

## BIO WARFARE: A BOON TO AUTONOMOUS MILITARY SYSTEM

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### Abstract

Technology benefits never come for free and Artificial Intelligence (AI) is no exception. Today we are at war with our own creation. The world has witnessed that most advanced technologies were always deployed for national security and military warfare. Ongoing Russia-Ukraine war reveals that on one side we speak about human rights and on another side, we are developing lethal weapons for the mass destruction of human lives, nature, and infrastructure, keeping cost optimization in mind. We are not enough intelligent when it comes to military intelligence, but we surrender to technology in a quest to protect ourselves. While human race is still trying to absorb the shocks of nuclear weapons used by United States during invasion of Japan, AI, and Generative Artificial Intelligence (GenAI) are emerging as a new threat that augments the capabilities of military warfare and Lethal Autonomous Weapon systems (LAWS). Not only developed economies, but poor countries with starving citizens are investing heavily on procuring and developing military arsenals. Military Industrial Complex (MIC) world-over is enjoying its most prospective days in the history of mankind. India is also not behind in this race with huge pipeline of orders for supplying fighter aircrafts and missile systems.

**Key Words:** artificial intelligence, ChatGPT, GENAI, lethal autonomous weapon systems, military warfare, missile systems.

### 1. INTRODUCTION

Humanity is still waiting for 'New World Order' even after the end of 'Cold War' era way back in 1991, which lasted for five decades after 'World War II'. We are witnessing escalating geopolitical tensions across continents, and 'New World Order' appears to be an over ambitious expectation even in the year 2023. We will not get into analyzing the forces behind disagreements between sovereign states that compels them to target innocent citizens of their so-called enemy countries. Large scale deployment of 'Artificial Intelligence' (AI) technology, including 'Generative Artificial Intelligence'(GenAI), for defense and military warfare is changing conventional battlefields into soldier less battlefields, dominated by autonomous weapons and killer robots that act as soldiers in cross-border military skirmishes today. AI in Military Market is expected to reach \$11.6 billion by 2025 (Mehra, 2021).

The Indian Prime Minister Mr. Narendra Modi asked Indian armed forces and top military brass to stay prepared to face new and emerging threats posed by technological upgradation of conventional military warfare by enemy countries (Times News Network, 2023). While reviewing operational readiness of military forces, he informed that government is taking all steps to equip its armed forces with latest weapons and technologies. This arms race between governments and militaries all over the world will result into more devastating effects to humanity, sooner or later, compared to US nuclear attacks on Japan. States are feeling pride to threaten their enemies with options of exercising nuclear warfare. Stronger countries are

encroaching boundaries of weaker ones, even with whom they shared cultural, social, political, and historical ties once upon a time. World is simply watching, and countries are trying to take advantage of struggling supply lines for their short-term business benefits.

“If you want to walk fast, walk alone. If you want to walk far, go together” (Tata, 2022). This holds true in case of harmony between human beings and technology too. Apart from human relations, today we need to faithfully work upon men-machine relations. Developing autonomous weapons, machines and computers that think and act like us with similar or extended intelligence had been the dream of mankind for a long time. The development of AI got momentum in last twenty years due to rapid advances in electronics and computer technology that made computers, robots, drones, and bots autonomous to the extent that today such AI manifestations are performing many complex tasks without human-aid. This phenomenon is broadly known as Artificial Intelligence and Machine Learning.

This paper is restricted to study of autonomous AI technology in military warfare. It tries to give a message to AI stakeholders, governments, and defense authorities to revisit their national and international policies since we collectively failed to develop right relations with technology while deploying AI in our life, more for destructive than constructive purposes.

## **2. RESEARCH METHODOLOGY AND LIMITATIONS**

Researchers followed qualitative research approach and restricted to exploratory doctrinal studies while writing this paper. Primary field data collection was not possible due to budget and time constraints. Researchers relied on University library and had studied in past many journal articles from Scopus and Web of Science databases, textbooks, etc. Authors critically analyzed reports of various government and private organizations while keeping an eye on changing geo-political situation. Researchers were also privileged in securing valuable opinion from their colleagues working in the field. Authors wrote this paper based on their professional work experience in the field of AI and understanding of defense strategies and military warfare developed over the years.

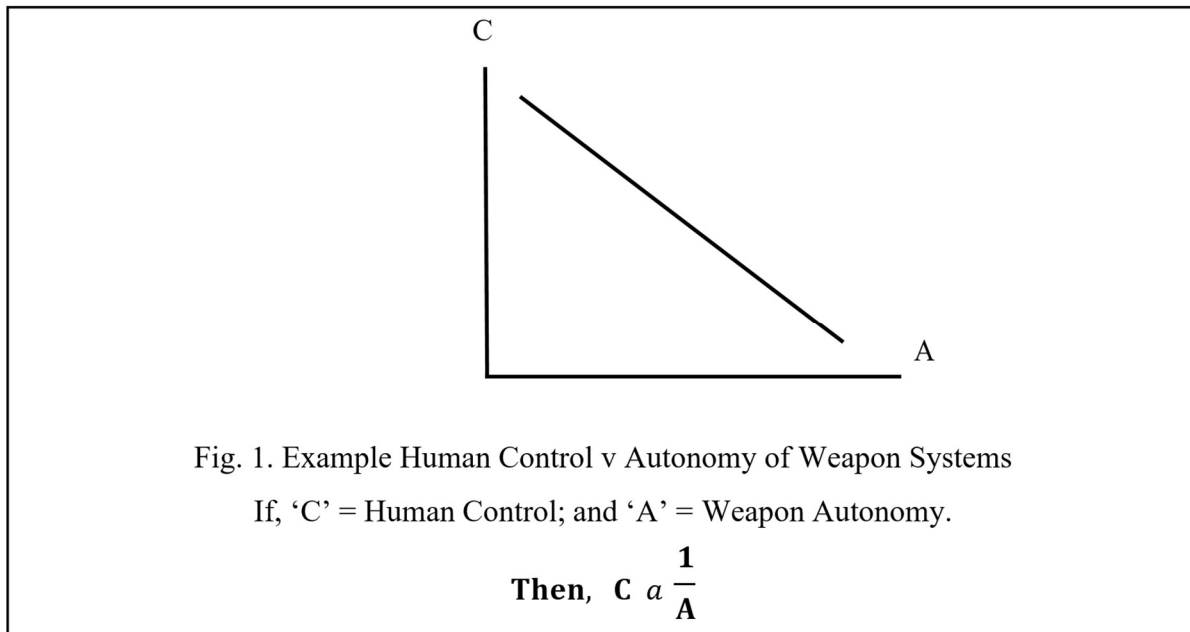
## **3. ARTIFICIAL INTELLIGENCE AND AUTONOMY OF WEAPONS**

AI systems are extremely dynamic in nature and execute various functions on continuous basis by recognizing data sets, data patterns and data relations, enabling it to spontaneously respond to any changes in circumstances or dataset. Apart from repetitive and routine tasks, AI enabled systems are even capable of generating intellectual property at par with human beings (Odeh, 2022).

Unlike traditional software applications that perform tasks as programmed, modern AI systems can read, write, analyze, and translate text to interpret meaning, recognize voice, faces, pictures, analyze datasets, learn from historical instances, and make decisions to act and respond autonomously, without human intervention. Hence, intelligent autonomous electronic technology is increasingly used in military warfare, robotics, surveillance, lethal weapons, missile systems, drones, pilotless target aircrafts, unmanned aerial vehicles, nuclear

arsenals, space satellites, etc. AI makes these weapons and supporting equipment much more deadly during military operations, capable of large-scale devastation of human life, nature, and infrastructure, resulting into economic slippage across related states.

Governments are trying to understand and control the use of autonomous technology by their defense forces during armed conflict. The principles of International Humanitarian Law (IHL) provide guidance on regulating development and acquisition of military warfare (Davison, nd). The challenges posed by Lethal Autonomous Weapon Systems (LAWS) is unique in nature because such systems are either fully or partially autonomous, and there lies an inverse relationship between human control and autonomy of weapons, as depicted below.



We tend to lose control over weapons with increasing autonomy, resulting into lesser human control in event of AI system actions, inactions, malfunctions that may result into harm to lives, infrastructure and nature, including harm to other controlled or autonomous weapons.

#### 4. TECHNOLOGY SURPRISES ON BATTLEFIELD

We will take a stock of current applications of AI and GenAI tools like ChatGPT in military warfare today, along with potential future applications of autonomous technology –

##### a) Military Warfare and Battlefield Autonomy

AI systems are deployed for warfare used in air, water, space and on land. Such systems are partially or fully autonomous requiring least human input. Compared to mechanical systems, electronic systems need less maintenance. GenAI tools can integrate well with these systems for collaborative attacks using multiple lethal weapons.

##### b) Simulation, Training, Translation and Text Interpretation

AI systems and ChatGPT can be used for preparing training guides and field manuals. It can be used for translating and de-coding confidential messages that helps in developing defensive strategies. Combat simulation is another area where AI capabilities are leveraged for training soldiers, pilots, etc. using computerized models. Natural Language Processing (NLP) can be

used for terrain analysis by extracting text data from various publications.

**c) Satellite and Meteorological Data Analysis**

AI systems can be used for extracting information from satellite images and meteorological data. Knowledge about battlefield terrain enables troops to plan attack and defense strategies. Meteorological data and weather forecasts help to plan military operations.

**d) Automated Recognition of Targets**

AI driven systems augment the capabilities of conventional target recognition systems by analyzing audio-visual data sources, satellite maps, etc. The correct positioning and structural information of targets is very much essential for success of military operation. For example, the US Defense Advanced Research Projects Agency (DARPA), Department of Defense, has developed an autonomous system called Target Recognition and Adaption in Contested Environments (TRACE) that analyzes images from Synthetic Aperture Radar (SAR) to identify and locate the targets.

**e) Unmanned Vehicles, Logistics and Transportation**

GenAI tools like ChatGPT can be deployed for convey route planning, artillery movement, logistics and transportation. Transportation of goods, food and ration, ammunition, armaments, and troops play an important role in success of combat military operations. AI can even help in route and cost optimization, fleet management and equipment maintenance. For example, IBM Watson, an AI enabled system, is deployed by US Army in its Stryker combat fleet for maintenance prediction that resulted in reduction of overall maintenance cost and instances of breakdown maintenance of vehicles.

**f) Battlefield Communication and Cyber Security**

Defense equipment are vulnerable to cyber and network attacks. AI systems can be deployed to protect loss of strategic, confidential, and classified military data by autonomously restricting access to secret networks, computers, servers, etc. Nowadays, intelligent systems are capable of recognizing network attacks and do have an in-built counter mechanism too. GenAI tools like ChatGPT and Google Bard can be used for network jamming. Use of encryption keys resists network jamming. We know that Ukraine's defense operations were paralyzed after complete destruction of its cyber infrastructure, which was later commissioned by Tesla's Star-Link satellite internet services.

**g) Surveillance and Battle Zone Patrolling**

AI capabilities of text, audio, video, and image analysis are boon to the development of any defense strategy and military operation. Using surveillance footage, movement of conveys, troops, vehicles, enemy aircrafts, missiles, and artillery tanks can be tracked along with monitoring their radio communication, social media posts, chat messages, etc. to detect suspicious activities. AI enabled Face Recognition System (FRS) can be used to identify and keep track of most wanted individuals along with anomaly detection.

**h) Missile, Lethal Autonomous Weapons and Tactical Nuclear Attacks**

AI plays an important role in missile guidance systems, target simulation, target identification and destruction, etc. These aspects become very sensitive in case of Inter- Continental Ballistic Missiles (ICBM) and missile systems loaded with tactical nuclear weapons. AI can be

efficiently integrated with missile systems to make them autonomous to the extent that such system becomes capable of firing missile, without human intervention, as soon as enemy target, like enemy aircraft, is detected. We can equally develop intelligent anti-missile systems as a part of our defensive strategy.

**i) Military Robotics, Drones, UAVs, and Pilotless Target Aircrafts**

Military robots and drones can be trained on huge volume of speech data to understand and respond to voice commands. Such autonomous machines can be deployed for field navigation, target tracking, and combat surveillance. Use of GenAI for robotics is in its nascent stage, and researchers have realized that its success will depend solely on quality and quantity of data. The autonomous control of unmanned aerial vehicles (UAV), pilotless target aircrafts and military drones using flight data, sensor readings, and weather conditions can be achieved by developing control algorithms for performance optimization using AI predictive models.

**j) Wearable Intelligent Gadgets**

AI enabled and satellite connected wearable gadgets like smart-watches or handheld devices can be developed for military soldiers. Such devices can support decision making, surveillance, planning attack or defense strategy on the battlefield. Data from multiple sensors like cameras, infra-red cameras, microphones, global positioning systems, surveillance satellites and drones, and weather-related information can be analyzed by these gadgets to support combat strategy. Such gadgets can be used for safe and secured military communication purposes too.

**5. ETHICO-LEGAL PERSPECTIVE OF MILITARY WARFARE**

Increasing military use of AI, and emerging GenAI tools like ChatGPT and Google Bard is making governments, militaries, academia, human right activists, technical and legal fraternities to brainstorm upon the subject, in a pursuit to achieve an equilibrium between technological developments, human rights and defense strategies. Neither we can hold the modern AI systems accountable, nor we can control the actions of a fully autonomous super intelligent weapon systems. AI, GenAI and other disruptive technologies are taking our life to new heights, but it poses unique ethical, legal, political, and social risks that collide strongly with established human values due to increasing use of technology in defense warfare.

**a) Data Interpretation:** AI systems seldom fail in interpreting meaning and understanding governing context of certain communication. Hence, system responses may not be reliable and accurate at times.

**b) Bias:** AI models demonstrate machine bias at times during decision making process and hence, quality of dataset used to train the model plays an important role.

**c) Security Risk:** If wrong hands and terrorists get access to autonomous weapon systems then harm to humanity cannot be averted. Cyber-attack is another threat from AI systems. In a data breach incident on 23 March 2023, personal and confidential data of Indian defense personnel was compromised (PTI, 2023). Recently, Italy temporarily blocked ChatGPT over data privacy concerns to become the first European country to act against popular AI platform (Times of India, 2023).

**d) Human-Control:** Present AI systems are not fully autonomous in real sense. Systems still fail in decision making and output is largely dependent on the provided human input.

Nuclear Attack Case of erstwhile Soviet Union (1983) is the best example of AI malfunction wherein Soviet Union's Nuclear Attack Early Warning System (EWS) malfunctioned and raised an alarm that USA has fired a ballistic missile targeting nuclear establishments of Soviet Union. This false alarm could have resulted into a nuclear war had it not been validated by the Soviet Defense Experts.

**e) Quality of Dataset:** Output of AI models largely depends on quality and quantity of training data. The collected data injected into AI systems is generally collected using conventional methods that lack reliability and accuracy.

**f) Ethical Concerns:** Human beings still could not design machines that follow ethics, morality, and humane values. Machine design techniques need to be elevated to next levels for constructive and prospective man-machine relationships. AI can replace human beings to a limited extent only. AI is laggard when it comes to human values, social and business skills, multi-tasking, dexterity, common sense, etc.

**g) No Accountability:** The law is yet to fix accountability and liability of the artificially intelligent machines in event of its actions or inactions. The developer or custodian of such system is conveniently held responsible for machine malfunction even if the AI system is acting autonomously without any human supervision or control.

Not only those listed above but there are many other risks and concerns that must be accounted for while deploying AI and autonomous technology for military applications. Even the Section 3 of the Indian Patent Act, 1970 excludes certain categories of inventions from patentability that are against public order and morality, including inventions related to Military Weapons and Atomic Energy (Ahuja, 2020). Leading AI technology experts like Elon Musk, Stephen Hawking, Bill Gates, and Stuart Russel acknowledged the threats of autonomous AI systems. They predicted that in few years AI could override human intellect; and we may not be in position to regain the lost control of our own creation.

## 6. INTERNATIONAL PERSPECTIVE AND CONCLUDING REMARKS

The authors are first to none in proposing very cautious stance while deploying AI for military warfare. Till date no country could provide leadership in regulating AI. NITI Aayog (National Institution for Transforming India), Government of India, released discussion papers, 'National Strategy for AI' (NITI, 2018) and 'Responsible AI - AI for All' (NITI, 2022), but both papers are silent on Indian AI policy for military warfare.

In June 2022, UK Ministry of Defense declared 'Defense AI Strategy' for involving private players in AI research to enhance defense capabilities. UK plans to engage with 'UN Convention on Certain Conventional Weapons'. The House of Lords 'Artificial Intelligence in Weapon Systems Committee' takes cognizance of technical, legal, and ethical aspects to control the use of LAWS (Skelton, 2023).

Israeli armed forces used four-wheel-drive remote controlled military robot, made by Israel Aerospace Industries, for patrolling in battle zones (The Hindu, 2021).

US DARPA has developed Packet Satellite Network and conducts research in AI, voice recognition and digital signal processing. In 2020, DARPA and US Air Force demonstrated



Hypersonic Air-breathing Weapon Concept (HAWC). Under Air Space Total Awareness for Rapid Tactical Execution (ASTARTE) program, it has developed hardware and AI algorithms to simulate and test the movement of troops in war zones. DARPA demonstrated AI enabled modern anti-tank weapon system in 2018 (Blain, 2018).

Many forums, like UN Chronicle, protest LAWS by raising ethical and legal issues and update readers with recent happenings and research articles (Gill, 2018). Utilitarian philosophy advocates that law must provide maximum benefit to the maximum people but to make it work, we must respect international laws to maintain peace (Bentham, 1789). Current situation makes us to think if AI will help humanity to enjoy developments peacefully or will it make our life miserable? United Nations Organization (UNO) and United Nation Security Council (UNSC) appear to be handicapped in controlling world peace order. Thirty members of North Atlantic Treaty Organization (NATO) also look divided at times when there is a question of their economic interests. Ukraine and western countries condemned Russia's presidency of UNSC for the month of April 2023 mentioning that violator of UN Charter and invader of neighbor has no place on UNSC (Jean-Pierre, 2023).

Today, AI is taking over conventional weapons by becoming integral part of modern warfare. We must explore the possibility of introducing an 'International Regulator' for developing standards and codes for autonomous weapons. Establishment of 'International Court' with global jurisdiction on autonomous weapons is the need of the hour. A robust legal and technical control mechanism is essential if an autonomous weapon system starts making, controlling, or attacking a similar establishment. Last but not the least, we must govern 'Men-Machine' and 'Machine-Machine' relationships because any kind of negligence will prove disastrous for entire human-race.

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