ARTIFICIAL INTELLIGENCE IN MODERN WARFARE: OPPORTUNITIES AND RISKS FOR INDIA

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Abstract

Artificial Intelligence (AI) is revolutionary in the way that it is changing various aspects of the warfare and introducing new technological advancement in military affairs that becomes very essential for strategy making, and protection of any nation. Indian defence constitutes a unique set of issues and challenges, particularly with respect to a growing world power that sits in a region fraught with multiple challenges and instabilities On the whole, the use of AI for its defence has a set of profound opportunities as well as formidable issues and challenges. Thus, this paper discusses the changes that are expected to be brought by the availability of AI to the Indian army, including autonomous weapons, threat intelligence, AI-enabled cyber operations and information operations. This paper includes specific studies applied to major sectors of interest: border control, counter-terrorism, naval incorporation of AI, and space defence. Moreover, the paper analyses ethical, legal, as well as operational concerns that AI technology presents. Concerns such as the use of lethal autonomous weapons, data protection, bias in AI systems, and the adherence to the international humanitarian law are discussed within Indian policy context. Moreover, a strong focus is made on the necessity to strengthen the regulatory environment and improve the cybersecurity system on the local and global levels. Concerning the protection of AI in India, the talent promotion and development through AI education and research, as well as AI talent retention, emerged as the essential strategies of the country's AI defence approaches.Employing a call for responsible AI, this research posits that, while India should embrace technological innovation, it should strike the right balance with the legal compliance, administrative transparency and ethical issues. Some of the requirements of responsible AI can serve to bolster India's national security framework while also laying down rules on the appropriate utilisation of AI in the military sphere.

Keywords: Artificial Intelligence, Modern Warfare, India, Autonomous Weapons, Cybersecurity, Defense Strategy, Ethical AI, Military Innovation, National Security, AI Governance.

Introduction

Artificial Intelligence commonly referred to as AI is now a revolutionary field in the world with a broad coverage of industries ranging from healthcare to finance, education to national security among others. In the sphere of defence, AI is changing the character of the twenty-first-century warfare and is instrumental in designing autonomous systems, improving decision making, and the logistics and other operations at the military field (Horowitz, 2018). The global community is gradually integrating artificial intelligence into their military policies to obtain some crucial and significant benefits. Nowadays, innovative technologies include drones, unmanned ground vehicles (UGVs) as well as real-time data analysis to perform numerous functions on the battlefield with reduced human involvement (Boulanin & Verbruggen, 2017).For a country such as India that is continuously experiencing a rise as a major power with a fairly complicated security situation – from the threats posed by China and Pakistan neighbours to growing risks in cyberspace and outer space – the inclusion of AI into the military and security strategies is a necessity as well as a potential. India's AY, also called the National Strategy for Artificial Intelligence (2018) presents AI as a strategic tool and an essential requirement for the country. Indian defence modernization is integrating AI for surveillance, cybersecurity, information warfare, and for prediction of maintenance of military equipment.But, there are significant ethical, legal, and strategic implications of such militarization of AI. The possibility of using lethal autonomous weapons, possible infringements of the International Humanitarian Law, and the danger of bias in essential systems require close monitoring the development of relevant regulation and cooperation of the international community (Roff, 2019). Hence, as India strengthens its AI capacities and proceeding toward the development of frameworks for the useful incorporation of the new technology in administration and the public sphere, it must address it to avoid seeing technological evolution place ethical management.

Research Objectives

1. To identify different approaches of AI in improving India's defence system and military function.

2. To come to a better understanding of the ethos of using the present day advanced technologies in the Indian defence, particularly, the question of autonomy, responsibility, and international humanitarian law.

3. To evaluate new policy strategies, organisations, and government partnerships particularly in relation to India's defence forces.

4. To formulate recommendations for the proper utilisation of AI in the future Indian military modernisation plan.

Introduction to AI in Modern Warfare

AI now takes a new dimension in warfare by optimising the level of automation as well as intelligence in combat operations. Many of the contemporary militaries of the world involve and adopt artificial intelligence in such fields as unmanned aerial vehicles, threat identification, supply chain management, etc. These technologies provide rapid decision making, reduce human factor aspect, and enhance accuracy (Horowitz, 2018; Boulanin & Verbruggen, 2017). Owing to the long-standing conventional threats and emerging challenges in cyberspace and space domains, India is incorporating AI in its defence system without waiting for such threats to manifest themselves. In 2018, the Indian government first set up the framework of the National Strategy on AI as it envisaged AI's importance in various fields of operation, security among them (NITI Aayog, 2018). To realise this vision India's ministry of Defence articulated in 2022 two bodies The option was to make the 'Defence AI Council and 'Defence AI Project Agency' to promote systematisation and integration of AI technology in the defence forces' (Press Information Bureau , 2022).

In this regard, the Ministry has listed 75 AI projects for defence purposes, and these include autonomous system, predictive maintenance, and AI-based surveillance (PIB, 2022). For instance, the Indian Army has employed AI in ISR, and the Indian navy has created Centre of Excellence in Artificial Intelligence in INS Valsura with the aim to help it in enhancing its maritime situational awareness (Times of India, 2022). Likewise, The Indian Air Force also launched its AI Centre of Excellence in 2022 to consider operational opportunities (Economic Times, 2022).However, the integration of AI in armed conflict includes certain legal and moral issues. Key concerns boiling down to the issue of responsibility, and ratio, as well as respect with the IHL concerning the advancement of lethal autonomous weapons (Roff, 2019). Algorithms chiefly, data security, and human supervision must be developed through enforceable rules and global standards (UNIDIR, 2021).AI will be a force multiplier in contemporary wars, and India's instrumentalism is equally audacious as it is prudent. Integration of

innovation with responsibility is thus going to be a significant theme of the future as AI enters the core of military.

AI Technologies Transforming Indian Defense Capabilities

AI is now central to the evolution of the India's defence sector at a very fast pace. The use of Artificial Intelligence in defence improves the chances for the quicker recognition of threats and improves India's preparedness for conventional as well as hybrid dangers. Application of tools such as machine learning, Computer vision, and neural networks is now common in areas like surveillance whereby the UAVs and Drones have greatly enhanced border surveillance and intelligence gathering round the Indian border with Pakistan and China. This is because AI-powered image and video recognition software can recognise the movements of the enemy and relay it in real-time thus cutting down heavily on time and even possible human errors (Chakravarthy, 2020).

The development and designing of autonomous weapon systems may still be in its early stage with regard to ethical issues, there is investment in this area by organisations such as the Defence Research and Development Organisation (DRDO). They can be used stand-alone or in backup mode in performing their operations in a given complex setting or warzone, thereby minimising the exposure of human soldiers (Saxena, 2021). AI is helpful in cybersecurity defence strategies where it helps to detect incidents and mitigate such threats earlier than conventional techniques.Similarly, India has formed the Defence AI Council (DAIC) at a high level and set up Defence AI Project Agency (DAIPA) for launching top AI strategic tendencies for all services (PIB, 2019). They have resulted in pilot schemes including facial recognition at checkpoint and spill and predictive maintenance of defence vehicles.

There is also the case in decision support systems. Cognitive technology in the form of simulations and wargaming permit commanders to explore multiple approaches to strategic problems within a short amount of time. These technologies are most beneficial for operational level decisions for a country embroiled in a hybrid and information warfare as explained by Singh (2021).Tactically, AI provides three major benefits for India: deterrence, force readiness or war mobilisation, and technological advantage. It improves combat preparedness while providing support to operational national security goals in the fluid global arena.One of the main implementation areas is in the use of artificial intelligence in decision making. Techniques like predictive techniques will enable fair analysis of the scenario, its probable impacts and an opportunity to recommend various strategies within a short

span. This helps the national command authorities to be always prepared and ready to respond to the threats in the shortest time and accuracy (Gupta & Kapoor, 2020).

The application of AI algorithms on satellite imagery provides space and satellite intelligence with the ability to analyze enormous data sets for defense surveillance purposes alongside early warning systems and threat detection capabilities. ISRO (Indian Space Research Organisation) teamed up with AI projects to achieve dual-use (civil-military) objectives according to Rao & Kulkarni (2021). Modern artificial intelligence technology improves the process of electronic signal detection while enabling effective jamming countermeasures as well as ensuring advanced cyber intrusion detection. The protection of India from persistent cyber attacks initiated by state actors makes AI essential for enhancing national cyber command functionality (Joshi, 2021). Additionally AI helps strengthen strategic logistics operations through predictive algorithms which aid supply chain automation. The Indian Army initiated AI deployment to predict failures in its heavy machinery and vehicle fleet through programs supervised by DRDO. India's policy strategy interacts with private institutions and academic bodies. Through iDEX (Innovations for Defence Excellence) startups gain incentives to develop defense solutions that use artificial intelligence. The strategic AI research receives support from international collaboration between India and Israel and the US and France.

Ethical and Legal Implications of AI

AI in warfare has significant ethical and legal implications in terms of responsibility, supervision, and compliance with the rules. These issues are pertinent in India where democratic governance along with commitment to international layer is a significant concern.It is noted that major ethical issue is the working of Lethal Autonomous Weapon Systems (LAWS). This practise rises concern on moral responsibility as well as compliance with International Humanitarian Law (IHL) through delegation of legal relé decision-making to an AI without supervision from a human being. India has not clearly stand on the side of totally banning at the UN on LAWS, while it speaks of moderation (UNIDIR, 2021).

There is also a concern of bias, which creates problems in identification and targeting and is dangerous in highly dense population areas such as Kashmir. Thus, the issue of 'black box' in the processed information by AI intensifies the question of accountability (Ghosh, 2020).On the legal side, the positions are not entirely definite in India. Neither the Information Technology Act, 2000, nor any

of the amendments that have been introduced have addressed the problems related to AI extensively. However, as the AI processes are delegated and made independent there arises the question of who is legally responsible when an error occurs or when the AI committed an unlawful act while on the job Mehta, 2022.Along the same idea, India is struggling with the question of privacy, especially while using the facial recognition AI solution. Thus, while the use and collection of biometric data may be ethical, especially for military purposes, the countries involved lack an adequate legislative act that would regulate it.

These problems can be solved through the adoption of ethical guidelines in AI for defence by defence institutions, based on NATO and the EU. The various best practises suggested includes mandatory training exercises on ethical use of AI in the military, third party reviews of the AI applications and the inclusion of ethics committee in the procurement process.

Future Trends and Policy Recommendations

Thus, the future prospect for the AI within the Indian Defence domain is seen to be more autonomous, integrated, and intelligent. The geopolitical competition and warfare involve new approaches, hence, the need to have progressive polices for India.

Trend 1: AI-Enabled Joint Operations. The future conflicts will be fought not only in the air, land, sea, but also in the cyber space and space domain. Artificial intelligence will be used in managing these processes involved. AI-enabled platform should be integrated to bring synergy across different services in terms of real time operations (Menon 2021).

Trend 2: Trend 2is cognitive electronic warfare and swarm drones. At present, India is working on drone revetments that are programmed to be capable of performing independent navigation, surveillance and attack on a target. These will revolutionise the offence and defences particularly in the higher terrains.

Trend 3: Human-AI Teaming. They would be even deployed with artificially intelligence co-pilots, robotic pack animals, and virtual commanders. It increases efficacy and reduces costs at the same time with human supervision (Bedi, 2020).

Conclusion

Artificial Intelligence can be seen as the key element of modernising the Indian defence force which has potential at the strategic, operational and tactical level. In Military, India has adopted the AI

technologies for use in surveillance systems with robotic drones, as well as in cyber security, and logistic prediction. Tactically, AI enhances the speed of decision making, threats good identification, and cooperation of the joint force in an unfathomably increasing geopolitical environment.On the same note, the use of AI brings forth some concerning matters of ethics and laws including those concerning autonomous weapons, data protection and the accountability of the algorithms used. These can only be met through integrated legal frameworks, ethics, accountability and transparency mechanisms.To prepare for the future, India should beef up home-grown AI R&D, defence AI architecture, and cooperate with the private sector.An effective national talent pool for training specialists in this field, as well as developing a strong policy that will help to strengthen technological independence and security, will continue to be paramount in modern warfare.AI is not only an instrument of power but has now become a necessity for any countries security. When it comes to indoctrinating AI in the defence system, it is evident that by adopting the responsible growth of AI while abiding by the principles of democracy and the global standards, the AI potential is capable of revolutionising India's defence sector for the better.

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