

Military Use of Artificial Intelligence under International Humanitarian Law: Insights from Canada

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Abstract—As artificial intelligence (AI) technologies can be used by both civilians and soldiers; it is vital to consider the consequences emanating from AI military as well as civilian use. Indeed, many of the same technologies can have a dual-use. This paper will explore the military uses of AI and assess their compliance with international legal norms. AI developments not only have changed the capacity of the military to conduct complex operations but have also increased legal concerns. The existence of a potential legal vacuum in legal principles on the military use of AI indicates the necessity of more study on compliance with International Humanitarian Law (IHL), the branch of international law which governs the conduct of hostilities. While capabilities of new means of military AI continue to advance at incredible rates, this body of law is seeking to limit the methods of warfare protecting civilian persons who are not participating in an armed conflict. Implementing AI in the military realm would result in potential issues including ethical and legal challenges. For instance, when intelligence can perform any warfare task without any human involvement, a range of humanitarian debates will be raised as to whether this technology might distinguish between military and civilian targets or not. This is mainly because AI in fully military systems would not seem to carry legal and ethical judgment which can interfere with IHL principles. The paper will take, as a case study, Canada's compliance with IHL in the area of AI and the related legal issues that are likely to arise as this country continues to develop military uses of AI.

Keywords—Artificial intelligence, military use, International Humanitarian Law, the Canadian perspective.

I. INTRODUCTION

IN light of the rapid pace of AI advances, a new revolution in military use of AI has drawn the international community's attention. AI could potentially offer unique capabilities to enhance military operations. Military use of AI could aid in the AI arms race changing the character of war and the future scenarios of warfare. As such, the advent of this technological advancement has given rise to enormous possible national and international challenges. IHL, which is also known as the law of war or the Law of Armed Conflict (LOAC), is the legal framework applicable to situations of armed conflict governing the conduct of hostilities.

Applying AI in any type of weapon system makes its use problematic from a legal perspective. The remarkable growth of autonomy in weapons systems changes the conduct of war and decision on the battlefield. AI could empower these weapons in algorithmic warfare carrying out more attacks

which not only is sufficient to alter the behavior of governments, but also results in a scenario in which intelligence can perform any warfare task without any human involvement. Generally, someone is preparing the algorithms and deciding to strike using them. What bias in technology decision-making would be about specific autonomous weapon systems (AWS) that are capable of carrying out operations without human intervention and taking decisions independently. As a result, IHL principles should be revisited to account for this new reality. With this respect, some argued that using AWS to reliably act in a discriminatory and proportionate manner is suspect [1].

AWS have been defined as weapons that can independently select and attack targets by the International Committee for the Red Cross (ICRC):

“An autonomous weapon system is one that can learn or adapt its functioning in response to changing circumstances in the environment in which it is deployed. A truly autonomous system would have artificial intelligence that would have to be capable of implementing IHL” [2].

Consequently, in times of armed conflict, AI in military operations will change human interaction profoundly through replacing humans in military operations, enabling humans, or eliminating human control over military AI systems.

Although there are IHL legal principles providing constraints to shape the behavior of states, there is still a need to review IHL to realize its applicability while technology advances. Because, it is unlikely that military application of AI in weapons per se, particularly, fully autonomous weapons could respect IHL principles.

II. RESEARCH OBJECTIVE AND CLAIM

The main objective of this research is to analyze the insights of Canada on military uses of AI under IHL. The research will center on the following question:

- Can Canada develop a transparent national AI strategy within the framework of international humanitarian law principles?

The research claims that IHL rules cannot comprehensively prevent the military use of AI, especially with the ability to “making independent determinations about when to use force without meaningful human control” [2]. The most essential reason for the lack of legal clarity in military AI would be the

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“inflexibility” of some states in adopting appropriate national binding principles whereas new legal measures or much clarity concerning national and international strategies are essential. This research is exposing a theme, the fact that international legal rules are still required to keep pace with the AI technologies in military content, and widespread legal measures should be taken. Raising an argument regarding the national AI strategy of Canada reveals if it could reflect international principles on its policy. Based on this claim, studying international and national pathways declares that states must clarify AI military conduct under the principles of IHL.

III. RESEARCH METHODS

According to the research claim on using a combined set of concurrent national and international regulations, the methods of this research would be studying international and national pathways on military AI. National and international policies should keep pace with militarized AI developments to regulate this technology for military purposes before AI warfare occurs, particularly when demands to achieve military AI are increasing among countries.

A. Study of International Pathways on Military AI; the Importance of International Law's Coverage

The integration of AI into autonomous weapons has revealed the necessity of legal clarification in IHL to assess the legality of the new militarized AI generation. The four 1949 Geneva Conventions, their Additional Protocols, and The Hague Conventions are the main treaty sources of IHL, forming the core of this legal regime. The Geneva Conventions and their Additional Protocols gave the ICRC a specific mandate to act in the event of an armed conflict where IHL determines when it occurs, in legal terms.

The determination of when an event constitutes armed conflict under international law is regulated by the body of IHL. There is no doubt about the applicability of IHL to new weaponry technological developments, as Article 36 (New weapons) of the First Additional Protocol to Geneva Conventions imposes a practical obligation on states to demonstrate that their right to choose the means of warfare is limited [3]. States are also committed to ensuring respect for IHL under the 1949 Geneva Conventions - Common Article 1 - and customary international law that create a binding obligation to implement the Convention. What is essential here is that considerations must extend to the legal obligation of States to address a wide range of challenges or even opportunities that new militarized AI presents ensuring respect for IHL under the 1949 Geneva Conventions. However, as a greater array of AI technologies enters into the modern battlefield, there will be more lack of details in this Article concerning how states will ensure respect in practical, and how non-parties ought to be obliged. Highlighting the international principles manifests that some cases have not been codified in IHL. In this regard, states are obliged to conduct hostilities following the “principles of humanity and from the dictates of public conscience” according to Martens Clause. The clause has been recognized as “a safety net for humanity” by the ICRC [4]

and is representing “the integration of moral considerations into legal analysis” [2]. This Clause, as identified in Additional Protocol I of 1977 to the Geneva Conventions, refers to the importance of public assessment in military conduct from the vantage point of International Law [5]. It strives to protect beyond codified law, in the “absence of specific treaty law or an international agreement” [2] on AI developments in AWS to neither combatants nor civilians feel deprived of protection. However, the questions remain on the adequacy of these rules.

Besides IHL principles, the Group of Governmental Experts (GGE) through discussions under the auspices of the Convention on Certain Conventional Weapons (CCW) has sought to regulate the next class of militarized AI systems. In 2019, the endorsement of a discussion by the High Contracting Parties to this convention in the field of AI systems was one of the most significant achievements at the multilateral level [6]. Under the CCW convention, usage of specific types of weapons is prohibited, however, this convention does not mention specific characteristic features of AI in military systems with the likelihood of high humanitarian impacts in the foreseeable future. Its principles seem to apply to some sort of automated systems and surrounding AWS, but the indeterminacy and the failure in the prediction of real challenges that they pose are still what requires to be grappled.

B. Study of National Pathways on Military AI; the Importance of Transparent National Measures

Approaches regarding AI development and its regulation vary, totally, depending on each state. Some countries have expressed their tendency in favor of imposing limits on fully autonomous weapons. While some states are standing for new legislation, others tend to rely on soft law and guidelines in cases such as interpreting obligations rather than stringent political measures and binding principles. UN General Assembly Resolutions, official declarations, guidelines adopted by international organizations, advisory opinions by international courts are examples of non-binding instruments and soft law. In addition to that, States can strengthen their domestic legislation related to the implementation of IHL under soft law. At a national level, developing guiding principles for the ethical, legal, and secure use of AWS and Lethal Autonomous Weapons Systems (LAWS) also is the first step for states to take.

1. A Canadian Perspective at International Stage

To commence with Canada's measures on an international level, Canada has ratified not all but the major IHL conventions including the Geneva Conventions in 1965 and the Additional Protocols in 1990. It is also among 164 States Parties to the “Ottawa Convention” or “Mine Ban Treaty” [7], one of the specific treaties through which IHL is codified. This Treaty prohibits military tactics using certain weapons including the production, stockpiling, transferring, and use of anti-personnel mines. One of the legal obligations in the Ottawa Treaty is adopting national implementation measures (such as national legislation) to ensure that the terms of the treaty are upheld in their territory. Another international measure taken by Canada

on military AI is its involvement at the Fifth Review Conference to the CCW, in establishing an open-ended Group of GGE on AWS to explore “possible recommendations on options for addressing Lethal AWS” [8].

At the GGE meeting on LAWS in 2017, Canada stated that it is “committed to maintaining appropriate human involvement in the use of military capabilities that can exert lethal force” [9]. It is among countries that have regarded the term “lethal” “as not useful and possibly problematic” [10]. Moreover, it has so far taken measures to comply with LOAC obligations such as the adoption of the Joint Doctrine Manual Law of Armed Conflict at the Operational and Tactical Levels [11]. Canada is also under an obligation to adopt domestic laws in line with the provisions of international treaties. The following section considers Canada's perspective toward military AI under IHL principles.

2. A Canadian Perspective at National Stage

Based on the ratification of IHL conventions, Canada has taken appropriate measures in compliance with this body of law in its national AI strategies. Canada plays a leading edge in all domains of AI ranging from scientific research, transportation, data, digital infrastructure, information technology, ethics, skills or education, space exploration, and so forth.

AI seems to have touched different aspects of AI policy in Canada's strategies. The Directive on Automated Decision-Making of Canada [12] that took effect in April 2019, is an attempt toward utilizing AI to be compatible with law principles such as transparency, legality, and other procedural factors. This Directive will be evolving to ensure that it remains relevant due to the rapid change of AI technology. The military realm should be the relevant part that needs to be covered in this national activity.

In its guidelines and national pathway on AI, Canada appears to follow a leading way in the use of this technology. Canada is the first country amongst others to release a national strategy for AI [13]. To maintain the lead, however, the growing military applications of AI developments, in particular, the autonomy of weapons systems need to get enough attention in Canada's policy. Canada in its Defence Policy Document entitled: “Strong, Secure, Engaged” [14], while pointing out that technological developments are the future of defense, declared its “commitment to maintaining appropriate human involvement in the use of military capabilities that can exert lethal force” [15]. AI is part of this document. As a consequence, due to the importance of sparking debates such as LAWS and gray military areas, the explicit mention of AI would be required to exploit the advanced AI capabilities.

Generally, Canada recognized that new means of technologies could bring fundamental challenges that are required to be reviewed upon which some measures and policies have been taken including the urgent need of “taking a strong and leading position against AWS on the international stage addressing the challenge of LAWS” [16] in 2017. As the development of new methods of military AI increases, Canada has aspired to respond to any threats to national and international principles. The Canadian Armed Forces, as an

example, has committed to maintain an appropriate human involvement in the use of military capabilities that can exert lethal force.

On one hand, Canada is taking steps to harness the potential of AI through national AI strategies, such as the CIFAR AI program that enhances Canada's international position as a leader in this area on the other. As of November 2018, a report on national and regional AI strategies was published by a Canadian-based global research organization (CIFAR) that motivated other countries towards taking steps in their national AI strategies [17]. It can be claimed that the CIFAR program does not include specific policies in strategic sectors such as the military realm. As a result, Canada has policies in place which are separate from the CIFAR strategy. For instance, in Canadian Safety and Security Program, advanced technologies in the military realm have been taken into account.

Canada has been active on the national fronts on AI regulation leading the way in the responsible use of AI with its initiatives through national strategies and guidelines to ensure the safe adoption, secure military AI applications, and promote the responsible use of this technology based on IHL principles and common values. Applying the most clarified national strategy and promoting responsible use of military AI can pave the way toward peaceful use of AI on both national and international frontlines.

From the future perspective, the most applicable legal framework to govern the military use of AI is an urgent need. Since the employment of AWS, LAWS or any other means or methods of AI technologies in military applications will be accompanied by numerous consequences, more issues deserve national and international discussion, clarification, and exploration: Apart from definitions of new means or methods of military AI technologies, there are questions regarding the appropriate and preventive legal measures that countries should have taken. The other discussion is that in the case of human intervention or control over the AI military systems, this intervention must be guaranteed. This issue is of value, in particular, in case of human error or an unintentional act. This is mainly because offenders shall be held accountable or responsible for both intentional activities and unintentional claims which are obvious violations of IHL. As a result, the current principles should be expanded and pragmatic ones should be explored.

IV. RESULTS

Since 2014, several international discussions have taken place on AWS, but new methods of AI-enabled military applications that support weapon systems and using them have not been addressed properly.

Law as a binding instrument seems to have its loopholes regarding new military AI. So, there is a need to design and consider the importance of legal regulations in the military application of AI among countries. On one hand, some voices are calling for a more cautious approach, including a new Treaty. On the other hand, others including many non-governmental organizations suggest that a more incremental approach under existing international rules should remain on

the attitude to maintain meaningful human control on any use of AI weapons. AI can equip weapons with a high degree of unpredictability which has glorified human intervention. The “effective human control”, or “appropriate levels of human judgment” is truly viewed by some authors as a general agreement among CCW State Parties [18].

Canadian officials have not supported proposals to negotiate a new international treaty, but a call to multilateral talks on LAWS in November 2013. Several organizations such as Human Rights Watch have been calling for banning AWS under an international agreement. The proposal of Campaign to Stop Robot Killers is to prohibit any use of lethal force by AWS without meaningful human intervention, supervision, or control over the use of force to ensure that AWS adhered to the principles of IHL. However, meaningful control is a subject that needs global debate, especially when the number of emerging countries with a tendency to military AI is increasing.

This study proposes multilateral approaches on the international and national levels among which Transparency and Confidence-Building Measures (TCBMs) might eradicate myriad future legal challenges. At the 2018 GGE meeting, Canada was “supportive of developing key Transparency and CBMs and looks forward to exploring these ideas” [19].

Secondly, applying a transparent code of conduct through CBMs reveals that states are committed to international law principles compliance as well as both responsible and peaceful AI use.

CBMs in the field of arms control are voluntary measures designed to prevent hostilities, reduce military tension and build mutual trust between countries [20]. In addition to that, Codes of Conduct comparing to multilateral conventions are more flexible and more capable of adapting to AI technological advances than binding treaties. As such, applying a code of conduct through CBMs could help reduce the risk of militarized AI conflicts. The major problem is that codes of conduct are not internationally binding but offer short-term solutions nationally. As a consequence, to reach a multilateral approach and solutions, international principles and authorized organizations to govern the secure military application of AI should be developed.

Thirdly, international cooperation between AI powers and emerging states can limit the future widespread legal concerns. To take Canada as an example, it seeks to “exchange views on regional security issues and threats to regional stability by establishing strategic dialogues with key regional powers” [21].

The development of new military AI technologies requires more guidelines, national effective perspectives, and constant meaningful international dialogues among States to be capable of meeting international standards.

It is said to grasp the development opportunity of a new AI generation and deal with issues raised by AI in law, or other affected domains, countries can deepen cooperation and discuss it together [22].

Sharing information and international cooperation create a transparent environment for states which, in turn, helps enable

trust between them. The mutual trust would be achievable through measures like the commitment and being a contracting state to the international law conventions such as the Convention on CCW adopted in 1980. It has to be mentioned that Canada is one of the signatory states.

Regarding international cooperation, on June 7, 2018, the governments of Canada and France released a joint statement on AI calling for “the creation of an international study group that can become a global point of reference for understanding and sharing research results on artificial intelligence issues and best practices” [23].

Other than those mentioned, there is a need for the Independent Supervisory Organization besides the current competent organizations. Covering legal challenges in cases of humanitarian concerns might be under the effective surveillance of supervisory organization(s) in close cooperation with relevant organizations, the United Nations, and the international community. This organization shall seek to ensure the national perspectives under the IHL principles through diverse perspectives. The organization will likely bear the authority to restrict states in militarized AI activities or prohibit military AI operations if it is proved the operation would endanger IHL principles and transparent national strategies. In this respect, the government of Quebec proposed creating an intergovernmental organization¹ dedicated to fostering consensus among member states on the standards or practices that must govern the applications of AI. Under the National Defence Act of Canada, there is an entity or unified armed forces separate and distinct from the Department of National Defence which is called the Canadian Armed Forces (CAF). Since this entity contributes to the conduct of Canadian defense diplomacy, it will maintain pace with the evolution of militarized AI advancements.

In 1998, Canada established a National Committee on IHL (CNCHL) not only to facilitate the implementation of IHL in Canada (including the 1949 Geneva Conventions and the 1977 Additional Protocols) but also as an effective way to ensure that national implementation measures are undertaken by States.

It can be witnessed that the Canadian law and legal system respect the body of national rights while ensuring a safe and secured society under the principles of international law.

V. CONCLUSION

Studying IHL in the wake of the exposure of applying AI in weapons unfolds an ambiguity in its principles covering all aspects of militarized technology. What enhances the subsequent debates are concealed in a variety of factors, such as the lack of legal clarity in international legal rules, the lack of some requirements on the national level, and the ability of states to apply AI in an arms race.

Many states do not have explicit restrictions, and they are not explaining transparently how they will mitigate risks. On top of that, the reliance on AI technologies by military forces propels sovereign powers to make an effort to strengthen their AI

¹ Organisation mondiale de l'intelligence artificielle (Omia)

competencies to be a supreme power on both national and international levels. The leadership of countries in developing AI animates concerns about international competition.

This study reveals that the best way to regulate military AI is using a combined set of concurrent national and international regulations. The research assumes that the “flexibility” of states in regulating transparent national rules would be the first step. Therefore, at a national level, generating an appropriate legally binding framework and set of principles are primary steps for states to consider military AI under IHL. States can create normative rules consistent with their national policies, the norms that the majority of states are interested in adopting.

At the international level, although there are IHL legal principles providing constraints to shape the behavior of states, there is still a need to review IHL to realize its applicability as technology advances. Applying a multilateral attitude can restrict new aspects of AI in military measures that violate IHL. To avoid this violation and based on the national and international activities of Canada, this country has taken appropriate measures in compliance with IHL in its national AI strategies. Engaging actively in AI policy manifests Canada’s commitment to prioritizing transparent military use of AI under IHL principles. Since Canada has inclined toward developing a transparent national AI strategy through its above-mentioned measures, the Canadian national law and its movement to develop the use of AI for military operations under IHL should be used as the model by emerging countries.

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