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2024 Richard S. Schultz '60 Symposium Fellow Research Report

Case Study on Israel's Military Use of Artificial Intelligence in the ongoing Israel-Hamas Conflict

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Abstract

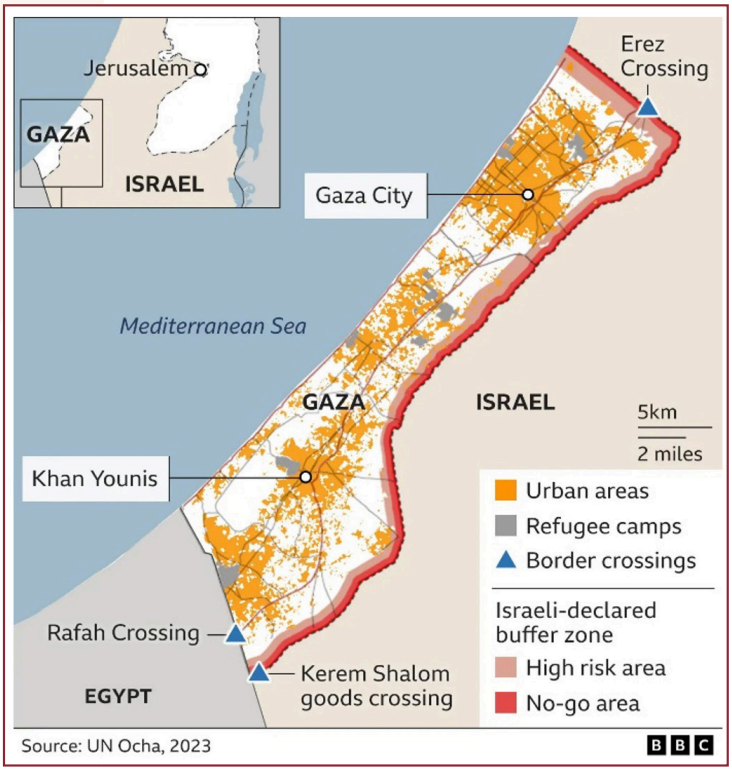
Located in the Middle East, Israel is continually proving itself as a technological and entrepreneurial powerhouse and is now striving to dominate in its pursuits of artificial intelligence (AI). The potential of AI allows states like Israel to begin incorporating AI in various fields, including offensive operations. The future of AI development depends on the societal perception of the technology; therefore, it becomes a vital factor in support of the military use of AI. By examining originating media outlets from Israel and Gaza (major parties in the ongoing Israel-Hamas conflict) and the U.S., an outer party with diverse access to media, this study will underscore the transformative effect of target media on public perception of AI using various forms of passive open-source intelligence (OSINT) and Google Dorking.

Preliminary Comment

This study's intent is neither to create bias nor to study the ethical considerations of a nation's use of technology. Instead, this study aims to inform and introduce the audience to the growing cyber domain and its emerging technologies that have begun shaping both society and one's approach to such capabilities.

Why is the Israel-Hamas Conflict relevant to the study?

Hamas have been an organization that historically opposed Israel and its military. Some factors to its hostility revolve around its ideological opposition and historical grievances that had carried on from previous Israel-Hamas conflicts in 2008 to 2009, 2012, 2014, and 2021, or from events like the Israeli security raids on religious sites like the al-Aqsa mosque in East Jerusalem and Jewish settlement on the West Bank, for political control, blockade, and restriction, where Hamas has declared the unjust actions imposed by Israel and Egypt. (Yale Law School, 2019)



The current conflict between Israel and Hamas was initiated on OCT 07, 2023, with Hamas launching a surprise attack on Israel. (Gradstein, 2024) Hamas cited the attack as causation to Israel's occupation of the Gaza Strip, the blockade of Gaza, and the expansion of settlements, all of strategic significance for military and economic advantages to Hamas. Israel's response to the confrontation was to destroy Hamas as an organization, free the 240 hostages captured from the surprise attack, and revenge the 1,200 people killed, as its initial claimed occupation of the Gaza Strip was due to security concerns of the flow of weapons and materials.

The persistence and complex nature of the conflict is a summary of the historical significance, strategic location of political control by Hamas, and the ongoing humanitarian and economic crises for both the Israelis and the Palestinians.

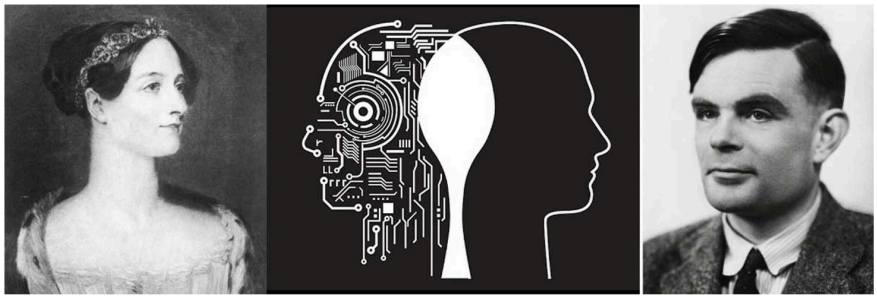
AI Breakdown: Can Machines Think?

A controversial question still pondered today was posed by Alan Turing, the father of modern computing. In his work, "Computing Machinery and Intelligence," Turing responds to this question by stating the answer is subjective to the definition of what "thinking" or "intelligence" is. (Turing, 1950)

In his work, Turing discusses his creation of the Turing test, which examines a machine's ability to imitate human conversation based on its written "algorithm," a mathematical set of instructions designed to accomplish a task.

Artificial intelligence (AI) today is a simulation of human intelligence, distinguishing human beings from animals by providing perceptual, cognitive, and decision-making intelligence capabilities. The end goal of AI is to reduce human labor ultimately and to improve efficiency. (De Cremer & Kasparov, 2021)

To achieve such intelligence capabilities, deep learning and machine learning became vital assets of modern AI.



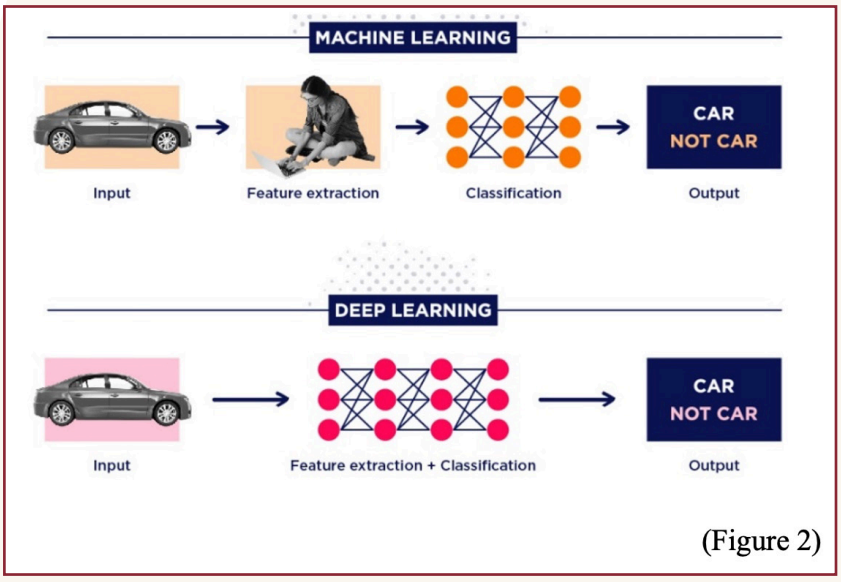
"Let us return for a moment to Lady Lovelace's objection, which stated that the machine can only do what we tell it to do."
- Alan Turing

FM

AI Machine Learning

Machine Learning is a subset of AI that develops algorithms and statistical models to improve performance on specific taskings through experience. These algorithms are being trained on large datasets (inputs) to recognize patterns and are used to make predictions or decisions on new, unseen data.

This methodology has been proven effective for AI; with Israel's targeting technology being private information, it is likely that such algorithms are being trained with machine learning to produce the ability to find "targets." (Xu et al., 2021)



(Figure 2)

In Figure 2, the objective is to develop an algorithm to recognize and identify "car."

To achieve this, the programmer must input characteristics unique to a "car" identity, such as "4 wheels." In continuation, specific patterns built by the shape and size of the vehicle will be recognized by the algorithm through repetitive trials.

STAGES OF MACHINE LEARNING

STAGES	DEFINITION	EXAMPLE
Supervised Learning	Algorithms are being trained on labeled data with human input, learning to map inputs to known outputs. This procedure will be conducted until an anticipated success percentage is met.	In Figure two, the procedure would only input data labeled as "car" to allow the algorithm to build recognition on assisted inputs accurately.
Unsupervised learning	The algorithm will self-identify patterns in unlabeled data without any human assistance. Results will be analyzed to determine if the algorithm will need another iteration of *Supervised Learning* or will proceed to the last stage, Reinforcement Learning.	In Figure 2, Once the program has proven recognition with the desired accuracy, the programmer could implement the same dataset as was inputted during the "supervised learning" phase to allow the algorithm to build its pattern recognition.
Reinforcement learning	The algorithm receives cycles of data and will make decisions based on the corrected data from previous stages. If results are successful, the algorithm will then be used for real-world applications	In Figure 2, this phase is reached once the algorithm has proven its ability to recognize cars without assistance. At this point, the programmer would provide the same dataset of car input during supervised and unsupervised learning but widen the dataset with alternative vehicles, like motorcycles.

All AI systems have been subjected to the multi-phase of machine and deep learning, a venue for AI to be independent. This becomes significant for image recognition in achieving Israel's strategic objectives, elaborated later in the study.

AI Deep Learning

This is a subset of machine learning utilizing artificial neural networks inspired by the structure and function of the human brain. At this algorithm level, the program can process and transform raw data as it flows through the network. (Burns, 2021)

Some modern-day AI applications include some of the following:

- Autonomous vehicles: self-driving cars and drones that rely on sensors or visual image detection to recognize specific taskings
- Computer vision: Image recognition, object detection, and facial recognition.

AI Natural Immersion to Society:

AI is becoming increasingly prevalent across various sectors due to its ability to enhance efficiency, improve decision-making, and drive innovation. One growing field is Autonomous Weapons Systems (AWS.) As defined by the U.S., AWS is an "artificial agent is designed at minimum to be able to change its own internal states to achieve a given goal (being able to identify, select or attack the target…) with or without the intervention of an agent and is deployed to exert kinetic force against a physical entity (whether an object or human being). (Taddeo & Blanchard, 2022) The ongoing Israel-Hamas conflict and its use of military AI have introduced the next level of AWS, one that supports Israeli's military capabilities and national security, analyzed for this study.

METHODOLOGY

To analyze the public perception of Israel's military application of technology, we must avail ourselves to diverse media outlets, the biggest sphere of influence for the involved parties.

In research of publicity available information about each technology in current use, it was found difficult to do a standard engine search. This led me to pursue a more detailed method known as "search engine optimization." Each search engine, i.e, Google, DuckDuckGo, has unique search operators that comb the web for specific information when combined with keywords or strings. Upon command, the chosen search engine will index every webpage to look for certain keywords, making previously difficult information on the page more accessible. In combination with a Virtual Protection Network (VPN) to assist in redirecting my location, I was able to bypass censorships/biases that made some published articles harder to access in the U.S. to be opened if my location was the "Netherlands."

Censorships and biased articles are a normal routine in wartime. A helpful resource that assisted in tunneling my research was Perplexity AI. This AI tool was used to find media outlets from Israel and Gaza and to confirm bias or coverage from articles found. Allowing the research duration to be significantly reduced.

Israel's Use of AI

The Israeli Army has incorporated the use of three different artificial intelligence systems to support its military objectives in the ongoing Israel-Hamas conflict.

"Lavender" is the first AI system used by the Israel Defense Force (IDF) to identify and target individuals associated with Hamas and the Palestinians Islamic Jihad (PIJ). The database processes raw surveillance gathered from social media connections, familial ties, and other behavior patterns based on specified criteria to generate a "kill list." Before Lavender's deployment, target selection was a complex process designed to ensure targets were of high levels of the military; however, post 7OCT2023, the initiation of the current Israel-Hamas conflict, the criteria were set to systematize the detection of all operatives (regardless of ranks).

Human review is then placed once the automated kill list designated. According to *+972 Magazine* (+972), the English partner of *Local Call* (Israel's originating media outlet), human analysis serves "only as a "rubber stamp" for the machines' decisions... devoting about "20 seconds" to each target." These 20 seconds ensure the Lavender-marked target is confirmed a male. The gender bias was due to "no women being among the ranks of the military wings of Hamas and PIJ." (+972). However, *Al-Monitor*, an independent U.S. news outlet that focuses on Middle East analysis, has acknowledged the existence of female Hamas members participating as "istishhadeyyat" (female suicide bombers), but no reporting of women in ranks is specifically mentioned. (Amer, 2015)

> "I would invest 20 seconds for each target at this stage and do dozens of them every day. I had zero added value as a human, apart from being a stamp of approval. It saves a lot of time, if [the operative] came up in the automated mechanism, and I checked that he was a man, there would be permission to bomb him, subject to an examination of collateral damage."
>
> -- B. a senior officer who used Lavender
> Echoed within +972 and Local Call

Lavender is complemented by another AI database in which IDF calls "Where is Daddy?," employed to track individuals marked as targets for bombing. These targets have been listed as a pattern to be systematically bombed in their homes, usually at night while their family was present. "It was easier to locate the individuals in their private housing," states +972.

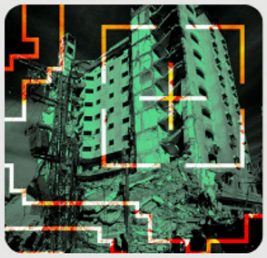
It is important to note here that news outlets based in Gaza are facing significant challenges in reporting; the ongoing war and blockade have severely impacted regional media operations. Instead, much of the reports about the situation in Gaza, including those related to Israel's military tactics, often come from international media organizations or Palestinian Journalists working with foreign outlets. This has additionally led to journalists contributing to the death rate of the ongoing conflict. According to IDF, the Israeli Army does not deliberately target journalists, but it cannot guarantee their safety as of 07AUG2024. (*Journalist Casualties in the Israel-Gaza War*, 2024)

Controversial viewpoints still stand. See article: (*Drone Footage Raises Questions about Israeli Justification for Deadly Strike on Gaza Journalists*, 2024)

In this case, +972 have listed in their publication their bias, "to be devastated by the horrific events of this latest war…from Israel's unprecedented onslaught on Gaza, inflicting mass devastation and death upon besieged Palestinians…" (Abraham, 2023) While their partnered news outlet "Local Call" showcases no mentions' of their emerging AI (i.e., Lavender, "Where is Daddy"), due to its audience being Israeli and its media censorship. Other Israel-based media outlets like "Yedioth Ahronot" and its English version, "Ynet," were additionally censored. No search resulted from Google Dorking via Duckduckgo and Google were found when looking into Israel's AI algorithms.

In addition to the two earlier mentions of AI, Israel has designed a third system called Habsora ("the Gospel") to assist in its strategic pursuits.

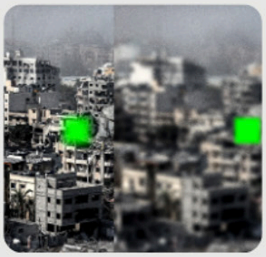
Israel's Use of AI



LAVENDER

The first AI system in use to support Israel's mission in the Israel-Hamas conflict. The algorithm identifies individuals as "targets" based on their association with Hamas and the PIJ.

Gathers data through raw surveillance, social media platforms, and behavioral patterns to build the "kill list."



WHERE IS DADDY

- collaborating with Lavender to take identified "targets" and gather data to track their traffic patterns.

Repetition has led to a trend where targets are systematically bombed at night when family members are present.

THE GOSPEL

Identifies airstrike targets, specifically individual operators and military equipment like rocket launchers, bases, and medical centers.

The identification methodology remains classified. However, it will likely have been retrieved from text messages, satellite imagery, drone footage, and seismic sensors.

FROM THE FIRST MOMENT AFTER THE OCTOBER 7 ATTACK, DECISIONMAKERS IN ISRAEL OPENLY DECLARED THAT THE RESPONSE WOULD BE OF A COMPLETELY DIFFERENT MAGNITUDE TO PREVIOUS MILITARY OPERATIONS IN GAZA, WITH THE STATED AIM OF TOTALLY ERADICATING HAMAS. "THE EMPHASIS IS ON DAMAGE AND NOT ON ACCURACY," SAID IDF SPOKESPERSON DANIEL HAGARI ON OCT. 9.
(ABRAHAM, 2023) (MCKERNAN & KIERSZENBAUM, 2023)

Having won the innovation award in 2020, the Gospel is acknowledged by IDF (Israel Defense Force) to identify buildings and structures where Hamas militants operate. It is "a machine that produces vast amounts of data more effectively than any human and translates it into targets for attack," states Aviv Kochabi, former head of IDF. (Davies et al., 2023) Although it is not explicated as to how the Gospel gathers its intel, it is likely to have come from a variety of sources such as cell phone messages, satellite imagery, drone footage, and even seismic sensors, according to Blaise Misztal, vice president of Jewish Institute for America. This group facilitates military cooperation between Israel and the United States. (Brumfiel, 2023)

In addition to facilities targeting, the Gospel also identified airstrike targets to individual operators and military equipment like rocket launchers, increasing its efficiency and capabilities.

Artificial intelligence is continuously proving to redefine the methodology in its field of use, and the strategic aspect is no exception. Tal Mimran, a lecturer at Hebrew University in Jerusalem, experienced with Israeli's military targeting operations, states, "20 officers might produce 50-100 targets in 300 days... the Gospel and its associated AI systems can suggest around 200 targets "within 10-12" days." (Brumfiel, 2023) The military incorporation of AI has cut down a significant amount of time in the decision-making process; this utilization of resources enables Israel to strike more targets in a shorter period, potentially at the fault of accuracy. See below for example: Airstrike in Damascus.

In relation, 01APR2024, a suspected Israel bombing hit the Iranian Embassy Complex in Damascus, killing seven people, including three senior commanders, one being Mohammad Reza Zahedi, a senior commander of Quds Force, an elite foreign espionage and paramilitary arm.

"We do not comment on reports in the foreign media," said an Israeli military spokesperson when asked about the strike. (Reuters)

The only Israel news media was +972, reporting in response to Iran's offensive attack was "Israel's airstrike on the Iranian consult in Damascus," although alternative media outlets, i.e., *The Times of Israel*, have reported the incident as "a miscalculated airstrike." (Fabian, April) This was published 18APR2024, several weeks after the embassy incident.

The New York Times confirms this airstrike, citing four unnamed Israeli officials who acknowledged Israel carried out this attack.

Middle East Crisis, UK-based news media covering the Middle East and North Africa, funded by the Qatar government, denies the funding reports in an interview with Israeli military spokesman, Rear Adm. Daniel Hagari did not confirm or deny Israel's role in the attack but told CNN that the strike had targeted "a military building of Quds Forces disguised as a civilian building in Damascus." (Goodwin, 2024)

In tracking real-time news media, a noting trend between each originating source of media is that all "Israel's airstrike" or "bombing" news incidents are never directly tied with any of the three AI databases, as no Israeli spokesperson has confirmed its usage in the ongoing war. The confirmation is built from unnamed sources who confirm personal interaction with the AI algorithms. Therefore, specific

Looking Forward

The future of Military AI is progressing at an exponential rate.

In FEB2023, the United States, an ally of Israel, participated in the REAIM Summit (Responsible AI in the Military Domain Summit) to discuss an international consensus on the development, deployment, and the use of military AI. Among the 47 attending states, Israel was not a participant.

In discussion, the application of AI was for armed forces to apply in weapon systems, logistical processes, and data analysis. In practice, AI could "sound alarm for change in intelligence footages, optimize flight paths or support the distinction between friend/foe and impartial." (Ministry of Foreign Affairs, 2023) Currently, the Netherlands, the main host of REAIM 2023, has conducted experiments that allow AI to analyze terrain and offer route options to a commander.

"AI is of great importance for the Armed Forces of the future. By using AI within the right frameworks and regulations, we make our operational and logistical processes easier and more efficient. In addition, AI enables us to make faster and more informed decisions. In this way, we not only protect our own soldiers, but we can also limit damage and casualties as much as possible. To ensure that we use AI in a responsible manner, we will continue to work closely with partners within existing alliances such as the EU and NATO, as well as with NGOs, think tanks, educational and knowledge institutions and the business community. In doing so, we are investing in our freedom."

Hostess Minister Kajsa Ollongren (Defence)
("Call to Action," 2023)

However, just like AI is a potential military advancement, the imposing liability still exists. What if AI makes a mistake? Who is held responsible for its deployment or in a situation where violence escalates?

"The rise of AI is one of the biggest future challenges in the field of international security and arms control. Technological developments in the field of AI are moving at breakneck speed, but the discussion about how to deal with them responsibly is still in its infancy. That is why we need to start a conversation now and put the discussion about AI on the international agenda."

–Minister Wopke Hoekstra
Minister of Foreign Affairs, REAIM 2023

United States today has published a "Political Declaration on the Responsible Military Use of Artificial Intelligence and Autonomy" from the REAIM Summit. Thus, it supports guiding the states' development, deployment, and use of AI technology for defense purposes. *Building Consensus on the U.S. Framework for a Political Declaration on the Responsible Military Use of Artificial Intelligence and Autonomy –United States Department of State* (2023)

Conclusion

Artificial intelligence is a growing field. The potential application of the technology has transformed traditional information-gathering within the cyber domain and pushed unconventional warfare to a new level. The Israel-Hamas conflict has proven to be a prime example of the offensive use of military AI. Conducting real-time observation of emerging AI integration into weapons systems and warfare has demonstrated numerous perception battles, particularly through news outlets. With diverse exposure to media outlets, censorship, and the classified nature of emerging technology, both nations (Israel and Gaza) rely heavily on the support of their citizens and the nations around them, focusing heavily on media perception.

Fundamentally, Artificial Intelligence is not inherently good or evil; instead, how we apply it is how we dictate the light in which we perceive its moral value. Autonomous Weapons Systems are one of many fields incorporating AI with emerging technologies; it is also a field many nations have begun investing in, offensively and defensively. For example, in its testing phases, the United States Marine Forces Special Operations Command (MARSOC) has been evaluating robotic dogs with the potential to be equipped with AI-enabled gun systems. (Edwards, 2024) The rifles used are reported to use AI-assisted Digital Imaging System to detect targets before receiving human authorization to engage. (Saballa, 2024) This experiment may be in its early stages, but it is also not the first armed robot dog. In previous experiments, the United States Marine Corps' design was similar to China's commercial shelf quadrupedal dog emerging in anti-armor rocket launcher or Russia's submarine gun-armed configurations. (Trevithick, 2023)

As you see, with each country applying AI in its interpretation, defensively or offensively, the potential future of what such technology could achieve ultimately will influence humanity's approach to warfare, making this more relevant.

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The Richard S. Schultz '60 Symposium Fellowship was established in 2017 as an endowed fund in honor of "Dick" by his wife of fifty years, Myrna L. Schultz, their children, Marni and Alan, and his classmates and friends.

The fellowship enables Norwich undergraduates, from any academic discipline, the opportunity to pursue areas of inquiry and experiences that will promote and expand their understanding of the past and how it impacts the present and future. Through research, travel, and inquiry the Schultz Fellow and faculty advisor will offer perspectives for us to face the future with better understanding and confidence.

After a wide solicitation and competitive selection process, this annual fellowship is granted by the Norwich University Peace & War Center to an undergraduate student for a single project that may involve additional Norwich undergraduate students. The award includes a $3,500 grant.

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