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Applications of Artificial Intelligence in Indian Defence Forces: A Literature Review

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Abstract - The integration of Artificial Intelligence (AI) in national security has defined global military capabilities. For India, the AI offers a strategic opportunity to increase operational efficiency, to automate decision making, automate cyber defense and modernize monitoring systems. This literature review analyzes six leading studies and policy documents investigating India's institutional efforts - especially by Defense AI Council (DAIC), Defense AI Project Agency (DAIPA), DRDO, CAIR and on ISR, autonomous systems, cyber warfare, logistics and command framework. India's moral approach, which lies in principles such as a just war tradition, especially in the deadly scenarios, emphasizes human monitoring in A-S) war. However, issues such as policy fragmentation and unclear operating structure hinders a Comprehensive or cohesive. While remarkable progress has been made, it is necessary for an integrated national AI strategy, cross-sector cooperation, and morally grounded innovation India to fully exploit AI's capacity and protect his strategic autonomy in a developed global security scenario.

Key Words: Artificial Intelligence, Indian Armed Forces, Autonomous Systems, Cyber security, ISR, Ethical Warfare, AI Policy, DRDO

1. INTRODUCTION

Artificial Intelligence (AI) has emerged as a transformational force in the modern military landscape, explaining how nation makes the concept of strength, autonomy and strategic preventive. The Fourth Industrial Revolution has accelerated the adoption of smart technologies in defense with countries such as the United States, China, and Israel, which are heavy investing in autonomous drones, battlefield robotics and real - time intelligence analysis to achieve technical superiority (Reichberg & Roy, 2024; Sehgal, 2024).

India continues to face persistent border tension with China, developing asymmetric hazards from Pakistan, and cyber risks, sees both as a strategic enabler and a force multiplier (Mallick, 2020; Mallick, 2022). Applications in monitoring, cyber warfare and predictive logistics are now an important part of the country's agenda. AI also promises decision making and adaptation of resource allocation in challenging terrain and dynamic operations.

To make this change institutional, the Government of India has initiated initiatives such as Defense AI Council (DAIC), Defense AI Project Agency (DAIPA), and DRDO Artificial Intelligence and Robotics (CAIR). These agencies now support 75 AI defense projects, including autonomous arms prototypes, AI-assisted monitoring systems, and digital battlefield simulation (Hooda, 2023; Press Information Bureau, 2025).

However, scholars argue that this development is fragmented without a harmonious national military AI theory (Reichberg & Roy, 2024). The review is based on six recent educational and policy studies to seriously examine India's developed AI defense ecosystem, identifies capacity intervals, moral concerns and strategic opportunities in aligning technological innovations with national security objectives.

Recent struggles such as Russia -Ukraine War and Israel–Iran growth in 2025 have shown how AI has developed in the need of a battleground -not only for ISR or drone, but also for automatic targeting, cyber deception, and manipulation (CSIS, 2025; AsiaLive, 2024) in the story. This development strengthens the need for India to carry forward their military AI integration - not reactively, but through a morally directed, strategic synchronized.

2. Strategic Drivers and Geopolitical Context

India's military AI strategy is strongly shaped by its regional security environment. As Reichberg and Roy (2024) emphasize, advances by China and Pakistan in autonomous weapon systems and AI-enabled command infrastructure present a direct challenge to Indian military preparedness. Indian policymakers perceive AI not merely as a technological tool but as a strategic necessity in maintaining deterrence and regional stability. Sehgal (2024) echoes this sentiment, underscoring India's need to adopt AI in response to evolving cross-border threats.

3. Institutional and Policy Landscape

India's defence establishment has initiated several programs and structures to facilitate AI integration. Institutions such as DRDO's CAIR, the Defence AI Council (DAIC), and Defence AI Project Agency (DAIPA) have taken the lead in coordinating AI R&D. Hooda (2023) critiques, however, that these initiatives remain siloed and disconnected. He calls for a unified, national AI military strategy under the Chief of Defence Staff, supported by adequate funding, civilian-military partnership, and industry collaboration.

4. Operational Domains of AI Application

Artificial intelligence continues to change the Indian armed forces in many operating domains. However, the level of integration varies depending on matters and mission objectives of service-specific use. Drawing from both domestic progress and global fighter landscapes, this section investigates India's AI applications in major military functions.

4.1 Intelligence, Surveillance, and Reconnaissance (ISR)

AI-Operated ISR has become central for India's border security and deep monitoring architecture. Drone thermal visions such as Rustom-II and Heron-TP are equipped with sensor fusion and AI-competent object tracking, now patrolling lac and LOC. India has also introduced the MBC2 Swarm Drone system that are capable of classification of autonomous aerial mapping and border threats.

The Ukraine-Russia War demonstrated how AI-August ISR-especially drone can enable 24/7 battlefield intelligence in competition areas such as drones self-creating and automatic satellite data processing. Inspired by these lessons, India is accelerating the autonomous flock Drone R&D, especially to operate GPS-reflective in high altitude areas and forest northeastern areas

4.2 Cybersecurity and Electronic Warfare (EW)

AI is central to detect and reduce dangers within India's cyber and electromagnetic landscape. Detects Machine Learning algorithms for military infiltration detection, cyber forensic and real -time misinformation filtering. Advanced NIDs are being developed to monitor cross-domain attacks on significant infrastructure.

2025 Israel-Iran Sangharsh exposed how deepfake videos, synthetic voice attacks, and AI-in-manufacturing misunderstandings can change the perception of battlefield and shape strategic narratives (AsiaLive, 2024). During that struggle, there was a flood with AI-borne materials, following the attacks on Tel Aviv and Tehran on social media-which was creating collective confusion.

Fearing similar hazards, India has begun to integrate the deepfake detection tools and adverse AI defense mechanisms in its cyber policy. The EW system is now being designed for jams, spoofs and counters against AI-competent drone navigation and battlefield bots-an approach informed by Israel's Iron Dome upgrade and Russian's Cyber-Ethical Playbook (AsiaLive, 2024).

4.3 Autonomous Combat Systems:

India is developing progressively semi-autonomous and fully autonomous systems for land, air and sea operations. Major platforms include:
- Rustom-II: A medium height long endurance (male) is intended for UAV ISR and strategic support.
- Aura (Ghatak): Under the development by a stealth unmanned combat aerial vehicle (UCAV) DRDO.
- Daksh and Muntra: Land-based robot bomb settlement and designed for reconnaissance in dangerous areas.

While these systems are not completely autonomous in weapon deployment, they represent an important transition phase. India's reluctance to embrace deadly autonomous arms systems (laws) is placed in theory and moral traditions, with public policy "Human-in-Loop" Operations Architecture (Reichberg & Roy, 2024).

In addition, both Sehgal (2024) and Mallick (2020) outline the capacity of the swarm, especially in insurgency operations and deep reconnaissance missions. However, full -scale deployment is still limited by data processing capabilities and rules of engagement.

4.4 Logistics, Planning and Predictive Maintenance

The AI app in logistics and maintenance is changing India's capacity to support further operations in high -risk terrain. Cases of use include:
- Autonomous drone convoy in Siachen and Arunachal for ration and medical distribution
- Future analysis for fuel and priests pre-state
- T -90 and BMP fleet using fault prediction model telemetry and anomaly detection (Dua et al, 2025) confirmed that AI-logistics simulation reduces additional inventory and reaction intervals by 30%. Inspired by Ukraine's Wartime Logistics Software and NATO's AI-supported Fleet Coordination System, India's DRDOs and IDEX-Placed Startups are operating the AI-Ai-based Integrated United Supply Dashboard to coordinate the TRAI-Service Supply Chains.

5. Ethical and Doctrinal Considerations

India's approach to AI militarization remains ethically cautious. Reichberg and Roy (2024) document how Indian strategists favor human-machine collaboration over full autonomy, especially in lethal scenarios. Graae (2024), while studying Denmark, notes similar concerns, emphasizing the need for societal debate and legal clarity—insights that resonate strongly in the Indian context.

6. Visual Synthesis of Strategic and Operational Contributions

Table 1: Strategic and Institutional Drivers of AI in Indian Defence

Domain / Contribution	Primary Insights	Source(s)
Strategic Imperatives	Regional threat response; deterrence against China (Pakistan	Reichberg & Roy (2024), Sehgal (2024)
Institutional Initiatives	DAIC, DAIPA, DRDO, CAIR, inter-agency R&D efforts and structural fragmentation	Hooda (2023), Pris Information Bureau (2025), DRDO Annual
Global Conflict Influence	ISR swerms, misinformation ops, AI targeting in Ukraine & Israel conflicts	CSIS (2025), AsiaLive (2024)
Ethical Doctrines & Policy Gaps	Human-in-loop norms, Dharmayuddha, legal ambiguity, moral caution in LAWS	Reichberg & Roy (2024), Graae (2024)
Research Trends & Benchmarks	Publication growth indefence AI; comparison with global benchmaks	Pandey et al. KPMG (2025)
Data Ethics & Governance	Bias mitigation, transparency in AI systems, national guidelines for AI ethics	NITI Aayog (2025) Graae (2024)

Figure 1: Strategic and Institutional Drivers of AI in Indiaan Defence

Table 2: Operational Applications of AI in Indian Armed Forces

Domain / Contribution	Primary Insights	Source(s)
ISR & Surveillance	UAVs, drones, terrain mapping, swarm surveillance	Sehgal (2024), Mallick (2020)
Cybersecuruity & EW	DAIC, DAIPA, DRDO, CAIR, inter-agency R&D efforts and structural tools	Mallick (2022), Reichberg & Roy (2024), AsiaLive
Autonomous Cormat Systems	UCAVs, robot vehicles, LAWS debate	Sehgal (2024), Mallick (2020),
Predictive Logistics & Maintenance	Forecasting, drone convoys, maintenance AI	Hooda (2023) Mallick (2020)
Data Ethics & Governance	Blas mitigation, transparency in AI systems	Dua et al, (2025) Graae (2024)

Figure 2: Operational Applications of AI in Indian Armed Forces

7. CONCLUSION

Integration of artificial intelligence in India's own armed forces reflects an important balance act: modernization of defense capabilities in response to dynamic global threats, while maintaining traditional moral principles such as Dharmayudh. Institutional speed - through DRDO, DAIC and DAIPA - has set a strong base. ISR shows progress, autonomous system, logistics and cyber defense, and India's moral caution around the deadly autonomous arms systems strengthens its moral leadership.

However, global developments-AI-managed drone in the Ukraine, including the use of herds and the use of algorithm targeting systems in Israel-enhancing the rapid speed and complexity of the model war. These examples serve as both technical templates and moral warnings for India's defense currency.

To fully exploit the AI's capacity, India must adopt a harmonious, cross-sectoral national strategy that fuses operating innovation with legal and moral clarity. With thoughtful investment, inter-agency coordination and theory, artificial intelligence cannot only become a device of preventive-but the foundation stone of India's strategic autonomy in rapidly developed security environment.

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