 **Assignment Cover Sheet**

| **Subject Code: CSIT 323** |  |
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| **Subject Name: Artificial Intelligence** | | |  |
| **Submission Type: Group report** | | |  |
| **Assignment Title: AI Read/Write report Assignment 2 Project Deck 2022** | | |  |
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# Executive summary

From asking if Aliens exist, humans create somewhat of an Alien themselves. Robots who started off some and can only handle one task at a time like an old person in a young body, now being able to perform tasks as well as a human and even more. This report goes through a journey about how Robots have done a service for humans in this world focusing on their services in the Military. Moreover, the report will take you through time and how the world can change for the better of humans and will delve deep into human psychology as we see if Robots can even be held responsible for their actions. Furthermore, diving deep into the different types of services Robots can accomplish, as well as the constraints and challenges Humans can face while trying to coexist with the Robots.

# Motivation and added value:

Great leaps in technology also give rise to serious risks if proper regulation and safety is not taken into consideration. One such emerging field in technology is robotics. Robotics at its core aims to absorb hard and dangerous tasks originally done by humans so that humans may occupy more cognitive and safer tasks. Moreover, a lot of tasks that are done in the military tend to involve physically demanding or life threatening tasks that need to be done. Therefore, robotics is more actively being developed for military applications and with this comes many benefits and risks, the motivation in this report is to gain a comprehensive understanding of both its advantages and possible disadvantages while also trying to explore the ethical implications. This report also explores the current state of military robotics and its use cases.

# Main constructs

## Military-Grade Robots have substantially improved the intelligence of military agencies around the world.

With sophisticated functionalities, robots have altered the military and defense sectors around the world. A variety of robots is required for ground missions and to secure a country from potential attacks. Moreover, robots assists in enhancing human capabilities for responding to potential attacks without endangering human soldiers, such as when disarming bombs.

The worldwide military and defense robotics market offers numerous opportunities for innovative applications to gain a competitive advantage over traditional warfare capabilities. Governments have begun to invest millions of dollars on robots in order to accelerate military applications. With a CAGR of 12.9%, the worldwide military robot business is predicted to reach US$30.83 billion in 2022 (Trends, M. 2021).

The military and defense industries use robots to provide human soldiers an advantage on the battlefield. Despite the fact that the incorporation of artificial intelligence automates these robots, they are still controlled by human soldiers to avoid unsupervised random killing.

## Top 5 Applications of Robotics in Military and Defence

* **Wearable robots**

This is one of the most common use cases of robots within the battlefield wherein they are used to carry heavy and bulky loads efficiently. Automation may be used here so that the least level of human intervention is required. This automation in turn allows soldiers to perform other crucial tasks in a battlefield (Market Trends, 2021).

* **Mobile Robots**

Mobile robots can play a variety of roles within the battlefields. They may be used to perform reconnaissance of the field by providing images or videos as well as help in neutralizing explosives. These robots can be trained to perform such activities autonomously or can be controlled by soldiers from the command center (Market Trends, 2021).

* **Search and rescue robots**

Battlefields consist of a lot of casualties and most of the deaths happen because victims are not provided with necessary aid within time. Search and rescue robots are highly effective to search, track and rescue victims from the battlefields even if they are surrounded in a dangerous environment which would be difficult for a human to access. These robots can be controlled by soldiers from the command center or sometimes even be trained to perform tasks autonomously (Market Trends, 2021).

* **EOD Robots**

These types of robots are designed to disarm traps, explosive objects, fireworks etc. This is especially helpful when explosives are installed in closed areas, inside vehicles or buildings wherein the incident may cause a high level of destruction (Market Trends, 2021).

* **Fire-fighting robots**

Fire is a common disaster which happens at every battlefield which causes several losses of lives. Robots being able to withstand high levels of temperature can be used to navigate through the incident site and put off the fire using various fire suppression techniques. Additionally, hardware such as infrared cameras, gas sensors can be installed on the robot which aids the robot to detect and navigate through smoke which otherwise is difficult to perform by human force (Market Trends, 2021).

**How Robotic machines can decrease the risk of human lives**

A variety of robots is crucial for ground missions and to secure a country from potential attacks. Robots serves in enhancing human capabilities for responding to possible threats without endangering human soldiers, such as when disarming bombs.

The worldwide military and defense robotics market offers numerous opportunities for innovative applications to gain a competitive advantage over traditional warfare capabilities.

Such as search and rescue missions are very crucial for this industry to rescue human soldiers from emergency situations.

The implementation of robotics has provided search and rescue robots to search, track, and rescue soldiers from multiple different environments like chemical, nuclear, radiological, and biological. It can be operated from a command center to rescue soldiers from battlefields without confronting any more risk.

**Advantages of Automated Surveillance Systems over traditional Methods**

For the improvement of citizens, an accurate and secure monitoring system is critical for this industry. Ground-based systems rely on surveillance robots outfitted with powerful weapons and high-resolution cameras. These infrared or night vision cameras aid in the observation of the entire military and defense facility and region without the use of soldiers.

The military and defense industries are investing millions of dollars in a swarm of drones to conduct powerful surveillance. These are small surveillance drones with long battery life and cutting-edge cameras. Infrared detection capabilities are likely to be added to the cameras in the near future. The ability to observe activity and detect potential hazards from above is critical for this industry.

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# Ethical considerations :

Human biology and psychology are not made to withstand the extreme environments of war, which leads to many soldiers being physically and mentally unable to return to normal after war. If robots could replace them it would contribute net good to those who would have been affected in their roles as soldiers. (R. C. Arkin, june 2008)

Robots do need a self preservation response like humans do which can allow it to put itself at risk to aid or protect humans in deadly environments, which may in turn save lives. This allows them to perform roles like bomb scout, bomb defuser or a field medical aid unit.(R. C. Arkin, june 2008)

Since semi autonomous/autonomous robots are programmed they can be instructed to cause the least damage possible to humans and properties whereas humans may not have the emotional or mental composure to follow such protocol.(R. C. Arkin, june 2008)

Locus of responsibility: this refers to who bears the final responsibility when crimes or problems are caused by robots as it can be hard to distinguish resulting in people not being able to apply laws or ethics .

If full autonomy is given to a robot it is hard to know which or whose ethical framework must be applied to the robot to lead to the best outcomes. As ethical frameworks and ideas tend to oppose one another or even refute each other it is highly unlikely to find the best framework with which an autonomous military robot should operate.

# Discussion

In current times, many modern armies like that of the United States, China, and Russia, among others have been intensely using robotics in military operations and combat for the country. The United States Army was able to cut down its army personnel from 540,000 to 420,000 in 2019 with the help of robotics. The fastest legged robot runs 20 mph and is named Boston Cheetah Robot(Simon, 2015).. The Pentagon wished to use drones for laser combat which in practicality could be a tedious job to do.

However, human safety is guaranteed at the hands of robots through AI and cutting edge technologies. Nonetheless, the need for human intervention to monitor these robots is unprecedented. Defaulting of robots on battleground can have lethal consequences for the army using this innovation. Safety of army personnel cut down to be replaced by robots can be questioned in terms of poor development or malfunctioning. Uncertain conditions in the battleground would still need to be a decision of the army personnel to handle. Maintenance costs can be alarming as well to ensure optional safety of robotic machines in use. Moreover, information being processed by robots should not be sensitive or confidential in situations of security breach of robots. Therefore, the use of robotics in the military becomes a more complex discussion requiring great thought as per a country’s borders and war needs.

(Simon, 2015).

# Limitations and Constraints

The military robots have a number of limitations and constraints. These include:

* The military robots are prone to be hacked and turned against their actual users.
* Governments can find methods to make military robots as an oppression tool
* Military robots, without the proper type of restrictions in place, can make unethical decisions during military operations that can lead to a high count of civilian casualties.

(Robots in Warfare, 2021)

# Conclusion

In general, the coexistence between Robots and humans is a good way to increase the efficiency of work and for a safer work environment for humans, such as a robot could do a dangerous task while a human can do a less dangerous work. This way the human is safer and simultaneously 2 works are being done instead of one which makes the process faster and more efficient. Robots can do repeating tasks without getting tired and can also do the work more accurately. However, humans are required in case there is a malfunction in the robot or if there is maintenance on the robot.

When it comes to a group of armies, robots can be so useful such as to take cover or to do maneuvers instantly based on the conditions (basically a highly dangerous situation). It can further be said that humans use computer systems to do calculations instead of doing them manually and computer systems are machines, so humans are already used to using technology and machines. The only major difference between a robot with implemented AI is that the robot will have the ability to do almost all of the work on its own using certain algorithms and calculations programmed into its memory. So, to conclude, based on the points mentioned above, the coexistence between robot and human will increase the chances of a more successful army group.

# References

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# Team Contribution Worksheet

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| 6608206 | Rohan Sujith Francis | * Motivation and added value * Main constructs :ethical considerations |
| 7058238 | Ibrahim Azam | * Discussion and critique on the topic |
| 7001915 | Muhammad Ibrahim Jafar | * Conclusion |
| 6882213 | Hassan Abdullah Ghauri | * Executive Summary |
| 6394140 | Mohammed Furqanuddin Siddiqui | * Main Constructs |