

The Rise in Autonomous Technology, Autonomous Weapons Systems, and Robot Weaponry: *Enhancing Security or Increasing Threats?* An Ethical Analysis

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Abstract - Nation states - some secretly, some openly - are financing in robot weapons and autonomous weapons systems (AWS). Novel technologies have combined with countries' security worries to give escalation to a new arms race. Because a country can enter the automated weapons universe in a way that is impractical for nuclear weapons, states are trying to make their existence known in both the offline and online battlefields. We have pointed out several reasons for the rise in autonomous systems and robotics. We have also ethically analyzed these ongoing developments, focusing both on global security and global threats with explanations for AWS development/deployment and suggestions based on the ethical analysis and explanation. Also, we have outlined the major concerns with respect to such robot weapons, autonomous technology, and autonomous weapons systems.

Key Words: Autonomous Technology, Autonomous Weapons Systems, Ethical analysis, Global Threat, Robot Weapons, Security

1. INTRODUCTION

Nations are preparing for the battlefields in cyber space and on land space. Cyber warfare is handled by computer professionals, who also are increasingly involved in the physical battlefield, deploying numerous autonomous technology (AT) and autonomous weapons systems (AWS). AWS includes robot weaponry (RW), network connected battlefield devices and remote-controlled devices. The AWS and robotics industry are openly supported by many nations involving the United States, UK, Russia, China, and South Korea. The United States Department of Defense's (US-DoD) "Unmanned Systems Integrated Roadmap 2013 – 2038 [1]" sets a clear and concise plan for the upcoming 20 years, to develop and deploy such weapons in air, land, and sea.

The future of AI is intimately connected to the future of AWS, RW and AT. The development of Automated Technology has enabled the development of Autonomous Weapons Systems. Automated (driverless) vehicles make it easier to transport devices and supplies, with reduced risks of human troops. The use of robot weapons and autonomous weapons systems are currently most useful in land battlefields. The current international and intra-national laws and treaties are not keeping pace with the development of new weapons

technologies, [2] which ultimately encourages the proliferation cyber weapons and autonomous battlefield technology.

There are arguments for both and against the use of AWS and AT in war [3]. The support for AWS is generally by the defense community, which advocates for these weapons seeking military advantages (benefit to unmanned systems: perception, planning, studying, human-robot interaction, natural language understanding, and multi-agent coordination). Other supporters emphasize moral justifications for using the technologies. An open letter published in July 2015 warns the use of AWS as the third revolution in warfare (behind gunpowder and nuclear arms). The global society has agreed to bounds on mines and chemical / biological weapons, but a treaty on limiting AWS has not yet been consummated.

Our study is arranged as follows. In *Section II*, we give a brief overview of background study, earlier works and attempt to identify the need and usage of RW / AWS in various domains. In *Section III*, we discuss the rise of AWS in the present context (including their global threat and worries) followed by the ethical analysis (of the rise of both RW and AWS) in *Section IV*. We analyze the global rise in terms of Security or Threat (for the entire world) in *Section V* with ethical analysis of the rise in *Section VI* as well as conclusions and summary of our study in *Section VII*. In *Section VIII*, we presented the possible future scope of the study of AWS.

2. BACKGROUND STUDY

In [3], **A. Etzioni & O. Etzioni (2017)** figure merits and demerits of Autonomous Weapons Systems (AWS). "This technology has promoted a debate among military planners, roboticists, and ethicists about the development and deployment of munitions that can perform increasingly advanced functions, including targeting and operation of force, with little or no mortal oversight". There are arguments in support of AWS and in opposition to AWS on moral grounds. The support for AWS falls into two areas: military advantages of AWS and moral apologies for using them. An open letter (in July 2015) called for a ban on AWS; signatories included Elon Musk, Steve Wozniak, Stephen Hawking, Noam Chomsky, and over three thousand robotics and AI

experimenters) at an international joint conference on artificial intelligence (AI). The letter warns that AWS constitutes a third revolution in warfare, after gunpowder and nuclear arms. The letter emphasizes that AI has the implicit to help humanity, but that “military AI arms” can blemish AI’s character and reduce the unborn benefits of AI.

In [4], **I. Bode & H. Huelss (2018)** define two studies on constructivist models of standard rise: to begin with, constructivist approaches benefit the deliberative over the practical rise of standards; and moment, they overemphasize central standards instead of moreover accounting for procedural standards. Expanding on these critiques permits researchers to respond to a critical break in research: examine how benchmarks of procedural fittingness evolving in the development and usage of AWS frequently contradict fundamental standards and open legitimacy desires. The authors also laid out the contours of a investigate program on the relationship of standards and AWS, contending that AWS can have principal normative consequences by setting novel values of fitting activity in international security policy. They too addressed the emergence of procedural standards through advancing AWS and resulting tries to constructivist approaches in international relations (IR).

In [5], **E. Winter (2018)** recognized the problem in the context of autonomous vehicles driving beneath the regulation of household law; governments appear to be stirring towards a utilitarian arrangement to problems with the unavoidable harm that will happen when the vehicles are deployed in large numbers. Autonomous machines are moving quickly from science fiction to science reality, where this autonomous technology defines the highlight as it can work “independently of human control”. Subsequently, society must consider how “decisions” are able to be made by autonomous machines. The matter is especially intense in circumstances where hurt is inevitable, no matter what course of deed is taken. This leads one to address whether utilitarianism ought to be transposed into the setting of autonomous weapons which might soon operate on the battlefield beneath the look of humanitarian law. The contention here is that it ought to because humanitarian law incorporates the most rule of ‘proportionality’.

In [6], **D. Amoroso & G. Tamburrini (2020)** proposed relinquishing the quest for a one-size-fits all result to the Meaningful Human Control (MHC) issue in favor of an appropriately separated approach, that may help sidestep current stumbling blocks. The reason was to supply readers with a compact account of progressing academic and diplomatic debates about approximately independence in weapons systems, that is, about the moral and legitimate acceptability of letting a robotic system unleash damaging dynamism in fighting and make life-or-death choices without any human intervention. The creators highlight the pivotal role played by the robotics research community to start ethical and lawful debates about independence in weapons systems. It is pointed out that these different concerns have

been mutually taken to care the thought that all weapons systems, including autonomous ones, ought to stay beneath MHC. At last, it is emphasized that the MHC thoughts loom huge on shared control approaches to adopt in other ethically and legally penetrating application domains for robotics and artificial intelligence.

In [7], **M. Skerker et al. (2020)** investigated the ancestries of various deontological concerns with AWS and to consider whether these concerns are unmistakable from any concerns that also apply to long-distance, human-guided weaponry. Artificial agents, of which AWS are one illustration, cannot realize the value of human life. To numerous, the awareness of AWS murdering human beings is bizarre. Yet faultfinders have trouble explaining why it ought to make a critical moral difference if a human combatant is murdered by an AWS as contradicted to being murdered by a human combatant controlling a comparative machine. A human combatant cannot handover his benefits of focusing on foe combatants to a robot. Hence, the human duty-holder who deploys AWS breaches the martial contract between human combatants and disrespects the targeted combatants. The creators moreover considered whether this novel deontological complaint to AWS shapes the groundwork of few other popular yet defective deontological complaints to AWS.

In [8], **N. Kshetri (2021)** surveyed various aspects of computer ethics and found AWS and RW as one of the major concerns in order to make a machine work without intervening and harming others. The current technological advancements with different ethics and need of morality has raised concerns whether weapons should be *human-guided* or *machine-guided*. The author also discussed machine ethics in the context of AI, robotics, and fuzzy systems. We can expect more social and ethical challenges from robotics and AWS sooner or later because the robotics and AWS industry (including AI, Machine Learning, and use of robo-tanks) is emerging the same way as computer and IT industry business did earlier. The author also concluded that supporters and non-supporter of AWS and “robot army” both have their legal agenda, but unless they can be utilized for “constructive works and emergency” help like natural disasters (rather than in wars, attacks, and weapons).

In [9], **R. Sparrow (2016)** concluded that in spite of the fact that the theoretical establishments of the thought that AWS are weapons that are criminal in themselves are weaker than critics have sometimes kept up, they are nonetheless sufficient enough to support the request for a ban of the improvement and deployment of such weapons. If our main consideration is to reduce the number of noncombatants passing, it becomes simple to assume AWS being ethical: they would essentially have to be better than human creatures at recognizing between legitimate and illegitimate targets in few given domains. Be that as it may, if we are concerned with what we owe noncombatants and others who are not honestly subject to lethal force, then the merely statistics form of discrimination achievable by robots may be

missing. The creator moreover focuses out that the line of argument created here is still equal to the task of justifying a worldwide treaty forbidding the broadening and deployment of AWS on the grounds that such arms are “evil in themselves”.

In [10], **K. M. Saylor (2020)** of Congressional Research Service (CRS) updated the US policy on lethal autonomous weapon systems (LAWS) and also raised some potential questions for the U.S. Congress. Since 2014, the United States has participated in international discussions of LAWS under the UN Convention on Certain Conventional Weapons (UN CCW) which is now a Group of Governmental Experts (GGE) tasked with observing the technological, military, ethical and legal dimensions of LAWS. Around 30 nations and 165 nongovernmental organizations have entitiled for a preemptive prohibition on LAWS due to ethical concerns, including operational risk, accountability for practice, and compliance with the proportionality and peculiarity requirements of the commandment of war. The US government does not currently sustenance a prohibition on LAWS, and has talked ethical concerns about the systems in a white paper (March 2018), “Humanitarian Benefits of Emerging Technologies in the Area of Lethal Autonomous Systems” which notes that “automated target identification, tracking, selection, and engagement roles can tolerate weapons to strike armed objectives more precisely and with less hazard of collateral damage”.

In [11], **J. Herkert, J. Borenstein, and K. Miller (2020)**, raised the lessons learned from the case included and the need to toughen the opinion of engineers within fat organizations. The authors presented the crash of two 737 MAX customer aircraft in late 2018 and early 2019, and succeeding grounding of the entire fleet of 737 MAX jets, that turned a global spotlight on Boeing’s practices and beliefs. The explanations for the smashes include several reasons (from design defects within the MAX’s new flight control software system to the lack of adequate monitoring of Boeing) but no one has written on the ethical significance of the calamities, in particular the ethical accountabilities of the engineers at Boeing and the FAA involved in designing and certifying the MAX. The authors also pointed out the need for superior involvement of professional engineering societies in ethics-related activities and for extensive emphasis on moral bravery in engineering ethics education. Conclusions and recommendations include valuable lessons for engineers and engineering mentors concerning the ethical responsibilities of the profession. Safety is not discounted, but careless engineering design in the tag of minimizing budgets and adhering to a delivery calendar is an indicator of ethical blight.

In [12], **J. Borenstein, J. Herkert, and K. Miller (2020)**, explored the ethical responsibilities of designers, producers, operators, and controllers of the technology since the design and deployment of autonomous vehicles is likely to proceed. The authors centered on the ethical responsibilities

encompassing autonomous vehicles (AVs) that these partners have to ensure the safety of non-occupants, meaning peoples who are around the vehicles (AVs) while they are operating. The term “non-occupants” incorporates, but is not constrained to, sidewalks peoples and cycle users. Authors are also curious in how to dole out moral responsibility for the safety of non-occupants when autonomous vehicles are launched in a complex, land-based transportation framework. One way to look at questions about duty for human security is to examine open statements by publics driving efforts to mechanize vehicles. The insistence of security as a priority is common among defenders of autonomous vehicles. Clearly, this ought to be a priority, but it supports questions about whose security is being prioritized. Similar, and perhaps even more disturbing, ethical issues arise when the autonomous vehicles are used in warfare.

3. RISE in AT & AWS

The prioritization and rise of automated vehicles (privately owned and used by one-family) as compared to the public transportation system (like automated trains from the 1980s) raises interesting ethical questions worldwide. The transportation industry with such public trains and rails can be an alternative to rapid expansion of AT in terms of protecting non-occupants and passengers [12]. This expansion and investment of AT (by several private vehicle companies and nations) is seen as a direct connection and expansion of Autonomous Weapons Systems too.

Support for AWS and RW are also going on rapidly worldwide saying that it will remain under the meaningful human control (MHC) and for the sake of military support by the government and national advantages to counter the terrorist groups (that are active in parts of Asia and Africa). The supporters also pointed out the human benefits with the use of AWS and RW in collaboration of new technologies like AI and Robotics.

Although there are strong arguments for “preemptive ban” of Autonomous Weapons Systems (AWS) on one side, there is huge investment for AWS and the number of AWS is growing every year on the other side. To come up with an ethical analysis and find the exact reason of the rise, we have tried to summarize the “for and against of AWS development and deployment” in the table below:

Table-1: Comparisons of the support arguments and opposition arguments of AWS (based on the Background study presented in Section II of our paper) [3] [6] [8] [10]

AWS support arguments	AWS opposition arguments
i. Military (and also national) advantages and support.	i. Third revolution in war (after gunpowder and nuclear arms).

ii. Moral justifications of using AWS.	ii. Can tarnish AI's reputation.
iii. Human benefits of new technologies in area of lethal autonomous weapons.	iii. Ethical concerns (operational risk, and accountability for use).
iv. Less risk of collateral damage or civilian casualties	iv. Proportionality compliance and distinction requirements of the law of war.
v. Utilized for constructive works and in natural disasters.	v. The future of armed conflict due to extensive deployment of AWS; the possibility of automated accidental start of hostilities, and the accidental escalation of hostilities.
vi. Remains under the "meaningful human control (MHC)".	vi. AWS (including AVs) are weapons that are evil in themselves.

with base as a cyberwar, that included disruption of governments and banking payments and with controlling each other government's websites [15]. After a limited cyberwar, Russia invaded Ukraine in a conventional land-based war. This recent example illustrates that cyberwar, perhaps using autonomous Internet bots, may eventually lead to other conventional land-based conflicts.

IV. Global rise of online devices and users: The escalation in virtual devices in the ratio of handlers (almost any handler having five linked devices), is the main source of online crimes and cyber-attacks [16] [17]. As proposed by N. Kshetri & A. Sharma (2021) in the EAMV model (Ethics, Authentication, Monitoring and Verification), the Online learning to Online Watching (which includes Work From Home too) must be authenticated ethically with monitoring, and verification for the online data and information. The four firewalls (EAMV) are requested as a requisite in the safety model to pawn the online attacks. This proposed model overcomes the escapes of existing security models with participation of computer ethics, supervising online request source and achieving two-way authentication process.

V. Less or no use of "computer/machine and cyber ethics": Although computer ethics is a explore arena entirely dedicated to addressing ethical defies brought up by information revolt, it cannot be done and addressed as much expected till now [18]. Understanding and controlling secrecy, anonymity, and security in the info age are still selected of the most compelling difficulties since the 80s. The dispute on the moral standing of artificial agents commences with requirements an artificial agent must encounter to succeed as an autonomous agent with fewer or minimal habit of machine ethics.

4. WHY THERE IS A GLOBAL RISE IN AT/AWS?

Although we cannot point out a single reason to be the primary concern of increasing AWS, we have pointed and discussed several aspects before the rise.

I. Global and nuclear arms race between nations: The strength of AI across the world which shows China on the top (based on research publications and patents), followed by US and other countries including Korea, Japan & India [13], have clearly paved the way for an AI arms race between nations. The national policies and strategies are important factors for success and the leading countries are investing billions of dollars to boost their nuclear and arms backups. International collaboration between European and American countries in arms and immunizations with government investment in R&D is now at the highest level than ever before in history.

II. Shortage of manpower, workers (cyber security personnel) in all industries worldwide: The actual impression on cyber threat levels in administrations is probably due to the global security skills shortage despite organizations taking some steps to recover it [14]. The steps by the organizations involve training (36%), anticipation of further bendable working (33%), and financing in diversity, equity, and inclusion (DEI) ingenuities (29%) along with the usage of cloud service suppliers (38%), automation of labor-intensive tasks (37%) and getting staff tangled in third-party relationships (32%). According to Clar Rosso, CEO of (ISC)², "growth in international allocation of cybersecurity professionals is cheering, but in reality, we still need, and urgency of task before us, insufficient old-fashioned hiring practices, we should put public afore technology, and embrace remote labor as an opportunity".

III. Cyber as the emerging base (other than air, land & sea) of warfare: The recent war of Russia and Ukraine first started

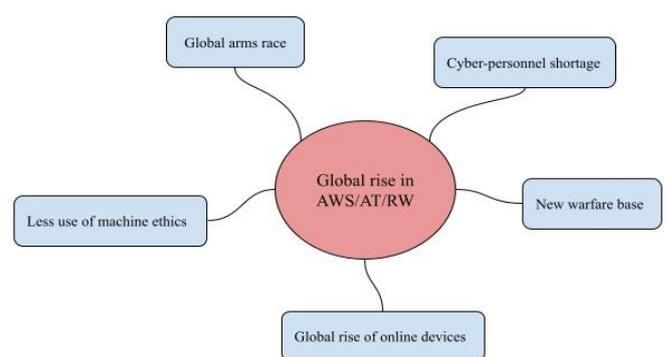


Fig-1: Summary of the five major reasons of global rise in Autonomous Weapons Systems (AWS), Autonomous Technology (AT), and Robot Weaponry (RW) (based on the Section IV of our study) [13] - [18]

5. IS THE RISE OF AT AND LAWS ADDING SECURITY OR RISK?

The use of Autonomous Technology (AT) and Lethal Autonomous Weapons System (LAWS) is shaping an international debate on several grounds. AWS today has a direct relationship with artificial Intelligence (AI) and robotics (especially robot weaponry). It clearly shows the threats for global society during peacetime [19]. The jeopardies of AT for humanity are not restricted to its weaponized procedure during an armed struggle. AT/AWS also bears threats for the entire sphere when it is not weaponized. It is potentially imaginable to tie AT and bioweapons, in that way could be extent by AWS. (Biological munitions are considered to blowout disease between people, wildlife, and floras by announcing microorganisms and toxins, such as bacteria and infections.)

The use of Nuclear Weapons for defensive purposes by nations around the world has already been debated in the United Nations (UN), Human Rights Council (HRC) and several other bodies. The sovereignty in weapons systems is now proceeding rapidly [20] (some examples are US-X47B, UK-Taranis, and French-nEUROn etc.). There are multiple operational risks including human intervention speeds and in the series of decision-making as a fail-safe instrument. AWS are broadly viewed as harbingers of a paradigm swing in combat as they are intelligent to make judgements on the consumption of lethal force lacking a humanoid in the decision-making round. From an ethical opinion of view, it is debated that AWS violates fundamental human values and many kingdoms have called for a preventive prohibition except dual homelands (Israel and the US) have contended that such machines may bid certain remunerations.

Robots (primarily remote-controlled) are skilled of hunting and killing foes on their specific, as installed by military powers around the globe as well as further innovative ones are on their way. The initiation of autonomous war-fighting engines has outstretched various alarms in the global community and progressively spawns objections [21]. In a statement to UN Council of Human Rights, the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, Mr. Christof Heyns, debated that the disposition of lethal autonomous robots (LARs) "could be objectionable because no adequate system of permissible accountability can be formulated, and since robots ought not have the authority of lifecycle and decease over human beings." The genuine threat existing by these systems arises in the form of relaxed, creeping, and continuous drive to autonomous war-fighting aptitudes in progressively difficult technological struggles.

Questions about the deployment of autonomous weapons along land borders in future to stop refugees or in the Israel Palestine war advance further thoughtful issues. Autonomous weapons will increase a host of practical

difficulties, from causing pricey and geopolitically destabilizing munitions races, to their susceptibility to pony-trekking and spoofing, to empowering trivial group of publics - even individuals - to set free massive levels of destruction and kill in boundless numbers, constituting an innovative kind of armament of bulk destruction [22]. Issues from the perspective of government sovereignty and national/global safekeeping should be concentrated. To reflect the allegations of human rights as well as the scenarios of democracy and open/free beliefs in the era of algorithms of viciousness, AWS possesses threats to the entire globe.

The area of lethal autonomous weapon systems (LAWS) has gathered communal attention and broad media coverage due to renowned scientists and technologists mentioned about their development and deployment. The cyber defense tactic and model followed by best countries shortage computer and cyber ethics that are cast-off to safeguard people, countries, networks, and systems. These developments advance important and multifarious safety, legal, ethical, communal, and technological concerns discussed by researchers, NGOs, governments, intercontinental community however robotics public has stayed out of the difference despite being a foremost provider of autonomous technologies [23] [24]. The operation to end killer robots made by ten NGOs and headed by the Human Rights Watch, necessitated a comprehensive, preemptive prohibition on the development and practice of fully autonomous weapons. Nations with innovative weapons manufacturing, such as Russia, the United States and Israel claim that there is no precondition to negotiate a distinct treaty for AWS and the modern global commandment is enough.

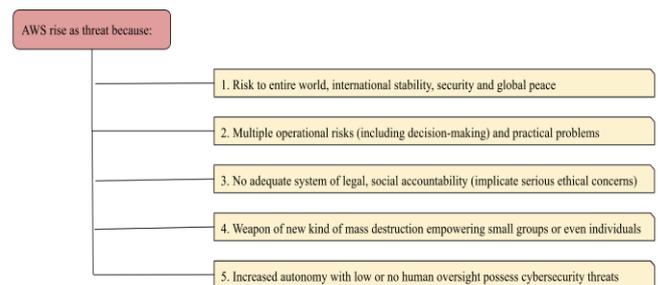


Fig-2: Summary of the five major reasons of AWS/RW rise as threat (based on the Section VI of our study) [19] - [24]

6. ETHICAL ANALYSIS OF THE RISE

There is no doubt that the use of AWS is growing every year and nations are investing billions of dollars for its development and deployment. The debate of AWS, Robot Weapons, and their ethics regarding their regulation under international law is a growing public debate. The increase in use of AWS, RW by the US military has drawn the attention of several human rights organizations (including Human

Rights Watch), and by several nation states including Russia and China. Any weapon that does not necessitate a human operator could be measured as an AWS, as DoD Directive defines “weapon system, as soon as activated, can hand-picked and appoint targets without more intervention” [25] [26]. If the US is the first country to adopt a formal policy on autonomy in weapon systems, this initiative will set an alarm for all the nation states worldwide. The extraordinary-profile public dispute over law and ethics of AWS kicked off in November 2012 after two unlike documents released by US DoD and the international law of armed conflict (LOAC) - the organization of worldwide law also known as international humanitarian law (IHL).

The International Committee of the Red Cross (ICRC) explains AWS as “weapons that can autonomously handpick and object attacks, i.e., with independence in the serious roles of acquiring, tracing, selecting and infecting” [ICRC 2014]. AWS and the predator robots are also criticized because of their potential to degrade human dignity. The three key types of oppositions to AWS identified are, (i) disputes based on outfits and AWS capability to conform to global humanitarian law; (ii) deontological opinions on necessity for human judgment and MHC, including disagreements on human dignity; (iii) explanations about their effects on worldwide stability and probability of going to warfare [27]. There are also further weapons, and other know-hows, that also compromised individual dignity. While there are quite a few ways in which AWS can be said to be in contradiction of human dignity, they are not special in this regard.

The clash between nations for military gain is motivating the development of AWS. A worldwide arms control settlement prohibiting AWS may represent the only way to thwart this competition. It is thus required to consider the ethical case for the expansion and deployment of AWS [28]. The hidden issue regarding AWS ethics, concerns whether these armaments are companionable with the condition of humanity respecting our opponents underprops the ideologies of *jus in bello*. Kingdoms that have the power to develop or pitch AWS will also have to tackle the query as to whether the ethical case for any such contract is worth the cost of military gain. There is the ethical circumstance to be made for functioning such a settlement and are matters for extra dialogue and argument.

One argument against AWS autonomous kills is as follows: When AWS destroys an enemy, the agent of the combatant's decease is not a duty-bearer, and therefore, being killed by AWS is a harm of the victim's human rights. With technical borders or constitutional ramifications, researchers have uttered protestation to the development and deployment of completely AWS. Artificial agents, of which AWS are single example, currently are not considered agents that can realize the value of human life [29]. Scholars have raised ethical complaints to use of AWS, advising that such systems would be vulnerable to hacking and must not be employed even if

the governmental and methodological concerns could be focused. If these arguments are correct, any individual duty-holder who installs AWS breaches the martial treaty between human fighters and disrespect the aimed soldiers.

The arguments above assume that the AWS accurately target and kill the intended combatants. However, other arguments point out that AWS may incorrectly kill non-combatants, or have other unintended, unwanted side effects. If computer visualization were to outshine human visualization, AWS could become superior to human soldiers at discriminating nationals from enemy fighters and engaging right objectives. However, that theoretical excellence in targeting has not been demonstrated. Furthermore, the more complicated the software, the more probable it will have contaminations (typically pondered to be software vulnerabilities) that can cause calamities. Hacking during battle is likely to cause momentous destruction that presents fresh and objectionable risks. The only practical way to reduce these hazards is certainly not to position AWS, though they are industrialized.

The horizontal of speculation into army robotics (including AWS and RW) is carried out by almost all nations either directly or secretly. Unlike human militaries, AWS are unaffected by emotional factors that root them to action outside of the command series [30]. Human soldiers sometimes refuses unethical orders; AWS are unlikely to do so.

Table-2: Summary of the ethical analysis and case of AWS rise, explanation with suggestions for AWS arguments, development, and deployment

Ref.	Ethical Analysis	Explanation	Suggestions
[26]	Although humans may still be watching the functioning of the AWS / Autonomous Military robots, the next sound footstep is to handover incrementally more of the decision-making authority to the robot themselves. It is generally contended that there are fascinating ethical surroundings to close the practice of Autonomous Weapons Systems.	The US army (along with the army of Russia, China, UK, and other nations) is aggressively constructing and deploying a variability of AWS / AV / robotic systems, it is essential to remain discovering the ethical measurements of such systems.	We are not always horribly decent at presuming out when and how the latest technological development will manifest itself. If expansions in AI do carry on moving onward, reaching nearby to human brain duplicating, some fears relating to AWS may conceivably reduce.

[27]	Types of concerns to AWS are: (i) tech-based disputes and aptitude to agree to IHL, (ii) deontological disputes based on human conclusion, (iii) consequentialist motives about their outcome on global constancy & battle chance.	Although there have been blames of the reliance on humanoid dignity in opinions against AWS, some of the several reasons given in calls for the stoppage of AWS is that they are beside human dignity.	It is resolved that while there are various ways in which AWS can be said to be opposing to human dignity, they are not distinctive, it is wiser to draw on several sorts of oppositions in disputes versus AWS.
[28]	The ethical case for allowing autonomous targeting is tougher than faultfinders have acknowledged and there would be somewhat ethically challenging nearly such pointing.	The principle of dissimilarity recommends that the practice of AWS is unethical by integrity of lacking to display suitable respect for the humanity of our enemies.	AWS are missiles that are "wicked in themselves", they are nevertheless enough to the task of challenging a prevention of the expansion and deployment of such armaments.
[29]	It creates a significant moral modification if a human warrior is destroyed by AWS as contrasting to being killed by a human soldier and these worries are dissimilar from any other worries.	One key driver to lethal AWS is that their usage disrespects their human objects by violating the martial treaty between human fighters and defective deontological doubts to AWS.	A human soldier cannot handover his privileges of targeting an enemy to a robot. Hence, the human duty-holder who installs AWS violates the martial agreement.
[30]	Moral explanations for the placement of AWS is challenged because AWS are unaltered by mental dynamics.	Many ethical complications are associated with AWS incorporating direct consequences of the independence given in picking and winning objects.	Software that routes AWS will have to break binary troubles former - (i) the frame problem and (ii) the representation problem.

7. CONCLUSION

In our opinion, AWS are ethically unpleasant because they are incapable to make moral judgements or to undertake for moral reasons in deciding whom to destroy. It is

impermissible to position AWS to damage enemy combatants, since rival combatants cannot cede rights in contradiction of being hurt by AWS. Another objection to practice of AWS is a missile *mala in se* in benefit of lacking to acknowledge the combatant's humanity. Employing an armament that destroys without acknowledging the humanity of its targets is disrespectful to those targets, and (some argue) to humanity as a total. Problem for this concern is extra sense, if AWS will be stronger than humans at discriminating (legitimate and illegitimate) objects, employing AWS combat is courteous to objects to provide superior assurance of targets aggression (in case of surrender or incapacitation). AWS are duty-bearers, and so opponents cannot cede a claim-right to AWS in contradiction of being targeted by them. All AWS purposes are illegitimate targets which is the major reason for AWS's failure to acknowledge the humanity of its targets.

The principles of *jus in bello*, matter regarding the ethics of AWS, worries the routine of these weapons with respect necessity for humanity. The relationship of admiration is absent, and their practice would be unethical, as AWS as "artificial agents" that select aims to assault. States or nations having capacity to position AWS will likewise have to confront the query as to whether the ethical example for any worldwide treaty and the growth of these autonomous technology weapons are not sheltered to the entire world but instead, they are a serious threat.

8. FUTURE ISSUES

There are matters and issues for further discussion and argument - and where, moreover there can be military advantage of using such autonomous weapons, autonomous technology, and robot weaponry. There are other weapons, and other technologies, (apart from AWS and robotics) that also compromise human dignity. It is sensible to draw on numerous types of protestations in arguments counter to AWS, and not only count on on a single concept. The prohibition on autonomous weapons systems should be at resident level or at international level is also another important issue and ought to be determined by the United Nations (UN), Human Rights Council (HRC), and International Committee of the Red Cross (ICRC), International Humanitarian Law (IHL), and International Committee for Robot Arms Control (ICRAC), and other bodies urgently.

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DATA AVAILABILITY STATEMENT

Not applicable.

CONFLICT OF INTEREST

None.

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REFERENCES

- [1] Homeland Security Digital Library, Unmanned Systems Integrated Roadmap, FY2013-2038, <https://www.hsdl.org/?view&did=816179>
- [2] N. Kshetri (2017), "Cyber Strategy of Government of Nepal (GoN)", *SSRN Electronic Journal*, DOI: <https://doi.org/10.2139/ssrn.3552143>, July 27, 2017
- [3] A. Etzioni and O. Etzioni (2017), Pros and Cons of Autonomous Weapons Systems, *Military Review May-June 2017*, PDF form www.amazonaws.com
- [4] I. Bode and H. Huelss (2018), Autonomous weapons systems and changing norms in international relations, *Review of International Studies* Vol. 44, Part 3, pp. 393-413., DOI: 10.1017/S0260210517000614, © British International Studies Association 2018
- [5] E. Winter (2018), Autonomous Weapons in Humanitarian Law: Understanding the technology, its compliance with the principle of Proportionality and the role of Utilitarianism, *Groningen Journal of International Law*, Vol 6(1) DOI: 10.21827/5b51d56abd19e, pp. 183-202
- [6] D. Amoroso and G. Tamburrini (2020), Autonomous Weapons Systems and Meaningful Human Control: Ethical and Legal Issues, *Current Robotics Reports (2020) 1:187-194*, Springer, <https://doi.org/10.1007/s43154-020-00024-3>, Published online: 24 August 2020
- [7] M. Skerker et. al. (2020), Autonomous weapons systems and the moral equality of combatants, *Ethics, and Information technology (2020) 22: 197 - 209*, <https://doi.org/10.1007/s10676-020-09528-0>, Published online: 23 February 2020, © Springer Nature B.V. 2020
- [8] N. Kshetri (2021), "A survey of Computer Ethics (w.r.t to Artificial Intelligence, Robot Weaponry, Fuzzy Systems, Autonomous Vehicles)", *International Journal of Innovative Technology and Exploring Engineering (IJITEE)*, ISSN: 2278-3075, DOI: <https://doi.org/10.35940/ijitee.D8582.0210421>, Volume-10, Issue-04, February 2021
- [9] R. Sparrow (2016), Robots and respect: Accessing the case against autonomous weapon systems, *Ethics, and International Affairs 2016 - pp.93 - 116*. cambridge.org, DOI: 10.1017/S0892679415000647, Published online: 10 March 2016
- [10] Congressional Research Service, K. M. Saylor (2020), page no. 2, Defense primer: US policy on lethal autonomous weapon systems, <https://apps.dtic.mil/sti/pdfs/AD1121848.pdf>
- [11] Herkert, J., Borenstein, J., and Miller, K. W. (2020). The Boeing 737 MAX: Lessons from Engineering Ethics, *Science and Engineering Ethics (2020) 26:2957-2974*, Volume 26, Issue 6, Pages: 2957-2974, December 2020, Springer Netherlands, DOI: <https://doi.org/10.1007/s11948-020-00252-y>
- [12] Borenstein, J., Herkert, J., and Miller, K. W. (2020). Autonomous vehicles and the ethical tension between occupant and non-occupant safety, *The Journal of Sociotechnical Critique*, Volume 1 Issue 1, 1-14, November 2020, DOI: <https://doi.org/10.25779/5g55-hw09>
- [13] Ghi T, and Srivastava A. (2021). The Global Arms race - How nations can avoid being left behind, *Arthur D Little PRISM / 1 / 2021*, pp. 92 - 103, <https://www.adlittle.com/sites/default/files/prism/GlobAI%20AI%20article.pdf>
- [14] P. Munacaster, Global security skills shortage falls to 2.7 million workers, *Infosecurity Magazine*, 26 Oct 2021, <https://www.infosecurity-magazine.com/news/global-security-skills-shortage/>
- [15] Martin Ciaran, Wednesday, March 2, 2022, Ukraine Crisis 2022, Cyber Realism in a Time of War. *LawFare*, <https://www.lawfareblog.com/cyber-realism-time-war>
- [16] N. Kshetri and A. Sharma (2021), "A review and analysis of online crime in pre & post COVID scenario with respective counter measures and security strategies", *Journal of Engineering, Computing and Architecture (JECA)*, ISSN: 1934-7197, Volume XI, Issue XII, Page 13-33, DOI: <https://doi.org/17.0002.JECA.2021.V11I12.200786.7902>, December 2021.
- [17] N. Kshetri (2022), "The Global Rise of Online Devices, Cyber Crime, and Cyber Defense: Enhancing Ethical Actions, Counter Measures, Cyber Strategy, and Approaches", *Dissertations*. 1155. <https://irl.umsl.edu/dissertation/1155>, Department of Computer Science, UMSL, DOI: <https://doi.org/10.13140/RG.2.2.33257.57446>, May 2022.
- [18] K. Miller and M. Taddeo (2020), *The Ethics of Information Technologies*, *Routledge (imprint of Taylor*

- & Francis Group), Publication date: 2020/8/13, ISBN: 978-1-4724-3174-5 (hbk), <https://books.google.com/books?hl=en&lr=&id=A1LzDwAAQBAJ&oi=fnd&pg=PT8&ots=tclRMqvKO9&sig=9vmohQ0YSybjhvQnN8wj00ZqFw#v=onepage&q&f=false>
- [19] R. Surber (2018), Artificial Intelligence: Autonomous Technology (AT), Lethal Autonomous Weapons Systems (LAWS) and Peace Time Threats, *ICT4Peace Foundation and the Zurich Hub for Ethics and Technology (ZHET)*, Scientific Advisor, ict4peace.org, https://ict4peace.org/wp-content/uploads/2018/02/2018_RSurber_AI-AT-LAWS-Peace-Time-Threats_final.pdf
- [20] F. Sauer (2016), Stopping 'Killer Robots': Why now is the time to ban Autonomous Weapons Systems, *Arms Control Today*, October 2016, Volume 46, Number 8, <https://www.armscontrol.org/taxonomy/term/510>
- [21] J. M. Beard (2014), Autonomous Weapons and Human Responsibilities, *Digital Commons @ University of Nebraska - Lincoln, College of Law, Publications*. 196. <https://digitalcommons.unl.edu/lawfacpub/196/>
- [22] P. Asaro (2019), Algorithms of Violence: Critical social perspectives on Autonomous Weapons, *Social Research: An International Quarterly*, Vol. 86, No. 2, Summer 2019, page 537 - 555, https://peterasaro.org/writing/Asaro_AlgorithmsViolence.pdf
- [23] N. Kshetri & K. Miller (2021), "A Study of Cyber-Defense Ethics and Initiatives by Governments of Under Developing Nations: A study of selected countries", *International Journal of Analytical and Experimental Modal Analysis (IJAEMA)*, Online ISSN: 0886-9367, Volume: XIII, A Study on Cyber-Defense Ethics and Initiatives by Governments of Under Developing Nations: A Study of Selected Countries, Issue: I, Page: 977-986, DOI: <https://doi.org/18.0002.IJAEMA.2021.V13I1.200001.015685901966>, January 2021.
- [24] L. Righetti et. al. (2018), Lethal Autonomous Weapon Systems, Ethical, Legal, and Societal Issues, *IEEE Robotics & Automation Magazine*, Volume: 25, Issue: 1, Pages: 123-126, March 2018, DOI: <https://doi.org/10.1109/MRA.2017.2787267>
- [25] G. C. Allen (2022), DOD is Updating Its Decade-Old Autonomous Weapons Policy, but Confusion Remains Widespread. Center for Strategic and International Studies (CSIS), Director, AI Governance Project and Senior Fellow, STP, June 6 2022, <https://www.csis.org/analysis/dod-updating-its-decade-old-autonomous-weapons-policy-confusion-remains-widespread>
- [26] K. Anderson and M. C. Waxman (2017), Debating Autonomous Weapon Systems, Their Ethics, and Their Regulation Under International Law. *THE OXFORD HANDBOOK OF LAW, REGULATION, AND TECHNOLOGY*, ROGER BROWNSWORD, ELOISE SCOTFORD & KAREN YEUNG, EDS., OXFORD UNIVERSITY PRESS, 2017; AMERICAN UNIVERSITY WASHINGTON COLLEGE OF LAW RESEARCH PAPER NO. 2017-21; COLUMBIA PUBLIC LAW RESEARCH PAPER NO. 14-553 (2017). Available at: https://scholarship.law.columbia.edu/faculty_scholarship/2037
- [27] A. Sharkey (2018), Autonomous weapons systems, killer robots and human dignity, *Ethics, and Information Technology (2019) 21:75-97*, Springer, Published online: 6 December 2018, DOI: <https://doi.org/10.1007/s10676-018-9494-0>
- [28] R. Sparrow (2016), Robots and respect: Accessing the case against Autonomous Weapons Systems, *Ethics, and International Affairs Volume 30 (Issue 1): page 93-116*. Published Online by Cambridge University Press: 10 ISSN: 2278-3075, Copyright: Carnegie Council for Ethics in International Affairs 2016, DOI: <https://doi.org/10.1017/S0892679415000647>
- [29] M. Skerker et. al. (2020), Autonomous weapons systems and the moral equality of combatants, *Ethics, and Information technology (2020) 22: 197 - 209*, DOI: <https://doi.org/10.1007/s10676-020-09528-0>, Published online: 23 February 2020, © Springer Nature B.V. 2020
- [30] M. Klinecicz (2015), Autonomous weapons systems, the Frame problem and Computer Security, *Journal of Military Ethics, Routledge Taylor & Francis Group, Volume-14, Number-2, Pages: 162-176*, Published online: 25 Aug. 2015, DOI: <https://doi.org/10.1080/15027570.2015.1069013>

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