

THE IMPACT OF AI TECHNOLOGY GUIDED WEAPONS IN THE WARONGAZA

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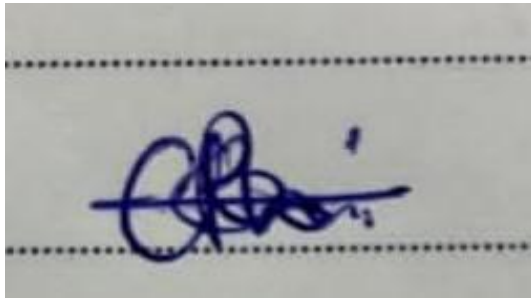
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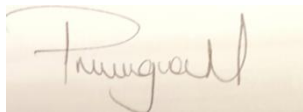
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DEDICATION

I dedicate this research to my family for always supporting me in all aspects like financially, socially, spiritually and physically and seeing me through my academic journey and also to my friends who supported in this journey

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Abstract

This study explores the impact of Artificial Intelligence (AI) technology-guided weapons on the observance of International Humanitarian Law (IHL) principles during the war in Gaza, with a focus on the 2023 Operation Swords of Iron. Through a detailed literature review and qualitative analysis of secondary data—including legal documents, scholarly articles, military reports, and satellite imagery—the research assesses how AI-guided weapons influence the principles of distinction, proportionality, necessity, and humanity in armed conflict. While proponents argue that AI enhances precision and minimizes collateral damage, findings reveal a significant gap between theoretical capabilities and real-world outcomes, particularly in densely populated areas like Gaza. The study identifies elevated civilian casualty rates and widespread infrastructure destruction, suggesting failures in upholding IHL principles despite the use of advanced AI targeting systems. These discrepancies highlight unresolved issues around accountability, legal oversight, and ethical deployment of AI in warfare. The research concludes with urgent calls for robust international regulation, enhanced human oversight, and mechanisms for post-conflict accountability to ensure that the use of AI in warfare aligns with humanitarian and legal standards.

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CHAPTER ONE

1.0 INTRODUCTION

Artificial Intelligence has had a fundamental influence on many global activities and events including wars. The use of Artificial intelligence-guided weapons in the war on Gaza, or any conflict, raises a range of strategic, ethical, and humanitarian concerns. Artificial Intelligence (AI) in weapons systems has the potential to fundamentally alter warfare and have important repercussions, both positive and harmful. The traditional use of people in warfare may eventually decline or possibly vanish if artificial intelligence (AI) continues to play an increasingly significant role in military operations. The judgments and abilities of AI-driven systems may become more and more important in the future of military involvement. Even before completely autonomous combat systems are developed, this casts doubt on the morality and viability of using AI in combat¹.

One of those questions, includes the viability of arms control in artificially-intelligent warfare. The laws that govern war are based on the principles of humanity² and the most concern that this research will want to dive in is how the introduction of Artificial Intelligence Technology has impacted the war in Gaza and find solutions and recommendations for the gaps that militaries that use Artificial Intelligence technology for international humanitarian organizations and war policy makers.

1.1 BACK GROUND

The genesis of the Israeli–Palestinian dispute precedes 20th century, with pressure intensifying after the 1947 United Nations mission to divide Palestine into Jewish and Arab states³. The inauguration of Israel in 1948 led to conflict with next door Arab

¹ Smith, J. (2023). *Artificial Intelligence and Modern Warfare: Implications for Global Security*. Oxford University Press, p. 45.

² International Committee of the Red Cross (ICRC), 2019. "Military Necessity and Humanity." ICRC Guidelines

³ Counter Extremism Project; European Council on Foreign Relations; Meir Amit Intelligence and Terrorism Information Center; Palestinian Academic Society for the Study of International Affairs; CFR research.

nations and the ousting of around 700,000 Palestinians, an action called the Nakba⁴. Successive disputes, alongside the June War in 1967, developed into in Israel taking over the West Bank and Gaza Strip, regions that Palestinians expect to form a future nation⁵.

Hamas was established in 1987 in the course of the First Palestinian Intifada as an associate of the Egyptian Muslim Brotherhood⁶. It resist Israel's moral justification to exist and fights to found an Islamic nation in historic Palestine⁷. In due course, Hamas has become an important political and armed group, mostly after it succeeded in the 2006 Palestinian parliamentary voting and hence seized of the Gaza Strip in 2007 after a short civil war with Fatah, the biggest portion in the West Bank⁸.

The dispute is dominated by timely tensions, often brought about by particular actions but stemmed in wider concerns such as region, refugees, and the recognition of Jerusalem⁹. An important dispute happened on October 7, 2023, when Hamas carried a massive offensive from Gaza into Israel, leading an estimated 1,200 Israeli and foreign deaths and the holding on of over 255 hostages¹⁰. In retaliation, Israel announced war on Hamas, leading to heavy armed attacks in Gaza¹¹.

B.J. Copeland defines Artificial intelligence (AI) as a set of technologies that enable computers to perform a variety of advanced functions, including the ability to see,

⁴ Journal of Palestine Studies Vol. 22, No. 4 (Summer, 1993), pp. 5-19 (15 pages) Published By: Taylor & Francis, Ltd.

⁵ Journal of Palestine Studies Submitted on : Friday, December 10, 2021-5:04:32 AM

Last modification on : Tuesday, December 19, 2023-2:08:03 PM

⁶ Reuters. (2024). What is the history of the Israel-Palestinian conflict? Retrieved from <https://www.reuters.com/world/middle-east/what-is-history-israel-palestinian-conflict-2024-05-14/>

⁷ Id

⁸ The Editors of Encyclopaedia Britannica Last Updated: Apr 26, 2025 • Article History

⁹ Gözde Bayar |15.02.2024 - Update : 15.02.2024

¹⁰ Congressional Research Service. (2024). Israel and Hamas Conflict In Brief: Overview, U.S. Policy, and Options for Congress. Retrieved from <https://www.everycrsreport.com/reports/R47828.html>

¹¹ Al Jazeera and news agencies

understand and translate spoken and written language, analyze data, make recommendations, and more¹². Artificial Intelligence (AI) guided weapons are war weapons used to identify, select, and kill human targets without human intervention¹³. Systems with artificial intelligence are made to mimic human-like skills including reasoning, experience-based learning, and meaning extraction¹⁴. These systems' skills are remarkable and getting more complex, even if they have not yet attained full human-level intellect or sentience¹⁵.

Although AI technologies have revolutionized military tactics, particularly with the deployment of drones, autonomous systems, and advanced missile targeting, they have also introduced significant challenges, including ethical issues, the potential for harm to civilians, and the threat of increased escalation. In the post-Cold War era, AI-powered weapons have greatly influenced global conflict by improving accuracy, speed, and operational efficiency¹⁶.

Humanity has been rapidly advancing in science and technology, achieving remarkable milestones such as landing a man on the moon and, more recently, bringing the moon into our homes through virtual reality¹⁷. As these groundbreaking innovations continue to evolve, nations are increasingly channeling investments into technological advancements, especially in defense. In particular, developed countries are shifting their focus from nuclear warheads to AI-driven strategies¹⁸. This shift is largely driven by the rise of Artificial Intelligence, which is becoming a key

12 The Editors of Encyclopaedia Britannica Last Updated: Feb 4, 2025 p.1

13 The Autonomous Weapons Newsletter p.3

14 B.J. Copeland, Artificial Intelligence, Britannica (Apr. 8, 2021), <https://www.britannica.com/technology/artificial-intelligence>.

15 Carissa Veliz, The Challenge of Determining Whether an A.I. is Sentient, Slate, (Apr. 14, 2016),<https://slate.com/technology/2016/04/the-challenge-of-determining-whether-an-a-i-is-sentient.html>.

16 Hussian, M., & Ryan, M. (2020). The Use of Artificial Intelligence in Modern Warfare: Insights from the 2020 Nagorno-Karabakh Conflict. *Journal of Military Technology*.

17 Roser, M., & Ritchie, H. (2021, April 26). Technological Progress. Our World in Data. <https://ourworldindata.org/technological-progress>

18 Landon, A. (2019, March 8). Visit the Moon with This Stunning New Virtual Reality Experience. Secret London. <https://secretldn.com/moon-virtual-reality-experience/>

component of modern warfare.¹⁹The future of AI lies not only in our convenient home gadgets and self-driving cars, but notably in the commencement and execution of warfare²⁰. The development of such advanced technologies may be feasible in the coming decades, even though Lethal Autonomous Weapons Systems (LAWS), such as "killer robots," have not yet reached the often-envisioned capabilities²¹. Without human direct control, AI-powered autonomous weapons can track terrain, identify enemy forces, and even engage targets²².

AI is predicted to be the most significant tool, if not the only one, used in conflict worldwide in the future.²³ The United States, China, Russia, and other advanced countries all see AI as a key component of their future global dominance²⁴. As Russian President Putin so eloquently stated in 2017, 'whoever wins the AI race, will rule the world'²⁵. Mr. Putin is right; in order to build autonomous weapon systems, militaries all over the world are spending money as quickly as their treasuries can print it²⁶. To date, the US Department of Defense has spent more than \$15 billion on the Joint Artificial Intelligence Center ("JAIC"), which oversees the evaluation and implementation of AI defense initiatives across all military branches²⁷. The impact of AI on traditional battlefield notions such as rules of engagement, laws of war, arms control treaties, and whether the deployment of AI-based military systems constitutes

19 Olckers, A. (2020, March 7). AI in War: "Algorithms Will Fight Each Other In 20 Years". Medium. <https://medium.com/swlh/ai-in-war-algorithms-will-fight-each-other-in-20-years-4df66b346826>

20 Id.

21 Klare, M. T. (2019). Autonomous Weapons Systems and the Laws of War. Arms Control Association. <https://www.armscontrol.org/act/2019-03/features/autonomous-weapons-systems-laws-war>

22 Id.

23 See Olckers, supra note 8.

24 Id.

25 Id.

26 Id.

Laura Wood, Global Artificial Intelligence in Military Market (2020 to 2025), BusinessWire, (Mar. 23, 2021), <https://www.businesswire.com/news/home/20210323005739/en/Global-Artificial-Intelligence-in-Military-Market-2020-to-2025---Incorporation-of-Quantum-Computing-in-AI-Presents-Opportunities---ResearchAndMarkets.com>.

27 See Olckers, supra note 8

warfare at all are starting to have significant ramifications as these endeavors continue to occur and grow²⁸.

The AI systems the IDF uses in Gaza were first detailed a year ago on the Israeli online news outlet +972 Magazine, which shared its report with The Guardian²⁹. Yuval Abraham, the Israeli journalist and filmmaker behind the investigation, tells TIME he believes the decision to “bomb private houses in a systemic way” is “the number one factor for the civilian casualties in Gaza.”³⁰ Abraham, whose report relies on conversations with six Israeli intelligence officers with first-hand experience in Gaza operations after October 7th , quoted targeting officers as saying they found themselves deferring to the Lavender program, despite knowing that it produces incorrect targeting suggestions in roughly 10% of cases³¹.

In the Israel-Hamas conflict , AI is being employed by both ends, especially drone technology³². Drones are used to bombard strategic locations of the enemy as both sides struggle to dominate the other in the war³³. Israeli defence forces have used these drones to detect targets and conduct retaliatory ground assaults and bombings³⁴. Israel has recently adopted a novel AI system during the Gaza war, signifying the noteworthy role of AI-enhanced warfare in the battlegrounds of Gaza³⁵. The Israeli Defense Forces (IDF) are also employing the use of an AI weapon known as the Fire Factory to conduct bombings, detect targets, and perform ground assault strikes ³⁶.

28 The Economist, Artificial Intelligence and War, (Sep. 7, 2019), <https://www.economist.com/leaders/2019/09/05/artificial-intelligence-and-war>.

29 The Times By YASMEEN SERHAN, December 18, 2024 2:50 PM EST

30 Id

31 Id

32 Human Rights Watch, 2014. "Israel: Gaza Conflict a 'Disaster for Civilians.'" HRW Report

33 Id

34 United Nations, 2014. "Report of the United Nations Independent Commission of Inquiry on the 2014 Gaza Conflict." United Nations Document, A/HRC/29/52

35 The Times By Fatafta et al.

36 Id

The IDF has been said to utilize an AI-powered system called ‘Habsora’, which produces targets quickly³⁷. By automatically collecting intelligence, this technology has made it easier to quickly identify targets for military strikes, which has been crucial to Israel's actions in Gaza during the conflict. Critics have referred to the identification of more than 12,000 targets as a "mass assassination factory," claiming that Israel misused AI-driven technologies throughout the conflict, resulting in countless civilian deaths³⁸. The 8200th unit of the Israeli intelligence agency Mossad created AI target systems such as "Alchemist," "Depth of Wisdom," "The Gospel," and "Fire Factory"³⁹. This serves as a reminder that modern conflicts demand far greater capabilities than military strategists initially anticipate.

1.2. PROBLEM STATEMENT OF THE IMPACT OF AI TECHNOLOGY GUIDED WEAPONS IN THE WAR ON GAZA.

The utilization of AI in warfare, mostly in Gaza has brought important questions as to the ethical, legal and humanitarian welfare⁴⁰. In the aftermath of WWII, mechanical developments like computers, radar and nuclear weapons opened the door for Cold war weapon competition, setting ground for development of AI weapons⁴¹. World leaders such as Hawking and Elon Musk have criticized the use of AI weapons citing for the controversy and called upon the regulation for their development to prevent the continued arms race⁴². In Gaza, AI weapons have been utilized to decide the targets but Human Rights Watch has brought issues about their effectiveness and their ability to abide by IHL principles⁴³. AI weapons could stall in distinguishing between

37 Amnesty International, 2014. "Gaza Conflict: Humanitarian Crisis." Amnesty International Report.

38 Id

39 Middle East, Yavuz Aydin |18.02.2024 - Update : 18.02.2024

40 Id

41 [A&E Television Networks, World War II, HISTORY (Oct. 29, 2009), <https://www.history.com/topics/world-war-ii/world-war-ii-history>]

42 [Eric Levitz, Elon Musk and Stephen Hawking call for a ban on autonomous weapons, MSNBC, (Jul. 28, 2016), <https://www.msnbc.com/msnbc/elon-musk-and-stephen-hawk-call-ban-autonomous-weapons-msna649206>].

43 [Human Rights Watch, Sept. 10, 2024]

military and civilian objectives hence leading to civilian casualties. The main issue lies within accountability, who is to be held accountable for the actions of AI weapons in-case of misjudgment⁴⁴. The present legal framework does not superscript these important concerns hence the concern of how the legal system can be modified to accommodate AI weapons⁴⁵.

1.3. OBJECTIVES

The objectives of this study will be divided into general and specific objectives to help in guiding the study.

1.3.0. GENERAL OBJECTIVE

To investigate and understand the impact of AI guided weapons on the principles of IHL in the war on Gaza

1.3.1. SPECIFIC OBJECTIVES

To investigate the impact of AI technology guided weapons on principle of discrimination during striking on the war on Gaza.

To investigate the impact of AI technology guided weapons on the principle of Proportionality on the war on Gaza.

To investigate the impact of AI technology guided weapons on the principle of necessity on the war on Gaza.

To investigate the impact of AI technology guided weapons on the principle of humanity on the war on Gaza.

1.4. RESEARCH QUESTIONS

⁴⁴ Id

⁴⁵ Id

What is impact of AI technology guided weapons on the principle of discrimination while striking in the war in Gaza?

What is impact of AI technology guided weapons on the principle of necessity while striking in the war in Gaza

What is impact of AI technology guided weapons on the principle of humanity in the war in Gaza?

What is impact of AI technology guided weapons on the principle of Proportionality in the war in Gaza.

1.5.0. SCOPE OF THE STUDY

The scope of the section will focus on the geographical, content and period of the study on the impact of AI technology guided weapons on the principles of IHL in the war on Gaza.

1.5.1.GEOGRAPHICAL SCOPE OF THE STUDY

The study will focus on Gaza because it is an area where AI technology guided weapons have been used in the war between Israel and Hamas.

1.5.2. TIME SCOPE

The study will focus in the time frame between 7th October 2024 to January 2025 when the cease fire was agreed between Israel and Hamas to stop the war on Gaza.

1.5.3 JUSTIFICATION OF THE STUDY

The war on Gaza was one of the wars that has had AI technology weapons used and this has led to impact on the principles of warfare which include the principles of

discriminative striking, humanity, proportionality, and necessity. This is due to the high casualties of civilians during the war on Gaza hence the question of accountability due to the use of AI technology guided weapons during the war on Gaza.

1.5.4. SIGNIFICANCY OF THE STUDY

For academicians, this research widens the knowledge on the interaction between AI, warfare, and international law, encouraging vital discourse on the ethics and legality of autonomous weapons in real-world wars. It offers empirical grounding to the theoretical and conceptual debates surrounding the use of autonomous weapon systems (AWS). Many academic discussions around AI in warfare remain abstract or speculative, lacking detailed, evidence-based case studies. By focusing on Gaza, this research can analyze concrete examples of how AI technologies have been used, how targeting decisions are made, and how these systems perform under the real-world pressures of asymmetric warfare. This moves the discourse from theoretical possibilities to grounded realities.

1.6 0. Figure 1 Conceptual Framework.

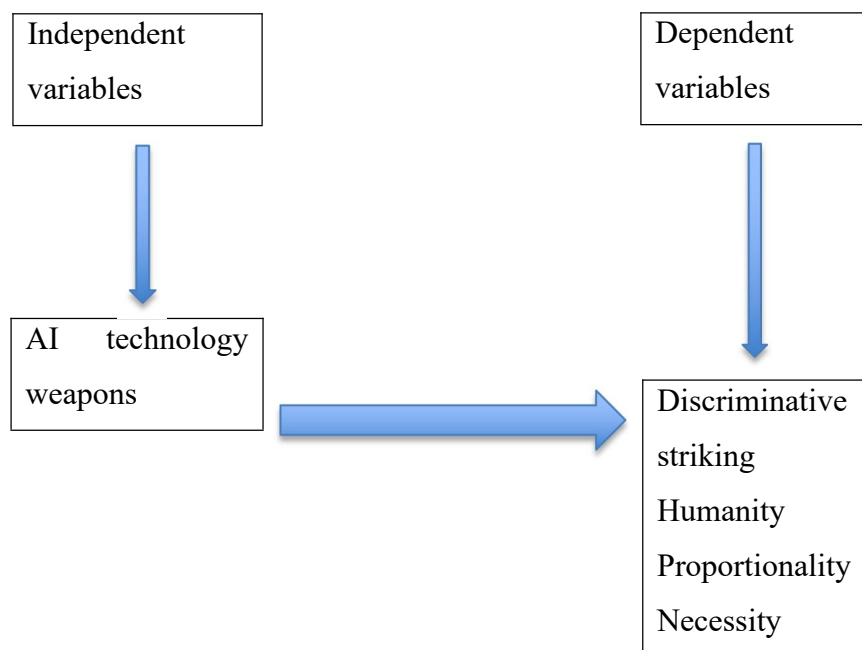


Figure 1 above shows the independent variable as AI technology weapons play a crucial role in the current war on Gaza through weapons such as "Alchemist," "Depth of Wisdom," "The Gospel," and "Fire Factory"⁴⁶. The fundamental complexities of war are difficult to grasp by Soldiers on the battlefield, let alone AI technology weapons. These systems, even when well developed, can commit fatal errors; errors for which we have not yet conceptualized effective regulatory or recovery procedures⁴⁷. Some military and world leaders such as Ban Ki-moon, Zaki Anwar, Nikki Haley, Jacinda Ardern, Ursula von der Leyen, Vladimir Putin and General John E. Hyten have addressed the fact that, AI technology guided weapons lack an ability to feel empathy and be merciful in war – restraints which limit the potential for brutality in conventional human combat⁴⁸. Discriminative striking, humanity, proportionality, and necessity are the dependent variables that are the core values of international humanitarian law which have been heavily affected by the use of AI guided technology weapons in the war on Gaza.

46 Shannon, R. (2020). "AI in Modern Warfare: Enhancing Precision and Minimizing Collateral Damage." *Journal of Military Innovation*, 12(1), 101-120

47 International Committee of the Red Cross (ICRC), 2019. "Military Necessity and Humanity." ICRC Guidelines.

48 Michael T. Klare, *Autonomous Weapons Systems and the Laws of War*, Arms Control Association, (Mar. 2019), <https://www.armscontrol.org/act/2019-03/features/autonomous-weapons-systems-laws-war>.

CHAPTER TWO

LITERATURE REVIEW ON THE IMPACT OF AI TECHNOLOGY GUIDED WEAPONS IN THE WAR ON GAZA.

2.0 Introduction.

The principles of discrimination, proportionality, necessity and humanity have a vital role they play in IHL as they provide the guidelines on what is accepted during warfare. The principle of distinction demands parties to a conflict to distinguish between militants and civilians, and between combatant objects and civilian objects⁴⁹. Attacks need only to be directed towards only at legitimate military targets⁵⁰. The Principle of Proportionality forbids strikes in which the expected incidental civilian causality would be more in relation to the concrete and direct military advantage expected⁵¹. The Principle of Necessity permits only those measures necessary to achieve an allowed military desire. Force used needs to be necessary for breaking down the enemy's military capability and not for causing not needed harm⁵². The Principle of Humanity forbids causing unwanted suffering, injury, or destruction. It demands for the protection of those not participating in war, even in military necessity⁵³. Through reading the writings of various authors and researchers who published on the same subject of Impact of IA technology guided weapons in the war on Gaza, this chapter will concentrate on the study of pertinent literature to this research issue and highlight on the gaps that this research will cover.

⁴⁹ Article 48 of Additional Protocol I to the Geneva Conventions (1977)

⁵⁰ Id

⁵¹ Article 51(5)(b), Additional Protocol I (1977)

⁵² customary international law, U.S. Department of Defense Law of War Manual, 2016,

⁵³ The Martens Clause (Hague Conventions, 1899 & 1907), reaffirmed in Additional Protocol I (1977), Art. 1(2)

General use of AI Technology guided weapons status.

The increase in the use of AI guided weapons has been discussed mostly in circumstances surrounding military innovations and the ability to ensure accurate striking, limit human casualties and achieve the desired targets⁵⁴. Shannon claims that AI guided weapons have the capacity to ensure effective military strikes by ensuring efficiency of intelligence gathering, surveillance, and targeting systems⁵⁵. However, Kessler contradicts that though these systems theoretically give an assurance to improve effectiveness, the reality on the battlefield has always risen tangible questions about the accountability and adherence to the IHL principles⁵⁶. In specific, Kessler asserts that the autonomous nature of the AI guided weapons can result into the violations of the different principles of IHL which include the principle of distinction, which demands the militants to distinguish military objects and civilian targets⁵⁷. Much as Kessler and Shannon try to prove that there is efficiency which may be theoretical in nature, there is a gap in the studies as to actual and practical conflict zones where such weapons have been used such as the war on Gaza. This has hence made it difficult to evaluate the actual adherence of the IHL principles when AI guided weapons are used. This limits our understanding of the actual implication and effects of non adherence of IHL principles in the use of AI guided weapons due to lack of data-driven evaluation of AI weapon use in active war zones. How AI technology guided weapons have impacted the principles of international humanitarian law in the war on Gaza.

Gordon rightly says that AI guided weapons are modified to identify, target and neutralize danger without direct human intervention⁵⁸ According to Cummings in his investigation on the implication of AI in warfare, he states that AI and its use in

⁵⁴ Guardian Newsroom: The unfolding crisis in the Middle East

⁵⁵ Shannon, R. (2020). "AI in Modern Warfare: Enhancing Precision and Minimizing Collateral Damage." *Journal of Military Innovation*, 12(1), 101-120

⁵⁶ Kessler, S. (2021). "Artificial Intelligence and the Principle of Distinction in Urban Warfare." *International Humanitarian Law Journal*, 14(3), 50-74.

⁵⁷ Id

⁵⁸Gordon, R. (2020). The ethics of AI in warfare: A critical review. *Ethics and International Affairs*, 34(4), 451-463.

warfare brings about the question of foundation ethical framework that controls military conduct, mostly the principles of distinction and proportionality⁵⁹. These principles, as spelt out by the Geneva Conventions, demand that strikes should be able to distinguish between military and civilian objects and the force that is to be used should be reasonable and proportionate to the military objective⁶⁰. Cuning M.L is of a view that difficulties can highly arise in highly populated areas such as Gaza which hence questions the efficiency of AI weapons that lack human control⁶¹. This idea is essential to weapon regulation because it forbids the use of any weapon that is unable to discriminate between military and civilian targets. This was proved in *Prosecutor v. Tadić*, a case which was heard by the International Criminal Tribunal for the Former Yugoslavia (ICTY) ⁶². In the case of *Prosecutor v Duško Tadić*⁶³, who was accused of crimes against humanity, including the use of indiscriminate weapons that harmed civilians, the ICTY rendered a decision which was that all parties involved in a war are required to abide by the principle of differentiation. which is a fundamental norm of international humanitarian law⁶⁴. Despite insightful contributions by Cunningham and Gordon on the discriminative capabilities and evolving architecture of AI-guided weapons, a significant gap remains in understanding how these technologies can be effectively accounted for in highly populated and densely built-up environments such as Gaza. While AI systems are often lauded for their precision and data-processing speed, the realities of urban warfare—characterized by civilian density, dual-use infrastructure, and rapidly changing tactical situations—complicate their deployment⁶⁵. Scholars such as Schmitt (2019) argue that even advanced autonomous systems struggle with the legal and ethical demands of distinguishing combatants from civilians in real time, particularly when adversaries operate within civilian

59 Id

60 Sweeney, M. (2021). AI and asymmetry in conflict: The Gaza example. *Global Security Review*, 22(1), 42-58.

61 Cummings, M. L. (2017). Artificial intelligence and the future of warfare. *International Journal of Law and Information Technology*, 25(3), 204-227.

62 ICTY, 1995, p. 35

63 Id

64 International Criminal Tribunal for the Former Yugoslavia (ICTY), 1995. *Prosecutor v. Tadić*. *International Law Reports*, 112(3), p. 35.

65 Cummings, M. L. (2017). Artificial intelligence and the future of warfare. *International Journal of Law and Information Technology*, 25(3), 204-227.

populations⁶⁶. This raises serious concerns about the accountability mechanisms for unintended harm caused by these systems. According to Roff (2014), the opacity of machine decision-making and the potential for algorithmic bias challenge both legal responsibility and post-strike review processes, especially when civilian casualties occur⁶⁷. Moreover, in war zones like Gaza, where infrastructure damage, displacement, and psychological trauma have long-term societal impacts, the use of AI weapons raises questions beyond immediate battlefield outcomes⁶⁸. Crootof (2015) emphasizes that without robust oversight and clearly defined chains of accountability, the deployment of AI weapons in such environments risks eroding international humanitarian norms and public trust⁶⁹. Current regulatory frameworks, including the Geneva Conventions and Additional Protocol I, are not fully equipped to address the complexities introduced by autonomous systems, leaving a regulatory vacuum that increases the likelihood of disproportionate harm⁷⁰. Therefore, while AI may offer enhanced operational capabilities, its use in civilian-dense conflict zones necessitates far more rigorous legal, ethical, and technological scrutiny to mitigate collateral damage and uphold humanitarian principles⁷¹.

Responsibility is one of the most disputed areas surrounding the utilization of AI in warfare. Lynch suggested that the legal and moral problems of AI weapons is holding parties responsible and accountable for the actions of AI weapons⁷². In the normal warfare, individual and personal commanders hold responsibility for certifying compliance with IHL but AI weapons complicate this responsibility structure mostly when the used weapons make dangerous decisions without human involvement⁷³. This is because AI systems can make decisions in real-time which leads to nondiscrimination during striking which violates IHL principles due to the complex

⁶⁶ Schmitt, M. N. (2019). Autonomous weapons and international humanitarian law: A primer for military professionals. *Harvard National Security Journal*, 10(2), 1–46. Available at: <https://harvardnsj.org/>

⁶⁷Roff, H. M. (2014). The strategic robot problem: Lethal autonomous weapons in war. *Journal of Military Ethics*, 13(3), 211–227. <https://doi.org/10.1080/15027570.2014.975010>

⁶⁸ Al Jazeera

⁶⁹ Crootof, R. (2015). The killer robots are here: Legal and policy implications. *Cardozo Law Review*, 36(5), 1837–1915.

<https://cardozolawreview.com/issues/>

⁷⁰ International Committee of the Red Cross (ICRC). (1977). Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977.

⁷¹ Schmitt, M. N. (2019). Autonomous weapons and international humanitarian law: A primer for military professionals. *Harvard National Security Journal*, 10(2), 1–46. Available at: <https://harvardnsj.org/>

⁷² Al Jazeera

⁷³ Kessler, S. (2021). "Artificial Intelligence and the Principle of Distinction in Urban Warfare." *International Humanitarian Law Journal*, 14(3), 50-74.

nature of urban environments such as Gaza⁷⁴. Lynch goes on to condemn the lack of clearness in international law concerning the legal point of AI weapons and their operators, stating that the lack of clarity on guidelines creates a dangerous legal environment⁷⁵. Despite the fact that Lynch mention the gaps in the existing legal frame work to ensure full human accountability as concerning actions by AI weapons, he did not offer any mechanism for holding accountable individuals for the actions of AI guided weapons

The need for human dominance over determination to use force is clearly set out by international humanitarian law⁷⁶. The ethical regards as to the degree of human control in important decisions like involvement and attacking are brought up by the dangerous character of AI-guided weapons⁷⁷. Attacks that are likely to pose unnecessary harm on civilians and their objects in relation to the intended military advantage of the target are prohibited by the proportionality principle⁷⁸. The choice and implementation of artillery in war-fields are directly affected by this principle. The ethical concerns that accompany the utilization of AI guided weapons on battle fields has been heavily criticized by Robinson most as concerning the ability of AI guided weapons to make ethical decisions as concerning the results of their targets, mostly when it comes to the preservation of civilians and their property⁷⁹. On the other hand, Anderson contends that dependence on AI guided weapons in battle fields can result into uncalled for demeaning and brutality of the conflict, where choices about living and dying are made by robots with no moral questioning⁸⁰. The same view was held by Ghani when he noted that AI weapons if not well used, can lead to

74 Sharkey, N. (2019). The ethical and legal implications of autonomous weapons systems. *Journal of Military Ethics*, 18(3), 257-272

75 Anderson, T. (2020). "Ethical Implications of AI in Warfare." *Journal of Military Ethics*, 19(4), 350-369.

76 Sharkey, N. (2019). "The Ethical and Legal Implications of AI in Warfare." *Journal of Strategic Studies*, 42(1), pp. 23-45.

77 ICRC, "Military Necessity and Humanity," ICRC Document

78 United Nations, 2014. "Report of the United Nations Independent Commission of Inquiry on the 2014 Gaza Conflict." United Nations Document, A/HRC/29/52

79 Robinson, C. (2019). "The Ethics of Autonomous Weapons in Armed Conflict." *Journal of Military Ethics*, 18(3), 209-224.

80 Anderson, T. (2020). "Ethical Implications of AI in Warfare." *Journal of Military Ethics*, 19(4), 350-369.

humanitarian concerns in Gaza due to indiscriminate targets⁸¹. The protection of non-combatants is the backbone of IHL but as noted by the above authors, the ability to ensure this protection is an insure in question.

The use of AI-guided weapons in war zones like Gaza presents important legal, ethical, and humanitarian issues. While these weapons provide military advantages, they also raise various issues in relation to adherence to the principles of IHL, majorly distinction and proportionality. The gaps identified in this review highlight the need for further study, particularly in the areas of accountability, transparency, and the ethical use of AI in armed conflict which this research will do.

⁸¹ Ghani, A. (2021). "AI and Humanitarian Impact: The Case of Gaza." *Journal of Conflict and Security Law*, 26(2), 213-229.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter will covered the Research design, research area, study population and ethical considerations

3.1 Research Design

3.2 Research Area

This research will be conducted research in Gaza.

3.3 Study population / target population

The target population will be civilians in Gaza who have been killed or injured by AI during the war in Gaza.

3.4.1 Data collection instruments.

The researcher will use secondary data during data collection from online literature a such as text books , journals, articles and case law.

3.5 Data analysis and processing

This research will adopt a qualitative approach using content analysis of publicly available documents and media reports. The goal is to gain rich, in-depth insights into the subject matter, rather than to generalize findings across a larger population. This will involve systematically analyzing articles, news reports, statements from international organizations, and governmental publications that discuss or mention AI weapons in the Gaza conflict.

3.6 Measurement of variables

The variables will be measured through analysis of military reports, white papers, legal opinions, and policy documents that outline the use of AI weapons by state and non-state actors. This will help to understand official narratives and justifications for the use of AI in warfare.

3.7 Data management and analysis

The data will be managed and analyzed through interpreting and explaining the data collected from secondary sources according to the objectives of the study.

3.8 Ethical considerations

The ethical consideration of privacy will be ensured through appropriately handling any sensitive and personal information especially data that includes identifiable information about individuals through keeping their identities confidential.

The ethical consideration of integrity will be maintained through ensuring the accuracy and integrity of the data through avoiding misinterpreting and manipulating of findings to suit the research agenda.

CHAPTER FOUR

4.1 Introduction

This chapter entails the data analysis, results and discussions that are presented in line with the objectives of the study.

4.2. Table showing the impact of AI technology guided weapons on the principle of discrimination during striking on civilians in the war in Gaza.

Month	Battle	Number of air strikes	No. Of civilian casualties	Average civilian death
Gaza, October 2023	Operation Swords of Iron	299	4,104 (2,798 killed, 1,306 injured)	10.1
May 2021	Operation Wall Guardian	124	1,230 (202 killed, 1,028 injured)	1.7
March 2017	Battle of Mosul	35	856 (600 killed, 256 injured)	20.7
September 2016	Aleppo offensive	19	1,182 (412 killed, 770 injured)	22.9

Source [AOAV](#) Posted 8 Nov 2023

The table shows documentation on different military operations, such the October 2023 dispute in Gaza, and gives a lens to investigate the effect of AI-guided weaponry on civilian fatalities, especially in relation to the principle of discriminative attacks—that is, the potential to target militants while preventing civilians casualties. Despite the employment of AI-guided weapons ,Operation: Swords of Iron lead in a numerous average of civilian mortality per air attack. This shows a significant reduction in discrimination during attacks, which is an important element for using AI in combat.

Despite that, the Gaza October 2023 situation differs from this assurance, showing how AI guidance failed to limit high civilian fatality. The deployment of AI may be controlled by outside happens, such as imprecise or unreliable information, attacking positions that may include civilian-populated zones and dense developed areas, where differentiating militants from civilians is supposedly impossible.

In May 2021 (Operation Wall Guardian), where AI was also allegedly employed, the civilian mortality rate came down (1.7 per strike), proving that technology can enhance discrimination when used properly. On the other hand, Prior non-AI-heavy attacks such as Mosul (2017) and Aleppo (2016) counted far more civilian mortality rates (20.7 and 22.9 per strike), proving the possible basis for enhancement that technology is capable—when employed efficiently and accurately.

The data proves that AI-guided weapons alone do not assure limited civilian fatality. While they offer accurate, their real shielding of civilians relies on: Human control and presiding Ethical and tactical decisions as well as having precise of attack information. In the event of Gaza, October 2023, the canon of discriminative striking looks compromised, hence leading important ethical and militant concerns about the employment of AI in wars.

4.3 Satellite images showing the impact of AI technology guided weapons on the principle of Proportionality on the war on Gaza.

Satellites show increasing damage across Gaza

■ Damaged areas



Source: Damage analysis of Copernicus Sentinel-1 satellite data by Corey Scher of CUNY Graduate Center and Jamon Van Den Hoek of Oregon State University, UN Ocha, OpenStreetMap, European Commission GHSL



The examination, conducted by Corey Scher of City University of New York and Jamon Van Den Hoek of Oregon State University, shows pictures revealing short term

differences in the height or structure of civilian infrastructure which indicate destruction⁸². The southern city of Khan Younis has been mostly hit in previous months, with beyond 38,000 (or more than 46%) of buildings now demolished or damaged, according to the analysis. Over the past two weeks, more than 1,500 shelters have been demolished or damaged there⁸³.

Al-Farra Tower - a 16-storey residential building in the middle of the town, the tallest structure in the zone- was demolished on 9 January as can be observed in before-and-after pictures of the city's skyline. Most of the surrounding in which it lies has been destroyed by Israeli air strikes since late December⁸⁴. Rawan Qaddah, a 20-year-old resident, who has been ousted and has no connection with her family states that Israeli forces targeted residential complexes, especially in the downtown Khan Younis area ⁸⁵.

AI-guided weapons are mostly used for their capability to target objectives with accuracy, purposelessly limiting unnecessary destruction. However, the damage proved that beyond 38,000 blocks were demolished or damaged, including Al-Farra Tower, the tallest structure in the area. This hence proves that even with AI guided striking, the level of harm⁸⁶. This brings into play a concern about the procedure employed to decide attacks and the real accuracy of AI in recognizing combatant and non combatant objects.

The data provided by the satellite data proves that residential buildings and schools were mostly destroyed, despite AI ability to examine and group structures, points to a likely shortage or intentional ignore of these weapons. AI may help in assessing buildings, but it does not automatically employ ethical or humanitarian thinking hence that responsibility still lies with the human mechanics.

The accuracy of technological weapons might complex the desire for accountability. If the damage can be investigated so accurately post-attack, the same information

⁸² Corey Scher of City University of New York and Jamon Van Den Hoek of Oregon State University

⁸³ Id

⁸⁴ Id

⁸⁵ Id

⁸⁶ Id

could possibly be used to evaluate legality or violation of international principles. However, that demands for transparency in how attacks are conducted and whether technological weapons were employed.

The demolition in Khan Younis proves the fact that AI-guided weapons are less reliable. Whereas modern advanced technology can not efficiently guarantee protection to non-combatants. Instead, they may intensify damage when employed uncontrollably or without limitations. The availability of advanced targeting machines does not provide humanitarian results — the purpose and intention behind their deployment are equally important.

CHAPTER FIVE.

CONCLUSION AND RECOMMENDATIONS.

5.0. INTRODUCTION

This chapter presents the summary of the researcher finding earlier presented in chapter four. The conclusions and recommendations are made in light of the findings of the study, the impact of AI technology guided weapons in the war on Gaza.

5.1 SUMMARY

The data and satellite imagery from the war in Gaza, particularly during Operation Swords of Iron in October 2023, show a sharp disputation between the conceptual assurance of AI-guided weapons and their genuine effect on civilian immunity. Whereas AI technologies are invented to improve the accuracy of army strikes and endorse the fundamentals of discrimination while targeting and proportionality, the reality on the ground proposes a keen collapse to convey on these plans.

In context of discriminative attacking, the median civilian fatality rate per airstrike in Gaza (10.1) far overshadows those documented in earlier AI-assisted applications like Operation Wall Guardian in 2021 (1.7), and even goes beyond the rates from non-AI-massive campaigns such Mosul and Aleppo. This shows a disturbing inconsistency between technological potential and its ethical application. It proposes that AI, when coupled with poor judgement, questionable targeting precedents, or conclusions compelled in heavily populated urban zones, does not naturally lower civilian casualty— and may even worsen it.

Satellite visual investigation of Khan Younis extremely stresses this concern. The demolition of above 38,000 buildings, including civilian buildings like the Al-Farra Tower and multiple schools, raises important issues about proportionality — an important principle of international humanitarian law. The application of AI should, in tenet, limit such unnecessary demolition by ensuring proper discrimination between military and civilian strikes. However, the majority scale of destruction highlight that

either these systems were unproductive or their ethical defenses were countermanded or disregarded.

The outcome progressively transparently is the lack of meaningful answerability AI systems can examine, target, and even provide post-strike information, but they do not carry liability. The choice about how and where to attack remain under human control — yet the effect around these choices, mostly in war zones like Gaza, create an ethical and legal grey area. If AI is applied to account accuracy, then the affected civilian toll and property damage demand a transparent estimation: Were AI systems , misapplied, led astray, or avoided? And who is held liable when they stall?

More so, the double utilization format of AI — as both a weapon and an analytical tool — leads to a complex. The same systems that could, in theory, limit damage are also applied post-conflict to determine damage, probability is high that perform as quiet eye witnesses to war crimes. Yet without general access to targeting protocols or responsibility systems these tools enforce a situation of harm without liability.

5.2 CONCLUSION

In a net shell, the use of technology in Gaza has uncovered a crucial defect in modern warfare: the imagination that accuracy and care equates to safety. Technology, no matter how up to date, cannot reimburse for defective plan of action, insufficient supervision, or the intentional neglect for civilian lives. Until there is full clear, ethical guidelines, and real accountability for the use of AI in war, its guarantees will remain worthless and its results, shocking.

5.3 RECOMMENDATIONS

The growing incorporation of artificial intelligence (AI) in contemporary warfare has ushered in a new era of dispute, with technology having an important role in modern military exercises. Nowhere is this more apparent than in Gaza, where the use of technology powered targeting systems has marked up crucial ethical, legal, and humanitarian issues. While such weapons are often validated as tools for accuracy and effective, their use in highly populated civilian areas like Gaza raises the risk of high errors and unaccountable violence. Therefore, it is important to evolve and impose

stringent systems to limit the deployment of AI-guided weapons and guarantee accountability for their results.

The most important proposal is the establishment of binding international laws mainly made for AI-guided weapons. Present international humanitarian legal framework (IHL) was not made with independent or semi-independent weapons in consideration, resulting to important flaws in accountability. A United Nations-led agreement, familiar in spirit with the Chemical Weapons Convention, can definitely spell-out and control the use of AI in war zones. Such treaties should ensure transparency in AI supervisory procedures and stop the use of independent weapons that cannot be reliably controlled or restricted.

Another important guideline is to impose "human-in-the-loop" agreement, which mandate that all lethal resolutions made by technology systems need meaningful human control. In Gaza, where the distinction between soldiers and civilians can be hindered due to the modern landscape, human discernment is important to avoid unforeseen disasters. Machinists must be instructed to inquire and confirm AI-generated targeting proposals, rather than take them as eventual. This perspective also mandates that culpability and liability can be clearly attached to persons or command structures, rather than being hidden behind a technological veil.

To ensure both popular confidence and legal exploration, all states using AI-guided technology must be called upon to release information on their use. This includes data on adaptive algorithms, decision-making procedures, and post-strike evaluation. In the circumstances surrounding Gaza, this can assist explain whether strikes were proportional, discriminate, and in line with international law. Self standing watchdog organizations should be given permission to examine these technologies and disclose on their discoveries, which can form the foundation for international investigations if needed.

Rather than counting on AI for combative reasons, funding should be diverted toward non-lethal use of AI that promote defense and protection. For example, AI can be used to boost early warning systems for civilian populations or guide humanitarian assistance efforts more productively. In Gaza, this could mean using AI to find and evict high-risk areas before combat operations begin, thereby reducing fatality.

Before any intelligent retrieve is employed in war areas such as Gaza, it should go through an independent standing moral review board constituting legal experts, ethicists, engineers, and representatives from humanitarian organizations. These boards can examine the likely dangers and ethical consequences of employing a particular system and determine whether its use coincides with both legal responsibilities and humanitarian guidelines.

Finally, there should be comprehensible tool for post-conflict accountability. If AI-guided weapons are believed to have caused illegal damage, then both the national actors and makers of the weapons must be held accountable. This can involve holding them liable through international courts, sanctions, or reparations to the affected. Making this liability will act as a formal punishment against uncalled for or careless utilization of technology in warfare.

In conclusion AI-guided weapons constitute an extreme change in the warfare, and their implementation in war zones like Gaza lays critical recognition for likely fidelity and hazards. Though AI can present new competencies, it also brings complex ethical and legal tests. Without vigorous systems to monitor, transparency, and accountability, the implementation of AI guided weapons risks mounting brutality and vaporizing international norms. By using the guidance above, the global society can take useful procedures regarding ensuring that the use of AI in warfare respects humanity, preserves human life, and respects the legality.

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