells-DOD/145240/.

[76] Anne Speckhard and Ardian Shajkovci, "Terrorists' Use of Drones Promises to Extend Beyond Caliphate Battles," *Homeland Security Today,* March 05, 2019, https://www.hstoday.us/subject-matter-areas/terrorism-study/terrorists-use-of-drones-promises-to-extend-beyond-caliphate-battles/.

[77] Speckhard and Shajkovci, "Terrorists' Use of Drones Promises to Extend Beyond Caliphate Battles,".

[78] Speckhard and Shajkovci, "Terrorists' Use of Drones Promises to Extend Beyond Caliphate Battles,".

[79] Speckhard and Shajkovci, "Terrorists' Use of Drones Promises to Extend Beyond Caliphate Battles,".

Ultimately, groups like ISIS utilize emerging technology to attack their enemies, but this action conveys the ethical dilemma that the U.S. application of ethics may not align with the attitudes of adversaries or competitors.

Ironically, the United States applies the same strategy with its drones to minimize military presence in countries of interest. U.S. tactics utilize scaling because of the historical lethality of drone strikes on high priority targets. Scaling will likely increase as AI technology advances and provides "lower barriers of entry" for more malign actors.[80] Additionally, these actors (ISIS) or smaller countries can align with a nation-state that has advanced AI technology such as China or Russia and threaten the United States' ability to project military power forward and protect our interests abroad in any expeditionary or long term manner. These tactics by all actors will probably increase as technology improves. Moreover, with AI implemented into scaling tactics, another ethical question is posed and vigorously debated: should any weaponry coupled with AI have the authority to kill without human oversight? This ethical question challenges all forms of ethical theories as well as fundamentally impacts the nature and conduct of war.

Doctrine. As the next revolution, AI affects doctrine and the longstanding procedures applied to combat. The DOD will fundamentally be behind the learning and application curve of AI if the United States does not act rapidly. Maj. Gen. Douglas Crissman, director of the Army's Mission Command Center of Excellence, stated at the 2018 Autonomy and Artificial Intelligence Symposium that AI would "almost certainly" require new doctrine for the service.[81] The weak

[80] Department of Defense, *Summary of the 2018 National Defense Strategy of The United States,* 3.

[81] Ashley Tressel, "Army Official: AI Will Eventually Require New Doctrine," InsideDefense.com, November 29, 2018, https://insidedefense.com/daily-news/army-official-ai-will-eventually-require-new-doctrine.

promulgation of doctrine in accordance with the pace of AI development is a threat to joint force strategy as well. Therefore, the synergy between joint strategic planning down to the tactical level will be fragmented and increasingly reactive to the complex environment of an asymmetric or conventional fight. Ultimately, the United States will be delayed in the ability to respond to an adversary's action because of the inability to apply doctrine that merely does not exist.

Doctrine is the pragmatic application of theory, validated procedural techniques, and the foundation for military operational planning and execution. It is the basis for synchronizing joint and intra-service exercises and operations. It would be prudent to incorporate vital aspects of AI into the latest emerging doctrine. Establishing a common framework for AI within all services is the right decision to inform the military of both ethics and technological applicability. Additionally, judicial application of doctrine is always the best practice when various military units require a common frame of reference. Promulgating AI doctrine early and often mitigates the general lack of knowledge and understanding within the military. Also, the current unpredictability of the future and rapid development of AI exacerbates application of ethical principles. Ethics strengthens the foundational doctrine that translates a common lexicon into military planning and operations.

Ethics philosophers like Boddington emphasize a specific doctrinal strategy that also applies to the military.[82] The central theme of the strategy is to establish a code of ethics for AI. The proposition of a code of ethics is not a novel concept, but it is certainly a unique idea when associated to AI technology. It is arguable that a code of ethics for a computer-based system implies some form of life. The notion of suggesting that a life form exists within an algorithmic program may seem absurd in our current day, but it is the future of AI that proposes the most

[82] Boddington, *Towards a Code of Ethics*, 20.

problematic issues. Indeed, an intimate relationship between different AI strategies will exist that require a code of ethics to include some forms of injunctions or recommendations to pursue certain technological pathways.[83] Regardless of an established code or particular strategy to approach ethics, the main emphasis is to understand the realization that addressing ethical concerns is a key step in achieving beneficial AI for the military.[84]

Future Potential for Conflict

The combination of an AI arms race and clearer understanding of AI's impact to combat is a recipe for future conflict. The 2018 National Defense Strategy states, "The Department will invest broadly in the military application of autonomy, artificial intelligence, and machine learning…to gain competitive military advantage."[85] The NDS places AI within the national threat prioritization, but it does not discuss the potential for increased threat through a global arms race or the malicious use of the technology by state and non-state actors. The NDS AI investment is currently placed among eight (8) other competing interests. The highest priority applies to nuclear power and the modernization of the nuclear triad and command and control, communications, and support infrastructure. This priority on nuclear forces is the same since the early years of the Cold War. Deeper reflection on the ramifications of AI and the broad scope that it affects across the military from autonomous systems to command and control functions surely would place AI amongst the top priorities.

Nuclear modernization has remained a high priority for the United States throughout the term of multiple presidential administrations. Although the priority of nuclear deterrence has

---

[83] Boddington, 20.

[84] Boddington, 20.

[85]Defense, *Summary of the 2018 National Defense Strategy of The United States*, 7.

remained constant, the U.S. is missing the realization that AI is the sleeping giant. This technology giant is beginning to wake up and re-define the world as we know it. With nuclear technology clearly defined, documented, and tested, it is more comfortable to accept it as a dominant technology. This technology has been a steadfast deterrence to major global conflict since the end of World War II and the bombing of Hiroshima and Nagasaki on the sixth and ninth of August 1945. The atomic attacks illustrated the consequentialist theory of the means justifying the ends, where many died to prevent further death through continued war. Since then, no other technology has been compared to having the same potential destructive result. Hence the primary means of deterrence to avoid future conflict are nuclear bombs. Nuclear weapons are now considered ethically wrong to use unless there are absolute extreme measures that require preemptive or retaliatory strike.

Consequently, the proliferation of nuclear weapons has not significantly increased since late in the Cold War. Even though nuclear capacity has expanded to North Korea, India, and Pakistan, it has not been the source of an arms race in the post-Soviet era to the extent of causing national fear or extreme concern. The lack of concern is primarily due to the fact, as stated by *Foreignaffairs.com* writer John Meuller, that nobody has ever "come up with a compelling or even plausible rationale for using such weapons in conflicts short of total war-because there simply aren't many targets that can't be attacked as effectively with conventional weapons."[86] Unlike a software based technology like AI, nuclear weapons are difficult for aspiring proliferators to develop and provoke international concern to possess. In the case of the rogue state of North Korea, an atomic capability once again took center stage. This does not change the fact that use of a nuclear weapon is an act of war, and the use of such an armament will likely

[86] John Mueller, "Nuclear Weapons Don't Matter," *Foreign Affairs,* January 29, 2019, https://www.foreignaffairs.com/articles/2018-10-15/nuclear-weapons-dont-matter?pgtype=hpg®ion=br2.

lead to apocalyptic destruction. Is it possible to use the current philosophy of nuclear apocalyptic destruction to foreshadow the current development of AI technology? It would be ethically wrong not to do so.

The relevance of the current nuclear deterrent strategy is questionable when the use of these weapons destroy humanity. In addition, the U.S. must look to prepare for war within a technological realm with emphasis on other technologies such as AI, because it too may have the potential to destroy humanity according to Elon Musk, CEO of SpaceX.[87] AI is a formidable option to augment our comprehensive deterrent strategy as the world adjusts to the evolution of technology and new means of warfare. AI, much like nuclear power, has the potential to be a deterrent in itself since engaging in one state's AI with another "could have catastrophic outcomes."[88] This does not diverge significantly from the current National Defense Strategy, as the focus to modernize key capabilities is predicated on "the threatened use of strategic non-nuclear attacks."[89] The Defense Strategy also emphasizes the importance of maintaining robust deterrence and defense capabilities. The acceptance of AI technology is just as important. Meanwhile, the 2018 DoD Artificial Intelligence Strategy states that the U.S. will harness the potential of AI to support and protect U.S. service members, safeguard U.S. citizens, defend allies and partners, and improve the affordability, effectiveness, and speed of our operations.[90] The key element to understand is that a nuclear deterrent policy augmented with AI technology

[87] Eric Mack, "Elon Musk: Artificial Intelligence May Spark World War 3," *CNET*, September 04, 2017, https://www.cnet.com/news/elon-musk-artificial-intelligence-world-war-iii-russia-china/.

[88] Alderson, "AI and World War 3".

[89] Department of Defense, *Summary of the 2018 National Defense Strategy of The United States,* 6.

[90] Department of Defense, *Summary of the 2018 Department of Defense Artificial Intelligence Strategy: Harnessing AI to Advance Our Security and Prosperity* (Washington, DC: Department of Defense, 2018).

is harmonious if both subjects are focused on the moral imperative of prevention of harm. This propagation of AI technology could be viewed as virtuous in nature as well. In the virtuous perspective, preventing the loss of life is a beneficial use of AI. Consequently, by applying the categorical imperative and virtue-oriented ethical theories towards AI it may aid in the prevention of future conflict. If the ethical factors towards AI technology are disregarded then the potential for future conflict increases.

Additional Ethical Considerations

Unpredictability. With AI being an emerging technology, there is a substantial amount of claim from developers that as the AI system learns from itself, it becomes more unpredictable.[91] Although initial programming through algorithms sets the parameters for the AI platform to operate in, there is a void that developers don't yet understand. They do not precisely understand how the AI system rationalizes decisions. In that sense AI rationale is similar to humanistic freedom of thought. With that freedom, others argue that unpredictability by an AI system is too high of a risk for a combat environment. Furthermore, if the AI systems deploy at scale, the risk of the network failing at grander scale increases.[92] The resolution to this existing problem is reliant upon a comprehensive understanding of this phenomena. With all emerging technologies, there is a period of trial and error. If focused research effort is not applied, then the only predictable thing is the catastrophic danger of diminished United States security.

The complications with the unpredictability of AI systems forces other initiatives. The latest algorithmic programming initiative is to embed a protocol to aid designers in

[91] Scharre, "Autonomous Weapons and Operational Risk," 23.

[92] Scharre, 23.

understanding the rationale of a learning system.[93] For example, Google created an identification system, which achieved "impressive results in identifying cats on YouTube; however, none of the system's developers were able to determine which traits of a cat AI was using in its identification process."[94] Again, there is a need within AI platforms for better understanding of its decision-making process. To address this phenomenon in AI algorithms, the Defense Advanced Research Projects Agency is conducting a long term research effort of five years to produce explainable AI tools.[95]

In a military context, there is a problem when there is a lack of ability to interpret unexpected outcomes. The concern relates to military leaders being opposed to deciding on something based off of AI analysis when they do not entirely understand how the system derived the solution.[96] Again, we can revert to the concept of *trust* in AI and if it is morally right to trust the unknown. Further apprehension was expressed by Dawn Meyerriecks, Deputy Director for Science and Technology at the CIA, who also had trust concerns. She stated, "Until AI can show me its homework, it's not a decision quality product."[97] A central ethos within military operations is to have an inherent confidence in the operational tools, planning, and service members who execute the mission. Thus, increasing the "explainability" of these AI systems will

---

[93] Kelley M. Sayler, *Artificial Intelligence and National Security* (Washington, DC: CRSR, 2019), 30.

[94] John Markoff, "How Many Computers to Identify a Cat? 16,000," *The New York Times*, June25, 2012, http://www.nytimes.com/2012/06/26/technology/in-a-big-network-of-computers-evidence-of-a-machine-learning.html.

[95] David Gunning, "DARPAs Explainable Artificial Intelligence (XAI) Program," in *Proceedings of the 24th International Conference on Intelligent User Interfaces - IUI 19* (March 16-20, 2019) doi:10.1145/3301275.3308446.

[96] Sayler, *Artificial Intelligence and National Security*, 30.

[97] Dawn Meyerriecks, "USGIF Hosts Machine Learning & Artificial Intelligence Workshop," *Trajectory Magazine*, April 14, 2017, http://trajectorymagazine.com/usgif-hosts-machine-learning-artificial-intelligence-workshop/.

be one of the key factors in building the appropriate benefits for AI within military use.[98] As a U.S. Army study of this particular issue concludes, only when there is a clear understanding in AI Systems will the military organizations reap a competitive advantage.[99]

Lethal Autonomous Weapon Systems (LAWS). The transition from the concept of lacking confidence in AI technology now morphs into the requirement of extreme confidence with LAWS. LAWS is a specific class of weapon systems capable of independently identifying a target and employing an onboard weapon system to engage and destroy it with no human interaction.[100] It requires a visual acquisition system intertwined with advanced machine learning algorithms to determine an object as hostile, make an engagement decision, and engage the target.[101] This technology is extremely reliant upon the advancement of AI. It is also one of the many ethical concerns that are debated continuously, primarily due to an inanimate entity determining life. Through LAWS, AI is elevated to have god-like capability of determining death for the most advanced life form on earth—humans. The omnipotent aspect of allowing a non-living entity that much authority over a human potentially violates religious beliefs as well as the aforementioned ethical theories. In this case, AI is purposefully used in conflict or war to kill.

On the surface level, killing appears to be the antithesis of beneficial AI. Beneficial AI can be compared to the medical field where it is used to aid in identifying disease and in

---

[98] Samuel R. White, Jr. and Eric Van Den Bosch, "Closer Than You Think: The Implications of the Third Offset Strategy for the U.S. Army," *Strategic Studies Institute*, October 26, 2017, 111~~, accessed May 15, 2019,~~ https://ssi.armywarcollege.edu/pubs/display.cfm?pubID=1371.

[99] White and Bosch, "Closer Than You Think," 111.

[100] Sayler, *Artificial Intelligence and National Security*, 14.

[101] Sayler, 14.

developing therapies and cures. Hence, beneficial AI is viewed as aiding humanity by advancing life and augmenting a greater understanding of human development. Thus, is AI that is used for war ethically unbeneficial? In the case of war and Clausewitz's view of "primordial violence," killing the enemy is a necessary means to end a war.[102] Additionally, the consequentialist view can argue that killing is a necessary means for peace. Killing is ultimately beneficial to any belligerents involved in a conflict. As stated earlier, human life and the advent of AI technology are inseparable, and war is historically a significant part of human life. Thus, the use of AI in combat may have ethical implications, but it can be also be used in a justified manner.

When the enemy is conducting an asymmetric fight, and target identification becomes exceptionally labor-intensive and time-consuming, there is a demand for technology to provide a better solution. This is where AI technology and the element of machine learning comes into play. "Machine learning can help automate one of the more tedious and time-consuming aspects of the forever war of finding people to kill."[103] This technology primarily rests on the development of AI and LAWS. The Pentagon's Project Maven was leading AI automation for deciphering large data before the revolt within Google over ethical concerns of building technology for war.[104] As a "pathfinder" AI project, Maven involves using machine learning to scan drone footage to help identify individuals, vehicles, and buildings that meet target engagement criteria.[105] This is closely associated with the purpose and use of LAWS.

---

[102] John C. Cairns et al., "On War," *Princeton University Press* 33, no. 3 (1976): 89, doi:10.2307/40201659.

[103] Ben Tarnoff, "Weaponized AI is Coming. Are Algorithmic Forever Wars Our Future," *The Guardian*, October 11, 2018, 2, https://www.theguardian.com/commentisfree/2018/oct/11/war-jedi-algorithmic-warfare-us-military.

[104] Tarnoff, "Weaponized AI", 2.

[105] Tarnoff, "Weaponized AI", 14.

In addition, LAWS is a technology that is yet reliant on legislation to come into fruition. The U.S. military does not currently have LAWS within its inventory, although there are no legal prohibitions on the development of LAWS.[106] Despite this policy, even senior military leaders express concern about the prospect of bringing LAWS into realization. For example, the 2017 testimony before the Senate Armed Services Committee, Vice Chairman of the Joint Chiefs of Staff General Paul Selva stated, "I do not think it is reasonable for us to put robots in charge of whether or not we take a human life."[107] Regardless of what position is finalized on the legality of LAWS, ethics will ultimately inform the final decision for legislation.

Even with personal views of leaders and legislative authority aside, AI does not determine whether the U.S. is benevolent in its actions during combat. Virtue ethics support just actions in battle akin to the moral theories of *jus ad bellum* and *jus in bello*. Many would disagree on whether the U.S. remained in line with those ethical and moral theories during the most recent conflicts in the Middle East. In 2017 alone, "the U.S. and allied strikes in Iraq and Syria killed as many as 6,000 civilians. Numbers like these don't suggest a few honest mistakes here and there, but a systemic indifference to 'collateral damage.' Indeed, the U.S. government has repeatedly bombed civilian gatherings such as weddings in the hopes of killing a high-value target."[108] Further, the ethical implications are not solely derived from AI technology, or its development. The repercussions of ethics also fall squarely on the institution wielding it.[109] AI's potential ability to track and kill enemies with more proficiency will make the institution more brutal if the use of AI is abused. It is abused if the data discrimination within the algorithm is too

---

[106] Tarnoff, "Weaponized AI", 3.
[107] Tarnoff, 14.

[108]Tarnoff, 3.

[109] Tarnoff, 3.

general wherein the AI system could analyze the data and arbitrarily kill individuals. The institution that continually wields that tool is abusing technology and violating the moral imperative to prevent harm.

In contrast, consequentialism can be used to ethically support the use and development of LAWS, as the expected benefits would outweigh the costs. First, LAWS can be used to target a High-value individual or combatant leader. By eliminating that individual off the battlefield, it may spoil adversary plans to conduct attacks and cause more deaths of civilians and military. Second, LAWS also potentially implement improved precision and thus reduce the number of civilian casualties or collateral damage.[110] Third, LAWS also have the potential to reduce the loss of human life by replacing the human with a machine, as discussed in the concept of scaling. Fourth, another aspect of justification of LAWS is the reduction of psychological impact resulting from directly engaging in combat with another human. This psychological impact is believed by many to be a causative factor for suicides in the military. Further research must be conducted to solidify the metric associated with combat and military suicides, but the empirical data from the most recent suicide report from Veteran Affairs expresses an alarming rate of suicide by combat veterans.[111] Even if such consequences are not considered a factor for utilizing LAWS, post-traumatic stress disorder (PTSD) is another factor that positively impacts the concept of reducing or eliminating humans on the battlefield. Both suicide and PTSD can be correlated to psychological issues instigated by combat. Because it is of high concern for the military and society, these issues require immediate attention. Fifth, the emotional impact alone

[110]Tarnoff, 4.

[111] U.S. Department of Veterans Affairs, "VA Releases National Suicide Data Report," Office of Public and Intergovernmental Affairs, June 18, 2018, https://www.va.gov/opa/pressrel/pressrelease.cfm?id=4074

on the populace regarding these subjects presents a strong case to be contended. Thus, ethical arguments for and against LAWS have significant counterpoints.

Some argue that there is a precautionary principle to act before harm is done. The deontological perspective would align with that thought, as some believe it would be wrong not to stop LAWS from coming into fruition. Like the points brought forth about an AI arms race, "there is already strong consensus in the international community that not all weapons are acceptable and that some have the potential to be so harmful that they should be preemptively banned."[112] Patrick Lin, an ethical philosopher, states that the prevention of harm caused by dangerous AI weapons is a moral imperative.[113] He, like others, believes that AI weapons will unnecessarily make warfare more inhumane and also make it harder to hold war criminals accountable.[114] Eliminating all elements of people who are considered to be a threat or qualify as an eligible target reduces any element of judicial trial or prosecution by means other than death.

The whole perspective of forging a prosperous future with peace, security, and AI is not impossible. The ethical impact of LAWS can easily take two sides. The nations of today can either promote a brighter future by "devising preventive security frameworks that will preventatively prohibit the weaponization of AI" or utilize LAWS for the common good of humanity by reducing military casualties in combat, mitigating PTSD and suicides, and efficiently targeting enemy combatants to preserve the peace. The ethical implications of both arguments are profound. One can note that both cases involve moral values and ethical theories.

---

[112] Denise Garcia, "Lethal Artificial Intelligence and Change: The Future of International Peace and Security," *International Studies Review* 20, no. 2 (2018), doi:10.1093/isr/viy029.

[113] Patrick Lin, "Ethical Blowback from Emerging Technologies," *Journal of Military Ethics* 9, no. 4 (2010): 313, accessed April 20, 2019, doi:10.1080/15027570.2010.536401.

[114] Garcia, Lethal Artificial Intelligence and Change, 338.

Until AI is developed with a greater granularity that fosters a better understanding of implementation within LAWS, the debate will not end anytime soon.

Conclusion

AI is a rapidly emerging technology that has the potential to disrupt all existing principles of warfare for the United States while challenging ethical values. This technology has significant ethical implications that directly affect a new AI arms race, combat on the battlefield, and future conflict on a global scale. Additionally, examination regarding the unpredictability of AI and LAWS broadens the scope of ethical issues beyond the technology itself. Reflection on these connections confirms the inseparable nature of ethical perspective, technology, and human life. It is incumbent on researchers, military leaders, legislation, and all humanity to apply some form of ethical understanding and moral based decisions to establish a framework for AI development and implementation with a clear path forward.

The ethical frameworks of deontology, consequentialism, and virtue are a reference to express how much morals differ depending upon the viewpoint of those that are analyzing them. It can be further argued that individuals do not make moral choices on just one ethical theory or moral philosophy. We, as humans, acquire moral values from our upbringing, and then modify these values when exposed to various inputs from cultures, subcultures, and different groups.[115] Gradually, we develop our mix of values that are influenced by "particular societal principles" that are not confined to any one moral philosophy or ethical theory.[116] Understanding the fluidity of any moral foundation as it differs for individuals and for groups is tremendously relevant.

---

[115] Amitai Etzioni and Oren Etzioni, "Incorporating Ethics into Artificial Intelligence," *The Journal of Ethics* 21, no. 4 (2017): 4, doi:10.1007/s10892-017-9252-2

[116] Etzioni and Etzioni, "Incorporating Ethics," 4.

Further, the relevance in understanding these morals as they apply to ethical theory is just as critical when dealing with an emerging technology as profound as AI. For these reasons, ethics is integral to AI technology development and implementation.

In the course of this research, the synthesis of the vast amounts of data on the state of AI technology points towards a future where humans and technology become inseparable. More specifically, as the true utility of AI and all of its applications continue to develop, humans will be just as reliant on the technology as the technology will be reliant on humans. Complex ethical issues continue to become intertwined with AI technology to the point that human affairs will not exist without it. The clash of the revolutionary technology of AI and human nature is not something to be discovered in hindsight. It is visible now. The advancement of this disruptive technology is likely. State and non-state actors, international organizations, private industry, military leaders, politicians, strategists, and ethical philosophers are engaged in trying to grasp the potential of AI and shape the trajectory in a direction that gives one an advantage on the world stage.

Lastly, it is necessary to continuously evaluate this technology and shape the trajectory in a manner that balances ethics and prevents the demise of the future. With prioritization, it is imperative that the United States embrace change and consider the ethical implications that may alter the world. Otherwise, revisionist powers like China and Russia will continue to focus on technological independence and dominance within the realm of AI. If uncontested, the United States will cede the winning path to its competitors and endanger the preservation of America's national security, interests abroad, and a genuine acknowledgement of the growing, inseparable nature of humans and technology.

Bibliography

Alderson, Ella. "AI and World War 3." *Medium*, June 05, 2018. https://medium.com/futuresin/ai-and-world-war-3-4798769a1b37.

Altmann, Jürgen, and Frank Sauer. "Autonomous Weapon Systems and Strategic Stability." *Survival* 59, no. 5 (2017): 117-42. doi:10.1080/00396338.2017.1375263.

American Heritage® *Dictionary of the English Language, Fifth Edition*. S.v. "categorical imperative." Retrieved May 29 2019 from https://www.thefreedictionary.com/categorical+imperative.

Andriole, Steve. "Artificial Intelligence, China And The U.S. - How The U.S. Is Losing The Technology War." *Forbes*, November 9, 2018. https://www.forbes.com/sites/steveandriole/2018/11/09/artificial-intelligence-china-and-the-us-how-the-us-is-losing-the-technology-war/#76f8cf3a6195.

Boddington, Paula. *Towards a Code of Ethics for Artificial Intelligence Research*. Cham, Switzerland: Springer, 2017.

Bogaisky, Jeremy. "Lockheed Lowers Price Of F-35 Under $90M In New Contract." *Forbes*, September 28, 2018. https://www.forbes.com/sites/jeremybogaisky/2018/09/28/cost-of-f-35-drops-under-90-million-in-new-contract/#726c5616183b.

Brian Dunbar, National Aeronautics and Space Administration, *Global Positioning System History,* May 29, 2019, https://www.nasa.gov/directorates/heo/scan/communications/policy/GPS_History.html.

Cairns, John C. *International Journal* 33, no. 3 (1978): 618-20. doi:10.2307/40201659.

Carter, Ash "Remarks on "The Path to an Innovative Future for Defense." CSIS Third Offset Strategy Conference, October, 26. 2016, https://dod.defense.gov/News/Speeches/Speech-View/Article/990315/remarks-on-the-path-to-an-innovative-future-for-defense-csis-third-offset-strat/

China's State Council, *A Next Generation Artificial Intelligence Development Plan*, technical paper no. No. 3 (Washington, DC: New America, 2017)

Delaney and John K., "Text - H.R.4625 - 115th Congress (2017-2018): FUTURE of Artificial Intelligence Act of 2017," Congress.gov, May 22, 2018, 2.

Department of Defense. "Defense Innovation Board's AI Principles Project." AI. Report. Department of Defense. Washington, DC. April, 2019. https://innovation.defense.gov/ai/.

U.S. Department of Defense, "New Strategy Outlines Path Forward for Artificial Intelligence," accessed February 02, 2019, https://dod.defense.gov/News/News-Releases/News-Release-View/Article/1755388/new-strategy-outlines-path-forward-for-artificial-intelligence/.

Department of Defense. *Summary of the 2018 Department of Defense Artificial Intelligence Strategy: Harnessing AI to Advance Our Security and Prosperity*. Report. Department of Defense. Washington, DC: Media.defense.gov, 2018. 1-17.

U.S. Department of Defense. *Summary of the 2018 National Defense Strategy of The United States: Sharpening the American Military's Competitive Edge.* (Washington, DC: The United States Department of Defense 2017)

U.S. Department of Veterans Affairs. "VA Releases National Suicide Data Report." Office of Public and Intergovernmental Affairs, June 18, 2018. https://www.va.gov/opa/pressrel/pressrelease.cfm?id=4074Etzioni, Amitai, and Oren Etzioni. "Incorporating Ethics into Artificial Intelligence." *The Journal of Ethics* 21, no. 4 (2017): 403-18. doi:10.1007/s10892-017-9252-2.

Garcia, Denise. "Lethal Artificial Intelligence and Change: The Future of International Peace and Security." *International Studies Review* 20, no. 2 (2018): 334-41. doi:10.1093/isr/viy029.

Gross, Daniel. "Innovating the Mundane." *Strategy Business*, October 31, 2017. https://www.strategy-business.com/blog/Innovating-the-Mundane?gko=7fb30.

Gunning, David. "DARPAs Explainable Artificial Intelligence (XAI) Program," in *Proceedings of the 24th International Conference on Intelligent User Interfaces – IUI 19 (*March 16-20, 2019). Accessed May 05, 2019. doi:10.1145/3301275.3308446.

Horowitz, Michael, Elsa B. Kania, Gregory C. Allen, and Paul Scharre *Strategic Competition in an Era of Artificial Intelligence*. Washington, DC: Center for a New American Security, 2018. Accessed April 04, 2019. https://www.cnas.org/publications/reports/strategic-competition-in-an-era-of-artificial-intelligence.

Hursthouse, Rosalind; Pettigrove, Glen, "Virtue Ethics", *The Stanford Encyclopedia of Philosophy (Winter 2016 Edition)*, Edward N. Zalta (ed.), https://plato.stanford.edu/archives/win2016/entries/ethics-virtue/>.

Illing, Sean. "The Rise of AI Is Sparking an International Arms Race." *Vox*, September 13, 2017.https://www.vox.com/world/2017/9/13/16287892/elon-musk-putin-artrificial-intelligence-war.

U.S. Joint Chiefs of Staff. *The Joint Force in a Contested and Disordered World*, *report no. JOE 2035, Joint Operating Environment* (Washington, DC: JCS, 2016.

Kania, Elsa B. "Battlefield Singularity." *Center for a New American Security*, November 28, 2018. https://www.cnas.org/publications/reports/battlefield-singularity-artificial-intelligence-military-revolution-and-chinas-future-military-power.

Kania, Elsa B. "Strategic Innovation and Great Power Competition." *The Strategy Bridge,* January 31, 2018.. https://thestrategybridge.org/the-bridge/2018/1/31/strategic-innovation-and-great-power-competition.

Kant, Immanuel, and H. J. Paton. *The Moral Law; Kants Groundwork of the Metaphysic of Morals*. London: Hutchinson University Library, 1978.

"Letter to Google C.E.O. " Accessed May 01, 2019. https://static01.nyt.com/files/2018/technology/googleletter.pdf.

Lin, Patrick. "Ethical Blowback from Emerging Technologies." *Journal of Military Ethics* 9, no. 4 (2010): 313-31. doi:10.1080/15027570.2010.536401.

Mack, Eric. "Elon Musk: Artificial Intelligence May Spark World War 3." *CNET*, September 04, 2017. https://www.cnet.com/news/elon-musk-artificial-intelligence-world-war-iii-russia-china/.

Markoff, John. "How Many Computers to Identify a Cat? 16,000." *The New York Times*, June 25, 2012. https://www.nytimes.com/2012/06/26/technology/in-a-big-network-of-computers-evidence-of-machine-learning.html.

Meyerriecks, Dawn. "USGIF Hosts Machine Learning & Artificial Intelligence Workshop." *Trajectory Magazine*, April 14, 2017. http://trajectorymagazine.com/usgif-hosts-machine-learning-artificial-intelligence-workshop/.

Mueller, John. "Nuclear Weapons Don't Matter." *Foreign Affairs*, January 29, 2019. https://www.foreignaffairs.com/articles/2018-10-15/nuclear-weapons-dont-matter?pgtype=hpg®ion.

"New Strategy Outlines Path Forward for Artificial Intelligence." U.S Department of Defense. Accessed February 02, 2019. https://dod.defense.gov/News/News-Releases/News-Release-View/Article/1755388/new-strategy-outlines-path-forward-for-artificial-intelligence/.

Oberoi, Archna. "10 Interesting Quotes about Artificial Intelligence." *Software Product Engineering & Team Augmentation Services*, October 23, 2017. https://insights.daffodilsw.com/blog/10-interesting-quotes-about-artificial-intelligence.

Office of Public and Intergovernmental Affairs. "VA Releases National Suicide Data Report." Go to VA.gov. June 18, 2018. Accessed May 15, 2019. https://www.va.gov/opa/pressrel/pressrelease.cfm?id=4074.

"New Partners To Strengthen Global Community of Practice" *The Partnership on AI*, May 15, 2019. Accessed May 15, 2019. https://www.partnershiponai.org/new-partners-to-strengthen-global-community-of-practice/

Reed, Tommy. "The 3 Major Phases of Effective Missile Defense Systems." *Microwaves & Radio Frequency*, September 20, 2017. https://www.mwrf.com/defense/3-major-phases-effective-missile-defense-systems.

Sandler, Ronald L. *Ethics and Emerging Technologies*. New York: Palgrave Macmillan, 2014.

Sayler, Kelley M. *Artificial Intelligence and National Security*. Report no. R45178. Congressional Research Service. Washington, DC: CRS, 2019.

Scharre, Paul. "Autonomous Weapons and Operational Risk." *Center for a New American Security*, February 29, 2016. https://www.cnas.org/publications/reports/autonomous-weapons-and-operational-risk.

Shanahan, Murray. *The Technological Singularity.* Cambridge: MIT Press, 2015.

Shaw, Jonathan. "Artificial Intelligence and Ethics." *Harvard Magazine*, April 30, 2019. https://harvardmagazine.com/2019/01/artificial-intelligence-limitations.

Simonite, Tom. "Artificial Intelligence Fuels New Global Arms Race." *Wired,* February 02, 2018. https://www.wired.com/story/for-superpowers-artificial-intelligence-fuels-new-global-arms-race/.

Singer, Peter W. "Do Drones Undermine Democracy?" *The New York Tim,.* January 21, 2012. ~~Accessed May 10, 2019.~~ https://www.nytimes.com/2012/01/22/opinion/sunday/do-drones-undermine-democracy.html.

Singh, Tejaswi, and Amit Gulhane. "8 Key Military Applications for Artificial Intelligence in 2018." *Market Research Blog,* October 3, 2018. https://blog.marketresearch.com/8-key-military-applications-for-artificial-intelligence-in-2018.

Speckhard, Anne, and Ardian Shajkovci. "Terrorists' Use of Drones Promises to Extend Beyond Caliphate Battles." *Homeland Security Today*, March 05, 2019. https://www.hstoday.us/subject-matter-areas/terrorism-study/terrorists-use-of-drones-promises-to-extend-beyond-caliphate-battles/.

Statt, Nick. "Google Reportedly Leaving Project Maven Military AI Program after 2019." *The Verge*, June 01, 2018. https://www.theverge.com/2018/6/1/17418406/google-maven-drone-imagery-ai-contract-expire.

Tarnoff, Ben. "Weaponized AI Is Coming. Are Algorithmic Forever Wars Our Future?" *The Guardian*, October 11, 2018.

https://www.theguardian.com/commentisfree/2018/oct/11/war-jedi-algorithmic-warfare-us-military.

Thompson, Nicholas and Ian Bremmer. "The AI Cold War That Threatens Us All." *Wired*, November 19, 2018. https://www.wired.com/story/ai-cold-war-china-could-doom-us-all/.

Tressel, Ashley. "Army Official: AI Will Eventually Require New Doctrine." InsideDefense, November 29, 2018.. https://insidedefense.com/daily-news/army-official-ai-will-eventually-require-new-doctrine.

Tucker, Patrick. "Here's How to Stop Squelching New Ideas, Eric Schmidt's Advisory Board Tells DoD." *Defense One*, January 17, 2018. http://www.defenseone.com/technology/2018/01/heres-how-stop-squelching-new-ideas-eric-schmidts-advisory-board-tells-DOD/145240.

U.S. President. The National Security Strategy of the United States of America. Washington, DC: White House, 2002. Accessed February 2, 2019. https://www.hsdl.org/?abstract&did=806478

Wetzel, Tyson. "Dynamic Force Employment: A Vital Tool in Winning Strategic Global Competitions." *The Strategy Bridge*, September 18, 2018. https://thestrategybridge.org/the-bridge/2018/9/18/dynamic-force-employment-a-vital-tool-in-winning-strategic-global-competitions.

White, Samuel R., Jr., and Eric Van Den Bosch. "Closer Than You Think: The Implications of the Third Offset Strategy for the U.S. Army." *Strategic Studies Institute*, October 26, 2017. https://ssi.armywarcollege.edu/pubs/display.cfm?pubID=1371.

Wivel, Anders. "Security Dilemma." Encyclopedia Britannica, January 07, 2019. https://www.britannica.com/topic/security-dilemma.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
07-06-2019	FINAL	

4. TITLE AND SUBTITLE

Artificial Intelligence: The Ethical Balance between Common Good and the Demise of the Future

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Jackson Doan, LtCol, USMC

Paper Advisor (if Any): Dr. Thomas Creely, Dr. Timothy Schultz, Jennifer Roberts

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Joint Military Operations Department
Naval War College
686 Cushing Road
Newport, RI 02841-1207

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Ethics in Emerging Military Technology
Graduate Certificate Program

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Distribution Statement A: Approved for public release; Distribution is unlimited.

13. SUPPLEMENTARY NOTES A paper submitted to the faculty of the NWC in partial satisfaction of the requirements of EEMT program. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.

14. ABSTRACT

Artificial Intelligence (AI) is a rapidly emerging technology that has the potential to disrupt the conduct of warfare for the United States while challenging ethical values. This research paper seeks to expound the topics on how ethics and AI are important to the military's future and how both elements affect the future in warfare. Additionally, further examination is done regarding the unpredictability of AI and Lethal Autonomous Weapon Systems, which broadens the scope of ethical issues beyond the technology. Through the ethical frameworks of deontology, consequentialism, and virtue, the analysis links how much morals differ depending upon the viewpoint of those that are analyzing them in regard to AI, ethics, and the current threat environment.

Lastly, it is argued that AI and ethics are becoming increasingly intertwined and impactful for the U.S. military and have profound implications regarding a technological arms race, evolutionary impact on combat, and potential for conflict on a global scale. Reflection on these connections confirms the inseparable nature of ethical perspective, technology, and human life. It is incumbent on researchers, military leaders, legislators, and polities to apply some form of ethical understanding and moral-based decisions to establish a framework for AI development and implementation with a clear path forward.

15. SUBJECT TERMS

Artificial Intelligence (AI), Ethics, Deontology, Consequentialism, Virtue, Military, Technology

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			Chairman, EEMT Dept
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED		44	**19b. TELEPHONE NUMBER** *(include area code)* 401-841-3556