Research Essay #1

Technology, War, and the Ethical Dilemmas of Autonomous Warfare

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Introduction

Technology and war have been paired together like peanut butter and jelly for all of history. Humans are constantly looking for new and effective ways to inflict the most damage on their enemy, while sustaining as minimal damage as possible on their own behalf. Modern warfare is the culmination of all passed efforts to advance this technology put into practice. Thus, warfare today is complicated, cluttered, and callous. Some warzones require soldiers to use the most advanced technology and tactics available to gain the upper hand, while domestic conflicts involving police and peace keeping forces still heavily rely on Roman tactics for crowd and civilian control. The amount of tactics and resources available is abundant, and exponentially increasing with time.

New technologies involving the use of unmanned aerial vehicles (UAVs), drones, and robots are set to unhinge war as we have previously known it. With a combination of these emerging technologies, war will become far more autonomous as humans are removed from dangerous, recurring situations and replaced by remotely controlled counterparts, and the dilemmas raised from this shift will have to be explored.

Discussion

Warfare in the 21st century has already seen a drastic change in overall style and tactics. One of the most troubling tactical changes comes in the form of improvised explosive devices, or IEDs. IEDs are akin to the land mines of previous wars. They are explosives, typically planted in the ground, meant to sabotage, and kill aggressing forces. However, the similarities end there as IEDs are truly within their own realm of humanitarian dilemmas. The improvised nature of IEDs means that no two IEDs are the same. Also, there are no guidelines for defusing specific IEDs like there are for mines and other explosives. Worse yet, IEDs can be remotely detonated at

opportune times without any warning. According to *news.UN.org*, IEDs were the leading cause of civilian deaths between January 1, 2018 and September 30, 2018 in Afghanistan, accounting for almost half of all civilian deaths in conflict related violence (UN News, 2018). With these factors combined, leaders of armed forces have begun using bomb defusal robots whenever circumstances allow for it.

There are several problems with the practical implementation of this solution, however. First, IEDs can be strategically placed in areas that robots cannot reach. Currently, defusal robots cannot climb stairs effectively, maneuver in and out of ditches, and navigate difficult terrain (Bogue, 2011). Additionally, the high cost of these robots makes them impractical for the high-risk job of defusing or detonating IEDs. Finally, these robots lack the dexterity of a human hand, adding to the list of these robot's technological limitations.

The near future will see the resolution of these limitations. Robots, such as the ones used in disarming explosives, are becoming cheaper, and more effective at their specialized tasks. There are many corporate and personal level projects that aim to solve maneuverability, usability, and dexterity issues. Perhaps the most astonishing example of how far robot maneuverability has progressed can be found with Boston Dynamics' Atlas. Progress on Atlas first started in the form of PETMAN, another humanoid robot debuted by Boston Dynamics in 2009. PETMAN was designed to test emerging clothing designed by the US military to help protect soldiers against chemical weapons (Crowe, 2020). While PETMAN's ability to do push-ups and walk at human pace was astonishing for 2009, it pales in comparison to its current counterpart, Atlas. To compare the two is like comparing the progress of a child to an adult, if that child was training for the Olympics. While PETMAN could do a few physical exercises, Atlas can go through an entire spectrum of movement. From jumping off platforms, to backflips,

to high speed running, and beyond, Atlas aims not to just copy human movement, but to surpass it. All this progress is viewable by the public thanks to Boston Dynamics and their YouTube videos.

Even with movement technology for robots advancing rapidly in ten years, matching the control and dexterity of the human hand remains an issue. One solution to the dexterity/control dilemma could be located in a rather untraditional emerging technology, virtual and augmented reality. It is important to note the differences between these two technologies. Virtual reality (VR) typically involves immersing the user in a completely artificial environment, most commonly, a video game on a computer. Augmented reality (AR) on the other hand, augments, enhances, or changes the already existing surroundings of the user. A combination of VR, AR, and defusal robots could allow a defusal specialist to have the same range of control and motion remotely, as they would in person. Additionally, sensors and information within the robot available to the defusal specialist could be displayed on a heads-up display (HUD), or even overlayed on top of the bomb itself. This would allow the operator to quickly access information that would be difficult or impossible to access normally once the defusal process was initiated. These abilities would be invaluable, especially as the materials and chemicals used within bombs are vast and evolving rapidly.

Once these issues are resolved, and the highest risk job in the military is moved to a completely autonomous solution, a catalyst of advancements in warfare will begin to occur. While bomb defusal may be the testing ground for fully autonomous warfare, it certainly is not the final frontier. Developing in parallel with defusal robots are unmanned aerial vehicles (UAVs), specialty assault and recon drones, and other specialty robots. UAVs and drones have already made their way into warzones of the 21st century. It is no longer a novelty to hear about

drone strikes in the Middle East or other areas of conflict, it is commonplace. So much so that countries that do not have even a small portion of the military funding the United States has, still have access to missile-strike drones. This raises a red flag that should have been raised a long time ago, as warfare turns from high casualty assaults, to impersonal, risk-free attacks. Military superiority is moving away from large numbers and advanced training, to large funding and advanced electronics. It is straying away from men fighting men, to machines bombing men, with the decision and execution being handled remotely and indiscriminately ahead of time.

We are already seeing the consequences of this impersonal warfare, both at home and on the battlefield. In traditional warfare, soldiers needed to be so steadfast and loyal to one's country that they would be willing to fight and die for it. This meant that the best soldiers were often religious and filled with undying national pride. This type of soldier is still prevalent in the modern world as almost every country with a developed military relies on patriotic citizens who believe they are fighting for what is right. In the future, the best soldiers will most likely be those skilled at operating machinery remotely, those who have excellent decision making skills, and those who can rapidly absorb large amounts of information on their current situation through the enhanced sensors robots and drones offer. This shift in the composition of the military will have cascading consequences both good and bad. On the positive side, our armed forces will be more educated, not restricted by age, and will be less likely to develop wartime related mental issues, such as PTSD. On the negative side, many families who have relied on the military as a career for generations may find themselves underqualified to participate in such an engineering and technology-based career.

A separate moral dilemma that will be brought on by the increase in autonomous warfare is automated engagement and execution of targets. So far this paper has covered the dilemmas

faced by robots that are directly controlled by a trained military engineer; However it is extremely likely that some robots capable of using lethal force will also be capable of engaging targets without direct commands. Using widely available facial recognition, UAVs and drones could be pre-programmed to kill high value targets on sight, removing human intervention and the chain of command entirely. This ability, along with the remoteness and ease of use of UAVs and drones, has already raised questions regarding the laws of war. Linda Johansson's article *Is it morally right to use Unmanned Aerial Vehicles in war?,* lists a plethora of moral dilemmas with this emerging tactic. These dilemmas include but are not limited to; numbing of soldiers tasked with killing, targeting errors, unfairness, and secret wars (Johansson, 2011).

Unfairness may not be something that weighs on the conscious for most when it comes to warfare, however, it certainly is on the minds of the losing side. When the United States used drones to destroy the armies of the Islamic State (IS), soldiers of the Islamic State were outraged over the impersonal tactic. In a Vice News documentary, an IS soldier says, "Don't be cowards and attack us with drones. Instead send your soldiers, the ones we humiliated in Iraq," (Vice News, 2014). While rightfully no one should sympathize with this specific extremist soldier, his sentiments could be shared among more and more small armies in the future. Small armies that cannot compete in the technology sphere of war will simply be left behind with their old fashioned, hand operated guns and bombs. Soldier's being numbed to the kills they are responsible for is also extremely troubling, especially with pre-programmed drones. If a pre-programmed drone is found to have committed a war crime, it would be incredibly difficult to find the correct person to punish. Managers, programmers, designers, engineers, operators, and commanders could all be put on the chopping block, or the ambiguity of the situation may expunge them from punishment. Johansson relates this dilemma to the numbness of killing in

video games. While this metaphor is accurate for this situation, it could also be boiled down further. An added degree of separation occurs

Conclusion

It is personally difficult to imagine the cascading consequences that will be brought on by autonomous warfare. This paper has covered the inevitabilities of autonomous warfare, both good and bad, but there are still many speculations to be made. For starters, it is reasonable to speculate that within this century we may see the world's first fully autonomous war. We are already engaging in fully autonomous micro scale conflicts, such as an IED being planted remotely and defused remotely, but this is merely a precedent, a training ground, and a tutorial for wars to come. The world has not seen a conflict of the magnitude of WWI or WWII involving modern robots and computers. In the future, a large conflict such as a world war would have entire battles fought remotely, or battles fought with a mix of remote and in person soldiers. Battles such as these would have a completely different pace, require new strategies, and would have unique consequences.

Another ambiguous area in autonomous warfare can be found in military mission objectives. A typical conflict in WWII involved taking a supply route out, liberating a city of enemy soldiers, or securing a zone of strategic importance. With autonomous warfare, these mission objectives may be rendered obsolete or at very least, largely scaled back. Since robots and drones do not need a hill to fight on, or a camp to return to at night, mission objectives will be judged on an entirely different metric. Whether that metric involves similar goals of area domination, or if it involves more advanced and sinister goals remains to be seen. One probable speculation is that objectives will move largely from area and population domination, to energy and high value target domination. Since robots and other instruments of autonomous warfare

need only energy, having direct control of power and electricity in an area will prove to be an invaluable asset. As well, with the precision offered by robots and drones, the targets of missions can be boiled down to just the high value generals and leaders of an opposition force, instead of focusing on ground troops. Additionally, since drones and UAVs can be deployed from extremely large distances away from the zone of conflict, there will be little or no need to maintain control of random bunkers, bases, and barracks, leaving attacking resources available to higher priority objectives.

Finally, it is impossible to talk about a war of any scale without discussing political objectives behind a war. For this we should look at the objectives of two major conflicts in history, WWII and the Cold War. WWII for Germany and German citizens saw one overarching objective, to end the unfair conditions brought on the German people after WWI and the Treaty of Versailles. They attempted this by invading neighboring lands and asserting dominance over surrounding territories. It is difficult to imagine what this would have looked like if it took place in 2040 as opposed to 1940. Certainly, everything from the initiation of the conflict, to its resolution, would have been much different. For example, if Germany had launched a wave of lifeless drones to take over Poland, how would the command of Germany measure their success? Would they do it possibly by holding the population hostage until it was deemed safe to send in human ground troops, or simply maintaining surveillance in the area to be assured no other military presence was of threat? It is difficult to imagine, but it would not be anything like a conflict humanity has ever seen before.

The objective of the Cold War was even more political than WWII. It was a battle of ideals, communism vs capitalism. A large amount of this war was fought psychologically by convincing the enemy they were wrong, mislead, or simply, doomed. However, in our

hypothetical scenario there is no one to convince. It is not possible to yell at a robot and convince it that it is fighting for the wrong side. Additionally, you will never change a populations culture without human interaction. Robots may be able to talk, display information, and provide a level of dialog, but it will never match the face-to-face interaction needed to overcome ideological differences. Ironically, in this sense it makes it difficult to even imagine Cold War conflicts being possible with modern technology even though arguably proxy wars still exist between the United States and Russia.

There is no telling what lies ahead and what tactics we will see in the next large-scale war. We can observe history and make speculations, but ultimately nothing the past has to offer provides a comprehensive overview of the matter. The only certainties are that battles will no longer be solely determined by training and ground forces, rather they will be more largely influenced by a country's technological resources. Battles may be won or lost entirely based on which side has better coding, better hardware, and better funding. The days of small, underdeveloped countries providing useful forces are most certainly over, as fighting will be reserved for those with the latest and greatest killer technology.

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