Isaac Kuo

Dr. Elisa Warford

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The Ethical Performance of Drones

By Isaac Kuo

Abstract

The recent advances and use of drones in combat have raised serious ethical questions. While the use of drones drastically reduces the risk of losing human lives in war, there are also legitimate concerns about their use. Drones have expanded their role in combat, from simple reconnaissance and surveillance to lethal strikes on enemy positions. As drone technology advances, the military continues to push for increased autonomy to reduce the operating and maintenance costs for the drones. However, as drones begin to make its own decisions, the moral responsibility of the drone becomes ambiguous. If an autonomous drones mistakenly destroys a school instead of the correct target, who is responsible? How can drones be designed to act ethically? There is a broad range of views on how to design the next generation of drones to act ethically and with moral responsibility. Some researchers believe that robots should have full autonomy in battle, because robots are not susceptible to the human emotions that push so many to commit atrocious war crimes. Other scholars question the ability of robots to perform the duties given to the machine, suggesting that we overestimate the power of computers in a blind pursuit of a strategic advantage on the battlefield. Currently, it is most sensible to adopt a human-machine partnership, maximizing the strengths of both human and robot to be most effective in battle. The robot, with its advanced sensors, can provide the human operator with the data to make an ethically responsible decision. The human operator has the final decision on the drone, and has full responsibility for the consequences of the drone. While it is true that current artificial intelligence is limited and cannot be fully autonomous in combat, the drones should eventually be developed to become fully autonomous. With the correct technology, fully autonomous drones will be more ethical in battle than humans, and the war atrocities in armed conflicts will be greatly reduced.

Introduction

Unmanned aerial vehicles, or UAVs, have recently greatly increased their role from simple surveillance and reconnaissance to increasingly controversial targeted killings. Armed UAVs, controlled from a base often thousands of miles away, are sent to eliminate the target(s). The key advantage of using drones is that it allows the military to attack the enemy while minimizing the damage and casualties. However, the drone attacks often cause significant collateral damage, killing many innocent civilians with the intended target. In an effort to reduce the cost of operating UAVs, manufacturers have made drones more and more autonomous, reducing the need for human interaction and instruction to the drone. However, the increased autonomy of the military's weapons has raised serious ethical questions about the responsibility for the collateral damage of indiscriminate drone strikes. Removing humans from the decision

making of UAVs during drone strikes raises ambiguity about who should be responsible for the consequences of drone strikes. Is it the robot, the programmer, or the military?

There are several views on the responsibility of autonomous weapon systems. In "The Case for Ethical Autonomy in Unmanned Systems" by roboticist Ronald C. Arkin, Arkin argues that UAVs should be given full autonomy to prevent war crimes[1]. Autonomous weapon systems are free from human emotions that prompt them to commit war crimes. However, while a valid point, current artificial intelligence technology is unable to replicate specific human experiences and capabilities. Completely removing humans from UAVs would severely underutilize humans' ability to use past experiences and fundamental knowledge to deal with unfamiliar situations that a computer would struggle to operate[2]. Modern artificial intelligence is still unable to accurately model the psychological tools of human thinking that allow humans to be creative and recognize patterns. For example, fully autonomous weapons systems are unable to distinguish combatants from non-combatants, while this is not too difficult for humans to do.

The other, more sensible view, called the Human-Machine Partnership approach, advocates an intermediate level of autonomy, where humans and artificial intelligence work together, combining human creativity with the unclouded and unemotional decisions of the computer[2]. Limitations in current computer technologies make it difficult for fully autonomous UAVs to accurately distinguish between hostile and friendly. However, humans are equally poor at making sound decisions during war, evidenced by the numerous war crimes that occur during every war. Thus, with human and machine sharing control of the weapon system, the human then has the responsibility to act within the ethical boundaries of war as laid out in international war laws and treaties. In the human-machine partnership, there is no moral ambiguity, as the actions of the drone falls on the human operator. This paper will examine the merits of the two dominant views on autonomous weapon systems, and present a balanced solution on how the military should deal with the ethical issues of unmanned warfare. In addition, the paper will discuss a future plan for how the military can utilize rapidly developing drone technologies to reduce human casualties in combat, while still operating within ethical boundaries.

The Case for Full Autonomy in Drones

Proponents of fully autonomous weapon systems, notably Ronald Arkin, argue that current and future developments in unmanned weapons systems allow them to behave even more ethically than humans when fighting. If engineers can create drones that can ethically outperform humans, then it should be pursued, even if the fully autonomous system is still imperfect. A fully autonomous weapon system can greatly reduce collateral damage and property damage. Arkin contends that robots are already faster, smarter, and stronger than humans, so it is not outrageous to suggest that robots can act more ethically than humans. It is already difficult enough for humans to distinguish between combatants and non-combatants, but future fully autonomous systems may be able to outperform humans in all aspects of combat, for these five following reasons[1]. First, robots do not need to protect themselves when the target is unclear or indistinguishable from innocent civilians. For autonomous robots, self-preservation is not a high priority, or a priority at all; military officers can use fully autonomous robots in a self-sacrificing manner, without the reservations involved with humans[1]. Second, robotic sensors have become increasingly advanced and are better fit for combat than human senses. For example, robots are now equipped with synthetic and wall penetrating radars, acoustics, and seismic sensing. Robots are capable of gathering much more advanced data than humans, and make them much better

suited for combat than humans[1]. Third, robots are designed without emotions that often cloud the judgment of humans on the battlefield. Humans in the military often make judgments based on their frustration from the battle, but robots are free from these restrictions, and can make much better and more ethical decisions[1]. Fourth, robots do not have to deal with the "scenario fulfillment factor," where humans see new information only to reinforce pre-existing beliefs. Scenario fulfillment leads humans to ignore contradictory information in high-stress situations, whereas robots are not susceptible to these behavioral patterns[1]. Fifth, robots can gather and process data much faster than humans. Modern and future military systems are becoming increasingly complex, and humans will soon be too overwhelmed to control them[1].

The military's increased use of drones to carry out lethal missions has faced criticism because of the collateral damage it's caused. However, throughout human history, humans have not adhered to the legal and ethical boundaries of war, far before drones were involved in modern combat. The prevalence of war crimes in human wars can be contributed to emotional instability in soldiers. A recent study was conducted about the soldiers and marines deployed during Operation Iraqi Freedom, and the results were alarming[3]. Less than half of soldiers and marines agreed that noncombatants should be treated with dignity and respect, and a disturbing 17% of soldiers and marines agreed, or strongly agreed, that all noncombatants should be treated as hostiles. Less than half of those soldiers and marines would report another soldier/marine for unethical behavior, unnecessary damage to property, or even killing or injuring a noncombatant. The problem extended beyond the actions and attitudes of just the soldiers. A third of the polled troops reported that their officers did not make it clear that noncombatants were not to be harmed. In addition, despite all soldiers receiving ethical training, 28% of soldiers and 31% of marines faced ethical dilemmas where they were unsure how to react. In the Iraq War, before drones were introduced to the battlefield, humans, including both officers and soldiers, were already violating many legal and ethical boundaries accepted by the international community. There are a myriad of reasons for battlefield atrocities by committed by humans, ranging from the desire for revenge, to unclear orders, to a lack of a clearly defined enemy, which was clearly the case in Iraq. These issues are largely emotional issues, where human troops allow emotion to control their decision making. The conflicts in Iraq and Afghanistan in particular have taken an especially heavy toll on the soldiers engaged in combat. Suicides while deployed have increased steadily, and were on pace to surpass suicide rates in the United States for the first time since the ethically murky Vietnam War, where many commanders viewed the laws of war as unnecessary and unrealistic. In addition, more and more troops have been diagnosed with post-traumatic stress disorder after returning home. From the various studies conducted on soldiers in and after combat, it is clear that war crimes are committed by soldiers deeply affected by the harsh emotions of warfare.

With the recent development and use of UAVs and other robots, the likelihood for war crimes actually increases. Because drones, combatants can now maintain an emotional gap between them and the enemy, creating a form of numbed killing[4]. While drones have significantly reduced the number of humans required to wage war, reducing the human cost of war, it increases the killing ability of our weapons, and it is easy to forget that dead human beings are the result of drone strikes. The physical distance between the drone operators and the victims creates an emotional gap that removes the drone operators from the consequences of drone strikes. Using drones to kill civilians or damage property removes the guilt usually associated with committing war crimes in person. As killing becomes more unemotional and like

a video game due to drone technologies, battlefield atrocities and war crimes may worsen, because guilt is no longer a factor. As shown by human behavior throughout wars, including the recent conflicts in Iraq and Afghanistan, it is simply unrealistic to expect humans to follow the laws of war.

Something must be done in order to reduce future war crimes, which is beyond the limits of humans in fighting wars. Humans have thus far proven shamefully inadequate in preventing war crimes and atrocities; as technology moves forward and weapons become increasingly deadly, humans can no longer be trusted to act ethically. In Dr. Arkin's laboratory at Georgia Tech, his research group is developing and ethical robotic warfighter that will enforce international humanitarian law. Their primary goal is to create fully autonomous robot warfighters that act within the constraints of international law and, more importantly, act more ethically than humans under similar circumstances[1]. Most of the causes for war crimes and atrocities, such as seeking revenge, frustration, emotional instability, do not affect robots. A fully autonomous weapon system not only has all the advantages of UAVs, most notably longer endurance, immunity to biological and chemical weapons, advanced sensors and data collection, but also will drastically reduce the war crimes and atrocities committed by humans.

Mistrust of Drone Capabilities

However, some are not so enthusiastic about the increased autonomy in combat drones. The move towards greater autonomy by drones in combat is undeniable by nearly all researchers in the field of robotics in warfare. Wendall Wallach, one of the authors of "Moral Machines: Teaching Robots Right from Wrong," acknowledges that we are moving towards greater autonomy in unmanned weapon systems, because we always strive to take the strategic advantage in situations, even if the ethical consequences are murky[5]. The use of drones decreases the human risk of engaging in armed conflict. This also leads to decreased barriers to fighting; the risk of losing human life in war is one of the greatest incentives to seek nonviolent solutions[6]. Drones largely remove this incentive, making it much easier for countries to justify engaging in war.

In addition, many scholars question the ability of fully autonomous robots to act within the ethical boundaries of war set forth at the Geneva and Hague Conventions, where much of international humanitarian and war laws were created[5]. The primary concern is that autonomous drones would not be able to distinguish combatants from non-combatants, a key component of international war laws. The international treaties drafted in Geneva were written when unmanned combat was the subject of science fiction, and is difficult to apply to drones. Even with current drones, it is difficult to establish ethical boundaries that can be applied to UAVs in combat. As drones move towards full autonomy, the ethical boundaries become more unclear and ambiguous. It will be nearly impossible to program ethical boundaries for a fully autonomous drone to abide by.

Furthermore, scholars have concerns over the ability of autonomous systems to perform as programmed. In science fiction, most notably the *Terminator* franchise, the fear with fully autonomous robots was that they would become more intelligent than humans and wage war with humans. However, in reality, robot technology is far from becoming more intelligent than humans, perhaps too far, according to Wallach. Wallach argues that humans, in our relentless drive to gain a strategic advantage on the battlefield, these robots are given more responsibilities

than they are actually capable of handling[5]. As robots take more responsibilities and become more autonomous, the risk and potential damage from a malfunction increase dramatically.

The Human-Machine Partnership Approach

It would be dangerous to have weapon systems be fully autonomous, at least with the current level of artificial intelligence technologies. Computer programs still cannot accurately model unique human behaviors such as creativity and pattern recognition. The human ability to react and perform under unexpected circumstances gives humans a distinct advantage over computer controlled weapons, especially right now[2]. Because of the current limitations of computer technology, it would be foolhardy for the military to implement fully autonomous weapon systems.

The human-machine partnership approach is a much more sensible alternative to fully autonomous weapons, and is much easier to implement. The human-machine partnership combines the creativity of human operators with the advanced data processing and data sensors of the computers in the drones[2]. This partnership divides the labor and responsibility of operating the drones between the human and the computer. The computer is in control of the data collection and processing, while the human is in charge of more important decisions, like identifying targets and distinguishing items where there is low visibility. When a human is involved with the operation of drones, the operator is always aware of the situation surrounding the drone. This also gives a clear responsibility for the actions of the drone, with fully autonomous systems the responsibility are very unclear. In the human-machine partnership approach, the human and machine complement each other. Humans and computers can develop different perspectives of a particular situation. The human operator can use the extra information gathered and processed by the computer to better inform a decision about the situation. For example, a human operator on a naval vessel could use the computer's advanced sensors to identify the objects surrounding the vessel, and the operator could identify the ambiguous objects. The partnership approach gives the drone more autonomy, removing the human operator and reducing operating costs, but leaves critical decisions, such as whether or not to terminate a target, to a human.

For the human-partnership approach, the human is clearly responsible for the actions of the drone. This creates an ethical boundary agent for the operator, forcing him/her to act within the ethical boundaries of combat[2]. The human operator possesses the final override and makes the ultimate decision on whether or not to carry out the strike. For example, a drone is flying a mission and identifies the hostiles on the ground and alerts the human operator that the targets have been spotted. This takes advantage of the superior sensors and data processing on the drone, which are used to identify targets where humans cannot see. However, the human operator may also identify structures, such as hospitals or civilian buildings nearby, where the computer cannot differentiate between hostile and friendly buildings. It is the responsibility of the human operator to use all the advanced information provided by the drone to decide whether it is ethically permissible to carry out the strike. In this scenario, there is no ethical ambiguity for who is responsible for actions of the drone. The drone gathers and processes information and carries out orders all within the mission parameters and all without human supervision. However, essential mission decisions, especially the use of lethal force, are left for the human to decide. The drone operator assumes full responsibility of the actions and consequences of the drone.

While the human-machine partnership is a more sensible approach to maximize the strengths of both humans and robots in drones, the partnership approach still has significant shortcomings. Proponents of fully autonomous weapon systems are correct in claiming that humans are embarrassingly bad at making ethically responsible decisions in the fog of war. In addition, the use of drones creates an emotional gap between the human and the victim, and can cause even further dehumanization of the victims, creating greater risk for war crimes to be committed by the human operator. In the human-machine partnership approach, it is the duty of the human operator to make ethically responsible decisions about the mission, given the enhanced intelligence provided by the advanced sensors and data collected by the drone. As technology develops, it is ideal for drones to become fully autonomous. Once it is possible to model human behavior and decision-making, drones will be able to make ethical decisions. Robots, with the right technology, will be able to perform more ethically than humans, drastically reducing the war crimes and unethical actions during war.

Conclusion

Ultimately, the rapid development and increased use of drones in combat have raised serious ethical questions about their use. As the military pushes for greater autonomy in drones in order to reduce operating costs, the responsibility for the actions of the drone becomes ambiguous. There are a wide range of views on how to ensure drones act ethically, ranging from mistrust to advocating full autonomy for drones. The unethical behavior of humans in war is largely a result of human emotions clouding their judgment, resulting in an unethical decision. Robots are unaffected by human emotions such as anger and desire for revenge, and they possess advanced sensors and data processing that allows them to be more effective and ethical than humans in combat. However, current robot technologies are limited, and the technology does not yet exist for drones to evaluate situations and make an ethical decision faster or better than humans. Human behavior and decision-making is very difficult to model and program into a drone. Thus, currently, it is more sensible to establish a human-machine partnership, where humans work with robots and maximize effectiveness by combining the strengths of both partners. The drone will not require a human operator, as they do now, and will carry out their orders and make non-critical decisions. However, critical decisions, especially the use of lethal force, are made by a human. The human can use the advanced sensors on the drone to gather information about the mission situation, and make the final whether or not to engage the targets. Until artificial intelligence technology progresses to make fully autonomous drones feasible, humans and robots will have to work together. However, in order to further reduce the loss of human lives in combat, drones should become fully autonomous. With the ability to distinguish civilian from hostile, drones cannot commit war crimes out of anger, but will perform more ethically than humans.

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