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“AI-Driven Warfare and India's Defence Preparedness”

Dr. Devidas Vijay Bhosale[1]
Assistant Professor and Head,
Dept. of Defence and Strategic Studies,
TuljaramChaturchand College of Arts, Science and Commerce, Baramati.
Affiliated to Savitribai Phule Pune University, Pune.
And
Dr. Aniket Sidhling Kothawale[2]
Assistant Professor and Head,
Dept. of Electronics,
TuljaramChaturchand College of Arts, Science and Commerce, Baramati.
Affiliated to Savitribai Phule Pune University, Pune.
And
Dr. Shashikant Chandrakant Nakate[3]
Assistant Professor,
Dept. of Computer Sciecne,
TuljaramChaturchand College of Arts, Science and Commerce, Baramati.
Affiliated to Savitribai Phule Pune University, Pune.

Abstract:

From the invention of gunpowder to nuclear weapons, every technological advancement has always influenced the nature and methods of warfare. In the everadvancing journey of technology, Artificial Intelligence (AI) has become the most transformative technology of the 21st century. Just as AI has made amazing progress in sectors like industry, health, education, and transportation, AI is now also bringing about a major change in the defence and warfare.The use of artificial intelligence in the defence sector is changing the definition of modern warfare. Journey from traditional warfare to “smart warfare” being accelerated by AI. Advances in AIare transforming warfare, giving the military new capabilities in surveillance, decision-making, logistics, and combat operations.AI allows armed forces make autonomous decisions, examine information, and identify potential risks in real time. This is not possible with traditional technology, and it is directly making military forces more effective. Modern

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wars will no longer be fought only on the battlefield, but will be fought through various means, as they are based on data, algorithms, satellites, drones, and digital technologies. AI has emerged as the backbone of this entire system. Thus, AI will be seen playing a significant role in shaping and guiding the defense policies of countries around the world. The transition from conventional warfare to algorithmic and autonomous warfare and global strategic competition have made it important for India to also focus on AI-driven warfare.

This article sheds light on AI- driven warfare,its nature, and India's defence preparedness and challenges.

Introduction:

Earlier wars were largely based on man-made decisions, physical weapons and human tactics. But today, the context of warfare has transformed a lot, and computers have made it even more complicated. Autonomous drones, robots, and systems that make decisions based on algorithms are all important parts of the battlefield. AI-driven warfare means that computers, machine learning, algorithms, and autonomous systems are utilized in military operations and decision-making. This givesa new level of capability to warfare, map reading, decision-making, timing, accuracy and reaction capabilities and makes them more effective than human levels.These automated techniques eliminate the limitations of human feedback and time required, enabling quick decision- making in critical situations.

Artificial Intelligence:

A New Form of War and Security:On the battlefield, it is essential to analyze information quickly and make accurate decisions. AI systems can look at a lot of data in only a few seconds. AI helps people make decisions faster and more precisely by using data-driven and predictive analytics. By analyzing enemy movements, satellite imagery, drone data, weather and terrain conditions, and troop movements, AI can provide immediate advice to commanders. Traditionally, this time can pass in hours or days. For example, AI-enabled systems in the US F-35 fighter jet help pilots make critical operational decisions in real time.AI plays a very crucial part in keeping the border safe. AI-based solutions are making

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autonomous drones and surveillance equipment for safeguarding the borders and monitoring operation much better. Border security is a very important issue for a country with a vast territory like India. AI is strengthening the concept of “smart border management”. This includes AI based thermal sensors, long-range cameras, automated alert systems, facial and biometric analysis, motion detection algorithms. These systems can work day and night in any weather. Any suspicious movement is immediately notified to the control room. For example, systems like IBM Watson are used in armed decision-making processes to assess the risk in operations.Drones, robotics and automated weapon systems are revolutionizing the battlefield. AI works to speed up data processing from multiple sources such as satellites, drones and sensors. AI can identify patterns, detect threats and provide actionable information. AI based drones are widely used today for tasks such as aerial surveillance, target acquisition, search missions, and weapon delivery. The advantages of drones include precise targeting, saving lives, access to remote and dangerous areas, long flight capabilities, and high-level photo and video analysis. In addition, drones, robotics and automated weapon systems are being used for UGVs (Unmanned Ground Vehicles), robotic vehicles, landmine detection, construction demolition, and gathering information in highly dangerous areas. For example, India's IndraJal Sovereign Drone Security System provides multilayered drone-based protection against threats from unmanned aerial vehicles.Cyber security has become the need of the hour, in fact, it can be said that cyber security has become the new frontier of digital warfare. Today's wars can be won or lost not only by missiles but also by cyber attacks. A country's defence systems, communication networks, weapons control systems, satellite networks can be damaged to a great extent by hacking. In the face of this growing cyber war, AI is seen to have increased the cyber security capabilities of nations. AI provides the ability to detect and prevent cyber threats by analyzing various patterns, predicting breaches in various cyber security systems and automatically responding to them. AI based cyber security systems monitor every movement taking place in the network, identify suspicious activities, automatically prevent cyber attacks, and keep information safe. It would not be an

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exaggeration to say that AI has revolutionized the intelligence sector because intelligence agencies can obtain highly classified information in a moments using AI. Using AI in social media information analysis, speech, voice and facial recognition, satellite-based information on enemy bases, movement prediction, encryption and decryption of secret messages, all have made it easier to identify enemy strategies.AIpowered simulation systems create a realistic training system that adapts to soldiers' performance and enables them to cope with complex situations.This is seen as strengthening the readiness of soldiers. Today, AI simulation and virtual reality (VR) are used to create war-like situations. This allows soldiers to experience how to deal with sudden attacks, develop terrain awareness, plan strategies, and make quick decisions in times of crisis without actually going to the field. This training is safer, more cost-effective, and more effective.AI is playing a critical role in military logistics and supply chain management in both war and peacetime. Detecting weak links in the supply chain and predicting material shortages, thereby ensuring an efficient supply system on the battlefield and in peacetime that can eliminate operational weaknesses. AI enables supply chains to operate more efficiently by predicting equipment maintenance requirements and managing inventory. For example, AI-enabled maintenance systems are being used on various US Air Force aircraft to save time and resources by signaling the need for repairs.

India's efforts and initiatives: The Defence Artificial Intelligence Council (DAIC) has been set up under the chairmanship of the Defence Minister to provide necessary guidance and structural support in this area. In addition, the Defence AI Project Agency (DAIPA) has been set up under the chairmanship of the Secretary, Department of Defence Production (DDP) to enable AI- based processes in defence organisations.Moreover, an AI roadmap has also been finalized for each DPSU under which 70 defence specific AI projects have been identified for development.Smart Border Fencing Project, AI enabled Drones, Robotics, Cyber Security Systems, Indian Navy's Autonomous Submarine Project.These initiatives are making the defence system more capable and technology-based.

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Challenges to India's Defence Preparedness: AI- based warfare systems in India's defence preparedness can be stated as follows:

1) Dependence on cutting-edge semiconductors and hardware:AI- based defence systems require high-performance semiconductors, processors, and specialized hardware. India still gets a lot of these technologies from other countries, which might cause problems in the supply chain and make India dependent on other countries.
2) Cyber risks and data security: AI systems need a lot of private, sensitive data to work. Cyberattacks, hacking, or changing this data can be very dangerous for national security.
3) Ethical and Legal Dilemmas (Autonomous Weapons, Human Control): An key moral dilemma is how much human control should be allowed over automated weapons systems. Because wrong actions might hurt innocent people, it is important to think about international law and human rights.
4) Insufficient skilled workers: There aren't enough trained professionals in AI, machine learning, and cybersecurity, which is a big problem. It is important to build a trained workforce for high-quality research, development, and technical maintenance.

Challenges and ethical questions or concerns related to AI: There are also several serious challenges that are worth mentioning in this article.

1) Autonomy vs. Human Oversight: A lot of researchers have said that letting computers make deadly choices is against international humanitarian law and that weapons that make judgments on their own could be problematic in the future.
2) There is always a chance that technology can be hacked, no matter how strong it is. It can be really bad if someone hacks into an AI system. Along with this, human errors in handling AI enabled weapons globallycan also have serious consequences. In the future, advanced nations will be far ahead in this technology which could result in a global strategic imbalance.
4) As AI is capable of making decisions on its own, our dependence on technology will increase, which will likely result in a decrease in human decision-making in all areas.

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5) There is no global agreement on autonomous weapons. This lack of agreement could create many administrative difficulties. Until such an agreement is reached in the future, this regulatory loophole is making things complicated .

Conclusion:AI is becoming a key weapon in modern warfare and future defence. AI rapidly alters how the military and defence work, creating a new battlefield that is fast, precise, and independent. If employed correctly, the technology will make the country safer, lower the danger of deaths, and make wars smarter, faster, and more accurate.AI offers new opportunities for increased security, but if left unchecked, it also poses unprecedented risks. The future of AI in defence is full of new difficulties and opportunities. Its deployment must take into account a number of crucial factors, such as making sure that AI is morally balanced and setting global standards through human oversight. It is imperative that this technology is used responsibly, within an ethical framework, and with rigorous safeguards. As nations invest heavily in military AI, international cooperation is needed to prevent its misuse and ensure that the perception that AI strengthens security rather than destabilizes it is essential. We must accept that AI is no longer just a technology of the future, but an inevitable reality of the present.AI is not just a supplement to India's defence system; it is becoming a vital component of its future strategic capabilities. As the nature of modern warfare becomes based on data, algorithms, automated systems and cyber capabilities, India needs to focus on becoming technologically self-sufficient, building a secure data infrastructure, and training talented workers. AI can help with decision-making, intelligence analysis, border security, cyber defense, and logistical management. However, we can't disregard problems with ethics, the law, human control, and the balance of power in the world. India has to make an AI policy that is accountable, open, and safe by using a "Human-in-the-Loop" approach. This will need a mix of local research and development, partnerships between the public and commercial sectors, cooperation between countries, and a defined set of rules. India can make its defense readiness stronger, more balanced, and more safe in the long run by using the proper strategic

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approach, being self-sufficient in technology, and following an ethical framework in the age of AI-driven combat.

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