The Future of Military Applications of Artificial Intelligence: An overview of the Role for Confidence-Building Measures

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Abstract - Artificial intelligence (AI) has become a reality in today's world with the rise of the 4th industrial revolution, especially in the armed forces. Military AI systems can process more data more effectively than traditional systems. Due to its intrinsic computing and decision-making capabilities, AI also increases combat systems' self-control, self-regulation, and self-actuation. Artificial intelligence is used in almost every military application, and increased research and development support from military research agencies to develop new and advanced AI technologies is expected to drive the widespread demand for AI-driven systems in the military. This paper will discuss several AI applications in the military, as well as their capabilities, opportunities, and potential harm and devastation when there is instability. The paper looks at current and future potential for developing artificial intelligence algorithms, particularly in military applications. Most of the discussion focused on the seven patterns of AI, the usage and implementation of AI algorithms in the military, object detection, military logistics, and robots, the global instability induced by AI use, and nuclear risk. The paper also looks at the current and future potential for developing artificial intelligence algorithms, particularly in military applications.

Introduction - Artificial intelligence is a type of computer technology which is concerned with making machines work in an intelligent way, similar to the way that the human mind works.

The abbreviation AI is also used. Artificial Intelligence is the developing arena of computer sciences wherein technology is advanced to make computers behave like Human Nervous system majorly brain. Artificial Intelligence has advanced in fields such as Computer games, Neural networks, Natural language, Expert Systems and Robotics. Artificial Intelligence research covers a broad range of topics that include knowledge representation, machine learning, natural language processing, computer vision, reasoning and logic, robotics, information systems, motion planning, Speech Technology, Speech Recognition, and Image Processing.

In short, Artificial Intelligence (AI) is the science of mimicking human intelligence inside a computer. In addition to Microsoft Corporation (NASDAQ:MSFT), Alphabet Inc. (NASDAQ:GOOG), and Apple Inc. (NASDAQ:AAPL), Oracle Corporation (NYSE:ORCL) is one of the biggest AI companies in the world. John McCarthy is considered as the father of Artificial Intelligence. John McCarthy was an American computer scientist. The term "artificial intelligence" was coined by him.

The journey of AI in India can be traced back to the late 20th century when research and development in the field were in their nascent stages. Educational institutions such as the Indian Institutes of Technology (IITs) played a pivotal role in nurturing talent and fostering AI research. Birth of AI 1950-1956 Alan Turing published his work "Computer Machinery and Intelligence" which eventually became The Turing Test, which experts used to measure computer intelligence. The term "artificial intelligence" was coined and came into popular use. AI entered India through the works of professor H.N. Mahabala in the 1960s. Knowledge-Based Computing Systems (KBCS) created in 1986 by UNDP also paved way for India to focus on AI. The history of AI in India dates back to the 1980s when the Indian government and research institutions started investing in AI research and development. One of the pioneers in AI in India is Prof. Raj Reddy, who is known for his contributions to AI and robotics. The impact of AI in India started to become more significant in the early 2000s with the growth of the IT industry and the emergence of startups focusing on AI and machine learning. Today, AI is influencing various sectors in India, including healthcare, finance, agriculture, and education.

Artificial intelligence (AI) has been gradually improving and becoming a more efficient way worldwide with the help of data, computer processing power, and machine learning

developments, especially during the last two decades. As a result, AI is being used increasingly and more frequently in the daily life of various sectors. A few of the various uses of this technology include speech recognition, biometric authentication, mobile mapping, navigational systems, transportation and traffic control, management, manufacturing, supply chain management, data collection, and control targeted online marketing. Therefore, it should come as no surprise that AI has many applications in the military sector also, in a vast range. Military capability is the current measurement index when determining a country or nation's "Power force." The U.S. Department of Defense defines military competence or capability as "the ability to achieve a certain combat objective (win a war or battle, destroy a target set)." It is directly or indirectly influenced by modernization, structure, preparedness, and sustainability. The equipment, arsenal, and level of technical sophistication largely determine the degree of modernization.

The Internet is replacing the conventional way of initiating war instigated from the start of the Second World War. Studies show that hacking attacks on for-profit companies and governmental institutions around the AI sector are more common now. According to researchers, modern autonomous systems and artificial intelligence (AI) are expected to be crucial in future military confrontations. Recent scientific publications show how prevalent neural network technology is today in the cyber fight. The development of intelligent transport systems (ITS) is one of the major examples, along with forecasting and assessing environmental phenomena, separating informational tweets from non informational ones (containing information that are rumors or non detailed irrelevant data), and forecasting dynamic FX conventional markets. This type of enhancer helps in the military sector in various ways and turns out to be the greatest weapon in developing military capability.

Data on a wide range of resources and capabilities (human resources combat and support vehicles, helicopters, cutting-edge intelligence, and communication equipment, artillery, and missiles) that can carry out complex tasks of various types, such as intelligence gathering, movements, direct and indirect fires, infrastructure, and transports, should be considered in military decisions. For instance, the decisional component necessitates an integrated framework that can carry out the necessary processes, from capturing a high-level course of action (CoA) to implementing a thorough analysis/plan of activities. One possibility is to build the approach on several AI methods, such as qualitative spatial interpretation of CoA diagrams and interleaved adversarial scheduling, and many others likewise enhance the military world in different paths.

Seven Patterns of AI: There are many applications for AI, including chatbots, automated drones, facial recognition, virtual assistants, cognitive automation, fraud detection, autonomous vehicles, and applications for predictive analytics. However, regardless of how AI is applied, each of these applications has something in common. Despite the variety of applications, people who have created hundreds or even thousands of AI projects know that every AI use case falls into one or more of seven categories, as shown in figure below.

Impact of AI in the Indian Army: Indian Army Day is celebrated annually on January 15 to commemorate the 1949 commissioning of the Indian Army's first Indian contingent. The impact of AI is transforming industries worldwide. The worldwide expenditure on AI reached $118 billion in 2022 and is expected to exceed $300 billion by 2026. Like other sectors, the influence of AI has resulted in a growing trend of global militaries using AI in their combat systems. The defence sector uses AI-based technologies for training, surveillance, logistics, cyber security, UAV, advanced military weaponry like laws, autonomous combat vehicles, and robotics. Rajnath Singh, the Indian Defence Minister, unveiled 75 recently created AI technologies on July 11, 2022. This event occurred at the inaugural 'AI in Defence' (AIDef) symposium and exhibition organized by the Ministry of Defence in New Delhi.

Furthermore, the minister emphasized the significance of promptly incorporating advanced technologies such as AI and Big Data in the defense sector. It is crucial to ensure we remain up-to-date with technical advancements and fully leverage technology for our services.

Applications of AI in Defence:
1. Border monitoring can be enhanced by integrating cameras, radar feeds, sensors, and other technologies aided by AI-based solutions.
2. These advanced technologies aid in identifying border breaches, categorizing targets, and improving the precision of defense operations.
3. Unmanned Aerial Vehicles (UAVs) - Drones outfitted with AI-based aircraft technology are highly proficient in conducting day and night surveillance operations, encompassing border control and comprehensive surveillance.
4. Lethal Autonomous Weapon Systems (LAWS) are equipped with integrated sensors and pre-programmed algorithms that assist in identifying, selecting, and tracking hostile targets.

5. These weapons can engage targets independently and thus reduce the need for personnel.

6. Autonomous armoured vehicles and robots perform unattended, real-time surveillance, transport injured individuals, and carry supplies under challenging locations, including deserts and mountainous areas.

7. Robots demonstrate superior performance in hazardous and high-pressure environments, surpassing the skills of humans.

8. Data management - AI can analyze and utilize unutilized or underutilized data, generating more practical and valuable insights for the Indian armed forces. It will improve the capabilities of Intelligence, Surveillance, and Reconnaissance (ISR).

9. Pattern recognition - AI can analyze data from many sources and discern patterns.

10. The purpose of this technology is to forecast possible terrorist attacks and insurgency activity and propose proactive measures.

11. Training and simulation encompass a range of disciplines that utilize system and software engineering principles to develop models that aid soldiers in training for various combat systems employed in real-world military missions.

AI Adoption in the Indian Military:

1. The Ministry of Defence's Department of Defence Production established a task force in February 2018 to examine the prospective implementation of AI in defence contexts. Its report was submitted in June 2018 under the "Strategic Implementation of AI for National Security and Defense" task force. In 2019, a Defence AI Project Agency (DAIPA) and a Defence AI Council (DAIC) were established by the task force's recommendations.

2. The DAIC comprises the three service commanders, the defence secretary, the national cyber security coordinator, and representatives from the DRDO, industry, and academia. The defense minister chairs it. The DAIC is tasked with convening biannually to deliver essential guidance that facilitates and executes policy-level modifications, operational framework development or customization, and structural support.

3. The ex officio president of the DAIPA is the Secretary (Defense Production), while members are selected from academia, industry partners, the services, Defense Public Sector Undertakings, DRDO, and the DAIPA. The DAIPA shall establish and implement benchmarks for AI initiatives' technology development and delivery process and consult user groups regarding the adoption strategy for AI-led and AI-enabled systems and processes.

4. At the level of the Defense Ministry, these are plausible measures; however, they must be supplemented with modifications to organizational structure, planning, and processes at the level of the end users, namely the military. Adoption of artificial intelligence will be inconsistent and suboptimal unless the military is adequately prepared to assimilate this technology.

Conclusion: AI is not a military plug-and-play technology. Some basic applications may fit into this category. Still, the Indian military must improve its data management and network systems, build acceptable organizational structures, and comprehensively prepare its staff to utilize AI. Technology's availability is less important than how to use it to improve our military.

The contributions of this paper are for the advancement of AI in the military capabilities, and the significance of this narrative review is to identify several key applications of AI in the military, including target recognition, surveillance, homeland security, cyber security, transportation and logistics, autonomous vehicles, and combat training. We have also highlighted the potential benefits of using AI in these areas, including increased efficiency, accuracy, and decision-making capabilities. The paper also identifies several challenges and potential risks associated with using AI in the military, such as the potential for malfunction, hacking, and other forms of cyber attacks. The ethical and legal implications of using AI in the military are discussed in detail, particularly in relation to issues such as autonomous weapons and the potential for unintended harm.

The study has the potential to inform policy and decision-making in this area, particularly in relation to issues such as military modernization and preparedness. The research findings could potentially aid in developing guidelines and regulations for the responsible use of AI in military settings.

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