Ethical and Legal Aspects of the use of Artificial Intelligence in Combat Operations

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Abstract

Artificial intelligence is used in a variety of fields: planning operations, helping commanders make decisions, etc. However, the use of artificial intelligence in warfare faces to internationally recognized human rights, the Law of War and the Rules of Engagement. The purpose of this work is to attempt to highlight certain ethical, moral, and legal issues that may be relevant to the development and use of artificial intelligence for military purposes. Since there are not enough investigations related to such fields, this paper will be based on the analysis of the use of robots.

KEY WORDS: *robotics, ethics, artificial intelligence, robotics rights*

1. Introduction

The 21st century is a breakthrough in scientific fields such as nanotechnology, neuroscience, the Internet of Things and robotics. Virtually none of these areas can be achieved without the use of artificial intelligence (AI). In the military, artificial intelligence is used in a variety of fields from planning operations and helping commanders make decisions to installing them in combat robots or other autonomous or semi-autonomous systems. However, military robots or other similar systems can be dangerous even in non-combat operations due to software malfunctions [1]. On the other hand, the use of artificial intelligence in warfare faces many challenges related to internationally recognized human rights, the Law of War (LOW) and the Rules of Engagement (ROE). Failure to comply with these rights, regulations, and requirements may have adverse consequences for those operating such systems. As a result, since about 2004, issues related to the ethical and legal challenges of robotics started to analyze.

The paper [2] raises questions about the ability of artificial intelligence to respond to moral objects. The question is that if people can make algorithms that allow machines to understand ethical norms, and then maybe machines will have their own goals.

The work [3] raises the question of whether robots "can and should" have rights. Although there are four possible answers as stated in this article, the author of the article offers his solution. That is to say, it offers a kind of moral answer - to be morally patient. According our opinion, this is an interesting answer, but it hardly gives a complete answer to the question.

The work [4] highlights the fact that killing machines that are based on artificial intelligence make war more "easer", i.e. countries with robotic killers may find it easier to start war on those countries with less capacity in this area.

Some works question the ability of military robots to achieve ethical and moral issues that could raise relevant questions. Some works even discuss the widespread use of such "smart" robots in perspective. Paper [5] highlights the fact that the use of combat robots in modern asymmetric warfare has a modest perspective. While there are some ethical issues at work, especially those related to the ease with which war can be sold, it is argued that modern warfare will not come first and foremost without soldiers able to cope with highly unpredictable and ever-changing situations. In his paper [6], the author explores such areas of robot ethics as social relations and the moral influence of robots. This work argues that robots need to be looked at, or at least soon, not as subjects but as objects. That is, this work doubts that AI-based machines that will be human-identical will be developed in the near future. But the question is what if such machines came up? In particular, neuroscience and computer science are evolving so rapidly that moments such as emotions, excitement, hormonal reactions, etc. can be expressed by algorithms and incorporated into robots in the future. Similar ideas are reflected in the work [7]. In this work, it is questioned whether in the short term it will be possible to achieve such level of AI development that it is possible to talk about

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machines as entities. However, this requires preparation.

Sufficient numbers of works are devoted to the Laws of War problem. The work [8] raises the question of compatibility between the use of military robots and the Laws of War. One such problem is that the use of robotic means in war makes war impersonalized, i.e. there are limits to personal liability for wrongful or wrongful acts. Similar issues are raised at work [9]. It attempts to make arguments against the use of military robots. Unclear responsibilities, the easier way to start a war, the refusal of robots to enforce the order, and other similar issues presuppose arguments against the widespread use of military robots.

Paper [10] examines the Law of Armed Conflict (LOAC). In this paper, we argue that although LOAC was built on the experience of previous wars and combat actions, the use of robotic systems in military actions calls for a review LOAC. Therefore, this work proposes the introduction of a new set of LOAC rules called Law of Robotic Armed Conflict (LORAC). In this paper, the five principles are proposed that should guide LORAC: LORAC shall seek worldwide acceptance and approval, LORAC shall enforce the design of ethical behaviour in military robots, LORAC shall aim for removing humans out of battle, LORAC shall aim for reducing violence on humans, LORAC shall aim for reducing human suffering due to war, LORAC shall aim for limiting harm on the environment during war, and LORAC shall aim for limiting cyber damage to critical civilian cyber infrastructure.

Some works attempt to group all the challenges associated with military robots. The paper [11] proposes problems grouped into five groups: Legal Challenges, Just-War Challenges, Technical Challenges, Human-Robot Challenges, and Societal Challenges. All other challenges that do not fall into these five groups are suggested to be grouped to "Other and Future Challenges". Paper [12] examines the compliance of autonomous systems with the law of armed conflict. This work raises issues such as respect for the principles of proportionality and precaution, accountability for violations of international humanitarian rules, etc. in the case of use of military robots.

However, as we can see, the vast majority of these works are devoted to the challenges of military robots or the use of robots as such. There is no doubt that artificial intelligence and robotics are very closely linked. However, as far as artificial intelligence in the military field is concerned, it is possible to emphasize some additional ethical and legal challenges.

Besides, works that offer some clustering of ethical, moral, and legal challenges often do not, in our view, clearly distinguish certain subgroups. This makes grouping complicated and unclear.

The purpose of this work is to attempt to highlight certain ethical, moral, and legal issues that may be relevant to the development and use of artificial intelligence for military purposes, and to identify some of the questions that, according to our understanding, need to be answered to maximize human rights in combat operations, LOW and ROE. Since there are not enough investigations related to ethical and legal issues the use of artificial intelligence for military purposes, this paper will be based on the analysis of the use of robots.

2. Artificial Intelligence as a Factor in Military Strategy

It is no secret that the military doctrines of all countries plans drastically reducing the time for making strategic decisions within the frames of C3 (Communications, Command and Control) and ISR (Intelligence, Surveillance and Reconnaissance) systems. This is only possible with the use of artificial intelligence.

In Russia, President V. Putin approved a program "National Strategy for the Development of Artificial Intelligence (AI) for the Period Until 2030" in the end of 2019 that pays special attention to the military sphere. The Russian Defence Ministry accepted the program "Creation of Advanced Military Robotics up to 2025 with a forecast up to 2030" in the end of 2015. Russian military programs "Autonomous combat drones" of Kalashnikov manufacturer or "AI-infused cruise missiles" that will analyze the air radar situation emphasize the short-time decision-making importance.

China adopted "New Generation Artificial Intelligence Development Plan" in 2017. This plan pays attention for strengthening the use of AI for decision-making, military actions and defence equipment.

USA has such programs as "Maven" and "Diamond Shield" which use AI to analyze enormous amount of data and offers scenarios for political and military leadership on how the enemy will behave.

All these plans and projects show that artificial intelligence plays a significant role in the military (defence) plans of the leading world powers. However, the question arises to what extent weapons based on artificial intelligence will comply with international law, especially with the international humanitarian law (IHL) and human rights. Artificial intelligence, currently unrestricted by any moral and ethical norms and mere human emotions like compassion, can be used in strategic plans to commit war crimes, genocide or crimes against humanity. All of this would be justified by the fact that the "robots amok" that the programmers did not anticipate anything, that a cyberattack occurred and so on. That is to say, the liability of the State and its officials may arise in this case.

If we allow artificial intelligence to plan military operations, to make decisions, to control not only robotic military systems, but also soldiers, then the military strategies themselves must be reviewed. One must not forget

the fact that artificial intelligence can plan operations in a sufficiently complex and possibly difficult way for state politicians, military commanders and operation troops to understand. Besides, at present, orders are given that are easy to understand. Artificial intelligence, being able to evaluate many factors, can issue commands that are difficult to understand or not understand at all. Trying to translate all this into soldier-friendly orders will take time and the use of artificial intelligence will become ineffective.

The responsibilities of the commander also change. If the AI is allowed to make decisions, the commander will only need to determine the criteria that the AI will have to implement. For example, what is the possible relationship between your soldiers and enemy soldiers, how many civilians can be killed, what financial losses are possible, and so on. However, in that case will moral-ethical concepts such as patriotism, liberty pursuit, etc., lose their meaning and be replaced by cold deduction. And it will lead to the refuses to fight and not give up, the question of the loss of freedom, or even the very existence of the nation. Also, keep in mind that AI can modernize initial algorithms in an unexpected direction for political or military leadership. This will again cause some uncertainties and dangers for both strategical and tactical plans.

3. Moral, Ethical, and Legal Challenges of Using AI in Military Operations

Analysis of the use of artificial intelligence allows us to distinguish between moral, ethical and legal areas that require an answer before AI is widely deployed in military operations.

We believe that all of these challenges can be broken down into the following components:

- Social Challenges;
- Moral Challenges;
- Legal Challenges;
- Political Challenges;
- Military Challenges;
- Technical Challenges.

The proposed classification of AI moral, ethical and legal challenges and each of their subgroups is presented in Table 1.

Table 1.

Proposed classification of AI moral, ethical and legal challenges

Social Challenges	Moral Challenges	Legal Challenges	Political Challenges	Military Challenges	Technical Challenges
Psychical and psychological	Humanism	Unclear responsibility	Lower barrier for war	Impersonalizing war	Self-defence
Technology dependency	Falling into the “bad” hands	Refusing an order	Aspiration to justify political and military action	Adherence to LOAC and ROE	Cyber defence
Intellectualistic bias	Squad cohesion	Human rights	Threat of asymmetric response	Transferring risk from combatants to civilians	Robots Running Amok
Civil security and privacy	Emotional	Robot rights	Avoidance of peace	Unilateral risk-free war	Unauthorized overrides
Wining hearts and minds	Operational moral		Non-conventional use		Wrong self-learning
Intercultural	Consent by soldier to risk		Affect war power		
	Distance of soldiers from the enemy				

3.1. Social Challenges

Psychical and psychological subgroup. There are a few moments to note when it comes to the influence of AI on a soldier's psychological state. First and foremost, AI can have a positive effect on the soldiers' psyche by eliminating stress factors such as fear of being injured or killed. Meanwhile, robotic systems will not feel any stress, no matter what weapon or force they are fighting. On the other hand, soldiers away from the battlefield make the battle anonymous. As a result, as stated [8], nice and normal people create mental doubles that sometimes do terrible acts that their normal identity would never do. Coming later, understanding what they have done can lead to major mental and psychological deviations.

Technology dependence. There is a vision that as AI evolves and its implementation into various spheres of life, one will lose some ability and become heavily dependent on AI. When it comes to the military, the advent of AI can affect the ability of soldiers to protect their lives and perform certain necessary operations (e.g., camouflaging, hiding). Robotization and AI can influence the performance of medical operations. For example, malfunctions in computer connections or power outages will influence to surgeons to perform the medical operations.

Intellectualistic bias. This subgroup of challenges means that AI operates on the battlefield without any emotion and purely by intellectual, calculated considerations. This, on the one hand, allows the desired results be achieved quite effectively. On the other hand, such a military operation becomes too calculated and too cold to leave any human emotions in it.

Civil security and privacy. Very often (and perhaps always), military issues are civilian. AI-based robots can often be used in civilian life. It is no secret that modern unmanned systems that film people gatherings can recognize one person or another. But what happens if a mistake or identification error results in one person being misidentified? What if a child dies or killed as such result? Therefore, the question of whether AI alone can solve civil protection and privacy issues becomes quite relevant.

Winning hearts and minds. Modern warfare, IHL and human rights require that the war be as less brutal as possible. As practice shows, winning a battle or war is one and perhaps the simplest thing. It is difficult to win the hearts and minds of the people of the conquered country. Obviously, the natives will be more comfortable interacting with living humanity than with a senseless, cold-deduced robot controlled by AI. Such a robot will not be able to provide human warmth and diplomacy in communication with the locals.

Intercultural. Every nation or ethnic group has its own identity that we understand through our communication, through our social interactions. That identity is best reflected by the terms "cultural differences" or "cultural commonalities". At the moment, it is difficult to imagine whether, failing to communicate socially, AI will be able to develop such features even through self-learning. The human experience and knowledge available allow us sometimes to act, even subconsciously, correctly in different cultural environments. In that case, an AI that does not have that experience and subconscious mind will behave only as its algorithm says. This can lead to breeding frustrations and even additional conflicts.

3.2. Moral Challenges

Humanism. Scientific and technical progress must be accompanied by moral progress. Distancing a soldier from the battlefield leads to dehumanization both of the enemy soldiers and the enemy civilians. The ability of an AI to be humane will depend solely on the human moral qualities that the AI will be given. Will AI also be moral when given certain features? On the other hand, like all war history shows, a soldier on the battlefield is exposed to a variety of emotions and may act in an inhumane and unreasonable way. Maybe in that case, AI with its cold feelings will be more humane than a soldier.

Falling into the "bad" hands. AI-based combat robots can be purchased by terrorist organizations. In that case, no matter how moral the AI, will terrorists reprogram such a robot and will it become anti-moral, anti-human. One way or another, but AI will only have as much humanity as is programmed in it.

Squad cohesion. It is understood that among soldiers must be strong mutual trust. This trust can be so high in real life that team members will not betray a friend who commits the violations. However, when a robot with a several sensors appears in the command, such violations can be captured and handed over. This naturally creates a dilemma for team focus. This is a huge challenge for the soldier on the battlefield when he/she cannot trust a team member.

Emotional. Can AI have emotions? Can AI at least scan people's emotions? Some AI-based robots are currently being developed based on human emotions. Psychologists working for AI say that there are six or seven basic emotions: joy, sadness, anger, surprise, disgust, fear and contempt. However, the question is, are these seven emotions truly basic in all cultures, all nations, and all states?

Operational moral. A robot with AI is a machine with a pre-loaded algorithm for how it operates in

the various situations intended by the programmer or the customer of such a machine. Operational situations and environments can change abruptly during an operation. Is it possible to create robots that can morally react to changing operational situations? All changes cannot be modelled under laboratory conditions, nor can they be predicted. How then will AI behave?

Consent by soldier to risk. The semi-automatic armed UGV system used in SAR killed nine and wounded 14 soldiers in 2007. It is naive to suppose that there will be no more such accidents. Especially since the control of such robots can be compromised remotely and nearby personnel will not know about this. Therefore, the soldier must take the risk of being injured or even killed by a "friendly force" robot nearby.

Distance of soldiers from the enemy. Basically, this subgroup covers all those challenges mentioned above. Dehumanization, atrophy of emotions, belief in easy victory, which may not be easy, at all, psychological problems, and other challenges are caused by the fact that the soldier is being pulled from the battlefield.

3.3. Legal Challenges

Unclear responsibility. One of the most important questions in any legal system is: Who is guilty? When we talk about AI, this issue becomes obscure. Who is guilty of AI's illegal behaviour: a designer, a system vendor, a purchasing organizer, an operator or its superior, or the same robot? As it is known, the different countries have different legal bases. The laws of some countries offer some precedents that may be related to robotic but need to be tailored to the specific circumstances that may affect the legal decision as well as the evolving technologies. In the military field, it is accepted that the commander is responsible for everything. However, can the commander be liable for the illegal actions of the military robot presented to him, especially if he is a fully autonomous robot? Who will be responsible for non-compliance of laws in this case?

Refusing an order. An AI-based robot may refuse to execute an order if, for example, it (the robot) believes that the order violates a programmable rule. For example, if a robot detects that a terrorist-occupied building is full of civilians. Who will be responsible for the overall course of the operation? Does the commander have to accept such responsibility? Besides, when soldiers see someone refusing to execute an order, will they not think they can also refuse?

Human rights. War crimes and crimes against humanity are breaches of International humanitarian law. Fully autonomous weapons are or would be able to select and engage targets without meaningful human control. At the moment, most human rights defenders question whether fully autonomous military robots based on AI will meet the requirements of international humanitarian law, including the rules of military necessity, proportionality, and distinction (individuality).

Robot rights. Currently, AI systems are viewed as tools used by humans and which do not differ essentially (in the ethical sense) from the rifle. However, for robotized systems which taking decision-making, questions may arise about their intrinsic values: whether they deserve ethical-moral attitude towards themselves and at what moment of their evolution they will reach that value. What about AI rights when they reach a level of autonomy where they have certain emotions, moral elements, etc.? Some experts believe that this level of autonomy can be achieved after 10 years. In that case, AI may claim certain rights similar to human rights. Currently, certain inanimate objects, such as ships, property, companies, etc., have rights. Similarly, animals, which are essentially are not moral-ethical subjects, have certain rights. So why cannot AIs who have certain morals and feelings have rights similar to those of man? Of course, this is a far-off challenge, but he needs to get ready now.

3.5. Political Challenges

Lower barrier for war. The availability of new military technology may lead to a desire to solve certain political problems by war. Especially if the opponent does not have such technology. This is particularly true of the respective AI systems, which can both plan military operations, estimate their cost and forecast course, and execute military operations themselves. However, this may already be a violation of the *jus ad bellum* principle of international law. In general, war must be a feverish solution to conflicts and disagreements. Therefore, the idea exists that the advent of technologies such as AI reduces the barriers to war. The question of what to do - whether to develop such systems or not - remains open. In essence, stopping AI development is impossible. However, it might be possible to regulate their use.

Aspiration to justify political and military action. The use of AI systems in military action, especially when it comes to the death or torture of civilians can cause protests both domestically and globally. Such actions may also give rise to liability under international law. Therefore, at the political and military leadership level, there may be a desire to put all responsibility into an AI that has "deviated" from the requirements. Such an excuse could be effective, especially if the public fails to control such events investigation or the production of such AI.

Threat of asymmetric response. As discussed above, robots could reduce the barriers to the war and make the war less risky. However, an adversary without similar technology can resort to asymmetric tactics, even in violation of international law: use terrorism, chemical weapons or the like. That is, an opponent can use non-traditional strategies and tactics. We can speak about new forms of military and social attacks that can radically change our societies.

Avoidance of peace. The theory of just war requires us to wage war in such a way that it leaves an open door to lasting peace after the conflict. The sooner peace is made, the less brutality and misery civilians will suffer. Such a pursuit of peace should be a compromise between the two parties. However, compromise is only possible with some concessions. If one country has technologies like AI, the other does not, and then the first party will not want to compromise. Understanding her superiority, she may well delay peace until will be reached the unconditional capitulation of the other.

Non-conventional use. AI systems can be used as a non-conventional weapon. Leaving rights for AI to decide when to use a weapon violates one of the principles of conventional weaponry - "seeing" the enemy. It was precisely the inability to see the enemy directly that led to the 1997 anti-personnel mines being recognized as unconventional weapons.

Affect war power. The possibility of using autonomous weapon systems based on AI will have implications for the war power. Autonomous weapons systems are expected to give political authorities more scope to act unilaterally in the face of restricted military action. The use of AI reduces the loss of soldiers, so there will be fewer objections within the country. In some countries, the launch of such military operations would be possible by a personal political decision, without the involvement and possibly the opposition of the citizens and parliament.

3.6. Military Challenges

Impersonalizing war. As mentioned above, one of the biggest challenges in using AI in war is that war becomes impersonalized. The impersonal war removes a basic level of reality from our thinking and awareness and makes engaging in violence, death, and mayhem easier. However, LOW and ROE usually require that a person himself to target to other personal personally or electronically in the real-time. LOW and ROE violations mean violations of international law. From other hand, the requirement that a target be identified by AI with an accuracy of 100% may be too complicated, because even soldiers do not require a 100% target identification in the battlefield.

Adherence to LOAC and ROE. It is now internationally recognized that LOAR and ROE are mandatory during combat operations. Otherwise, it would be considered a violation of international law and would be recognized as a military crime. It seems that AI, which is easy to program, could easily be adapted to those requirements. However, most experts recognize that such requirements can be difficult to apply in practice when unexpected unpredictable situations arise. It also begs the question whether these rules coordinated with each other and that they are sufficiently clear to be programmed. LOW and ROE leave a lot of space for controversial or undefined imperatives, which can cause the robot to cause unwanted and unexpected behaviour.

Transferring risk from combatants to civilians. The parties to military action, as required by international law, must separate the targets, i.e. it is necessary to distinguish between military targets and civilians. However, it is hard to create a machine that can separate a fighter from a non-combatant, especially when the insurgents are civilians today and in the nearest future. Besides, robots must separate active fighters from wounded, who cannot fight, and who surrender. This is a difficult task, but it is necessary to clearly state how to do this and what the accuracy of such separation should be. Therefore, such AI must be at a higher level than they are now. Understandably, that the battlefield and the soldier find it difficult to distinguish targets. However, public opinion places significantly stricter requirements on AI than on a warrior.

Unilateral risk-free war. This challenge is strongly related to affect war power challenges. Now, however, military commanders can decide on unreasonable combat, bearing in mind that the enemy does not have such weaponry. Finally, AI capabilities can influence military leadership to persuade the political authorities that war will be easy and victorious.

3.7. Technical Challenges

Self-defence. Azimov's robots' laws allowed robots to defend themselves in cases where these actions do not conflict with people. In general, killing robots can be programmed without a sense of self-defence. But when viewed practically, i.e. economically, the question arises whether the robot, which is costly (tens of thousands or millions in the EU), should defend itself, even to the detriment of those who attack it. In most countries, the legal system provides that a person has the right to defend his or her property. This is even truer when it comes to the defence of military property. In addition, self-defence skills can be important for a robot to avoid being abducted and

hacked into it. Therefore, a compromise has to be found between these goals: to have the more ethical robots based on AI or to protect such robots from hijacking or violations.

Cyber defence. The core of AI is software. Like every software, so is AI that can be affected by a cyberattack. Such cases are already being recorded. For example, Iran is said to have taken over the US UAV RQ-170 Sentinel during a cyberattack in 2011. Therefore, very realistic scenarios when even the most advanced AI can be affected by a cyberattack. As a result, the AI may cease to function, may fall into the hands of the opponent, or may unexpectedly be launched against the owner of this AI. In that case, the consequences would be difficult to predict. On the other hand, the AI itself, in response to a cyberattack, can act as a cyber attacker.

Robots Running Amok. It is now widespread in society to see that robots can escape their original programmed behaviour by using techniques such as self-study or by developing other robots without such limitations. However, in reality, it will take a long time for appearing such AI systems, which will be able to not only to fully construct other AI-based robots but also to be able to deploy evolving intelligence to them. However, there are already scripts in which hackers can attack AI systems in such a way that AI and robots start acting unpredictably or targeting their owners. In that case, we will actually have "crazy" robots. Therefore, it is necessary to take some action that could prevent the opponent from reprogramming the UGV.

Unauthorized overrides. This is an important enough issue in today's digital world. This is an important enough issue in today's digital world. This is a constant state of restlessness in the face of any new technology and they are solved mainly by non-technical means. First, in order to avoid or at least reduce the possibility of unauthorized access, it is necessary to use organizational measures and select appropriate people in the team. It is also necessary to use technical security and protection measures. In most cases, the development of such AIs and robots based on AI is protected from unauthorized access. Nevertheless, some challenges still need to be addressed in the design and deployment phases.

Wrong self-learning. We always face the challenge of whether the AI self-learning algorithm is built on valid data. If at least one of the data is incorrect, sooner or later we will face major problems. Such mistakes in the self-learning process can accumulate and "explode" in the most inappropriate or dangerous moment. One of the ways to avoid wrong self-learning is to use the data without unconfirmed assumptions. Data that is unclear has a high degree of dispersion or is missed should be avoided and not used in AI. It must be remembered that AI can think and predict but cannot understand. Therefore, even the slightest error in the algorithm or programming can cause major problems.

4. Conclusions

The analysis of the ethical and legal aspects of AI use leads to the following conclusions:

- There are unusual challenges in ethics and justice for AI;
- The use of AI and robotic systems, ignoring the human rights and warfare challenges, can have legal and political consequences for those who use such systems;
- The technological dependence of soldiers can be a challenge for military leadership in planning and conducting operations;
- Unreasonable use of AI in military operations can lead to asymmetric resistance.

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