



RESEARCH ARTICLE

The Impact of Artificial Intelligence Militarization on South Asian Deterrence Dynamics

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Abstract

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The rapid advancement of artificial intelligence in recent years has significantly altered the strategic landscape and character of warfare. Military institutions are extensively exploring various aspects to fortify security, recognizing AI as a pivotal technology reshaping the nature of confrontations. Within the Indian defense sector, there's been proactive involvement in assimilating artificial intelligence. This strategic incorporation of AI within India's military framework will distinctly influence Pakistan's assessment of potential threats thereby impacting deterrence dynamics at both conventional and nuclear level. The paper applies the Deterrence Theory. This theory posits that the possession of superior military capabilities can dissuade adversaries from initiating conflict. In the context of AI integration, the paper aims to explore how advancements in AI bolster India's deterrence posture vis-à-vis Pakistan and militarization of AI by India will impact the deterrence equation and stability dynamics in the region. Moreover, this also might disturb the equilibrium enhancing the likelihood of conflict between two states. By exploring the possible impact of militarization of AI by Indian defense sector, the paper finds that AI militarization can alter the balance of power dynamics impacting the strategic stability and stability-instability paradox between India and Pakistan. Qualitative research methodology has been used for comprehensive analysis of existing literature on AI's role in modern warfare, coupled with an examination of research work on militarization of AI in South Asia. The aim is to delineate the repercussions of Indian AI militarization on the power dynamics of South Asia and deterrence equation. Thus, by examining the key domains of Indian AI militarization, this paper suggests that to keep pace with India's technological advancement, Pakistan should undertake the policy of quid-pro-quo since it cannot afford to delay the integration of AI in its defense sector contemplating it as a national security concern for Pakistan.

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Introduction

The global landscape has witnessed swift advancements in technology, coupled with the evolution of sophisticated weapon systems and dynamic shifts in warfare tactics. The proliferation of artificial intelligence (AI) technology stands as a pivotal development reshaping contemporary military doctrines and the enduring strategic goals of nations. This transition is characterized by a paradigm shift in military operations, where traditional armaments are progressively supplanted by AI-driven methodologies aimed at both deterring and engaging adversaries. The South Asian theater has witnessed substantial strides in the domain of AI, notably with India emerging as a prominent investor in cutting-edge technologies, specifically AI, to bolster its strategic positioning vis-à-vis regional counterparts. As the world's fifth-largest economy, India holds a significant economic advantage, enabling the acceleration of AI integration within its military framework. This thrusts India as a burgeoning industry, attracting venture capital investments valued at USD 50 billion in AI-centric technologies. In contrast, Pakistan has steadfastly endeavored to sustain deterrence equilibrium within the region since 1998, directing efforts toward augmenting the quality of its strategic capabilities, particularly concerning India, to ensure a balance in the regional power dynamics.¹

Despite significant technological advancements, notably in AI, and India's robust investments in this sphere, Pakistan faces considerable challenges due to its resource constraints. Consequently, Pakistan might face pressure to divert its limited resources towards AI research and development. Failure to do so could potentially result in an increased sphere of influence for India, thereby undermining deterrence mechanisms across the wider South Asian region. In the context of AI advancements, the realist perspective appears most germane to understanding the security landscape unfolding in South Asia. Power maximization is necessary for state survival in an anarchic system and the technological advancement have also changed the dynamics of

¹ Antoine Levesques, "Nuclear Deterrence and Stability in South Asia: Perceptions and Realities," *IJSS*, accessed December 26, 2023, <https://www.ijss.org/research-paper//2021/05/nuclear-deterrence-south-asia>.

power.² In order to have leverage on others, now existing power dynamics require state to incorporate AI in not only their economic pursuits, but also in defense sectors. States like the US and China have already embarked on this journey, and that also necessitated India to modernize its existing systems by incorporating AI. The possibility of AI to be used in nuclear weapons creates a security dilemma between the two South Asian neighbors. Hence, to maintain the credibility of its deterrence posture in coming decade, it is necessary that Pakistan should focus on AI research and development for both civil and defense purposes to maintain balance in the South Asian region.

Militarization of Artificial intelligence: Defining AI in a broader context

Artificial Intelligence has many meanings and has been interpreted in various ways since the 1950's. It is now understood generally as a broad spectrum of technologies. Being a catch-all terms AI refers to a "wide set of computational techniques that allow computers and robots to solve complex, seemingly abstract problems that had previously yielded only to human cognition."³ This helps machines to perform human actions based on their learning and using their logic. In other words, Intelligence is being imbedded in machine systems to perform tasks like humans hence called Artificial Intelligence, something which machines were unable to perform a few decades ago and now perform complex tasks due to deep learning and better programming. More simply, one can define AI as the "programming of machines in such a manner that their cognition and responsive capabilities match that of a human being while taking the aid of a tremendous amount of data."⁴ The four main elements required for development of AI are deep learning

² Snyder, Glenn H, "Mearsheimer's World-Offensive Realism and the Struggle for Security: A Review Essay", *International Security* 27, no. 1 (2002): 149–73. <http://www.jstor.org/stable/3092155>.

³ Petr Topychkanov, ed., The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk: Volume III - *South Asian Perspectives* (April 2020): 4. <https://ciss.org.pk/PDFs/SIPRI-Topychkanov.pdf>.

⁴ Shaza Arif, "Emerging Trends of Artificial Intelligence in South Asia and its Implications for Pakistan," *NUST Journal of International Peace & Stability* 2019, vol. II, no. 2: 55-66. file:///C:/Users/CISSAJK-16/Downloads/njips_edmin.+33-172-1-PB.pdf.

technology, big data, computing power and algorithms.⁵ Although a branch of computer science, it has also become interdisciplinary science with its various offshoots in the face of image recognition, robotics, neuroscience etc.

As aptly described by Russian President Vladimir Putin, “AI is the future for all humankind. It comes with colossal opportunities, but also threats that are difficult to predict. Whoever becomes the leader in this sphere will become the ruler of the world”.⁶ Realizing the efficacy of AI development to maintain an edge, various states have embarked on journey towards AI advancement to reap the benefits it entails in various domains. AI has set the path towards the 4th industrial revolution as the world is advancing rapidly in acquiring multiple technologies. These multiple technologies range from AI to Robotics, to Quantum Technology, Digital Fabrication, Bio, and Nanotechnology. The significance of AI in civil sectors have compelled states like the United States and China to adopt such technologies to boost their economy also paving way to incorporate AI in military sectors.⁷ Moreover, the academic debate on AI and strategic stability has revolved majorly around states like the US and China that made rapid advances initially in the civil sectors and now are heading towards military uses of AI. In South Asia, it is something new to debate on.⁸

Militarization of AI

States around the world are using AI significantly to boost the economy due to its vast contribution in areas of heavy industry, agriculture, manufacturing, transportation, and medical research. AI technology will also be useful in warfare and therefore, states strategic goals require their attention towards this new and emerging

⁵ China Arms Control and Disarmament Association (CACDA), “Artificial Intelligence and Its Military Implications,” *The Militarization of Artificial Intelligence* (New York: United Nations, 2019): 19-20.

⁶ Radina Gigova, “Who Vladimir Putin Thinks Will Rule the World,” CNN, September 2, 2017, <https://www.cnn.com/2017/09/01/world/putin-artificial-intelligence-will-rule-world/index.html>.

⁷ Ibid.

⁸ Petr Topychkanov, ed., *The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk: Volume III - South Asian Perspectives* (April 2020). <https://ciss.org.pk/PDFs/SIPRI-Topychkanov.pdf>.

technology. The militarization of AI has developed cyber weapons, and control autonomous tools like drone swarms — “fleets of low-cost quadcopters with a shared ‘brain’ that can be used for surveillance as well as attacking opponents”.⁹ The US and China have significantly begun militarization of AI to have a relative edge and same trend has been observed by other states including the two South Asian Rivals, but at a slower pace. The introduction of autonomous technology in the form of AI laid the basis of the third revolution in warfare. The first revolution was the introduction of gunpowder followed by development of nuclear weapon.¹⁰ The assumption regarding their use in various defense and nuclear sectors is vague, yet their exploitation by nuclear armed states for national security is beyond question as states seek to have an edge over other states when it comes to technological advancement. The Military can use AI on a dual use technology in the production of autonomous weapon systems, along with integrating it with existing conventional and nuclear stockpile. Autonomous weapons are rapidly expanding into military domain due to their enthralling accuracy and minute response times. The combination of four basic elements gives varied forms and qualities to the military application of AI. AI militarization can be categorized into two types according to Dimitri Scheftelowitsch.¹¹ The one is autonomous robotic devices, and another is stationary applications.

Robotic devices may take the form of military robots built with decision making capabilities, navigation, and senses to interact with their external physical environment. These robots can be either

⁹ Alex Gatopoulos, “Project Force: AI and the Military – a Friend or Foe?” *Aljazeera.com* (Al Jazeera, March 28, 2021), <https://www.aljazeera.com/features/2021/3/28/friend-or-foe-artificial-intelligence-and-the-military>.

¹⁰ Steven Vo, “PART I: Killer Robots: A Third Revolution in Warfare?” *Georgetown Journal of International Affairs* (blog), March 19, 2021, <https://gjia.georgetown.edu/2021/03/19/part-i-killer-robots-a-third-revolution-in-warfare/>.

¹¹ Dimitri Scheftelowitsch, “The State of Artificial Intelligence: An Engineer’s Perspective on Autonomous Systems,” *The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk: Euro-Atlantic Perspectives*, ed., Vincent Boulanin, 27-28, Solna: *Stockholm International Peace Research Institute* (SIPRI), May 2019, <https://www.sipri.org/sites/default/files/2019-05/sipri1905-ai-strategicstability-nuclear-risk.pdf>.

partially or fully autonomous. “The independent or autonomous tanks, Unmanned Aerial Vehicles or drones and underwater independent vehicles” are various examples of such robotic devices.¹² Killer Robots also known as Lethal Autonomous Weapons are systems that impose act of deadly use of force in land, air and underwater without any human involvement. Their competence lies in the fact that they detect and discern targets and attack it all by themselves. The non-robotic and digital applications are stationary applications of AI in military that have the same advanced level decision making power as robotic devices. In this domain, “Early Warning and radar systems use specific application of AI, Ballistic Missile Defenses and AI enabled cyber systems, Advance Intelligence, surveillance and reconnaissance capabilities, data processing and analysis systems for space-based assets and selective functions of nuclear command and control systems” use AI technology. The strong level of autonomy in military is bestowed by AI weapons and help states gain a comparative advantage vis a vis adversary.¹³ Therefore, it is being employed by major powers to shift balance of power to their favor. The defense spending of the US is approximately US\$600 Billion and that of China is US\$250 billion.¹⁴ This difference is thought to shift as China is integrating AI acknowledging this gap can be mitigated by adding more sophistication and accuracy to already existing weapons. The Ability of AI to make profound impacts coupled with accuracy, by leaps and bounds once integrated into the military¹⁵ gives the rational behind the militarization of AI. The similar trend is anticipated to be followed among the South Asian arch nuclear rivals.

¹² Ibid.

¹³ Ibid.

¹⁴ “Military Spending by Country Worldwide 2022,” *Statista*, accessed December 25, 2023, <https://www.statista.com/statistics/262742/countries-with-the-highest-military-spending/>.

¹⁵ Matt Field, “China Is Rapidly Developing Its Military AI Capabilities,” *Bulletin of the Atomic Scientists* (blog), February 8, 2019, <https://thebulletin.org/2019/02/china-is-rapidly-developing-its-military-ai-capabilities/>.

Appraisal of India's Militarization of Artificial Intelligence

India has witnessed a conspicuous rise in the integration of artificial intelligence in its military paraphernalia over the last decade¹⁶. This emphasis on AI militarization is in congruence with the broader ambition of military modernization with the aspirations of regional hegemonic aspirations¹⁷. To materialize the blueprints of AI militarization, India maintains a comprehensive edifice of institutions and organizations. These bureaucratic and technical bodies carry out the projects of research and development, technological advancement, emerging technologies, and the militarization of artificial intelligence. The oldest and most important organization in charge of managing technical advancement and its incorporation into the Indian military is the Defense Research and Development Organization (DRDO) of India.¹⁸ The Centre for Artificial Intelligence and Robotics (CAIR), which is largely focused on robotics, artificial intelligence, and intelligent control systems, was founded by DRDO. Over the years, CAIR has made significant strides in the aforementioned areas. To support the Indian military on the battlefield, CAIR is also building robots, particularly for intelligence, surveillance, and reconnaissance purposes.¹⁹

¹⁶ Shashi Shekhar Vempati, "India and the Artificial Intelligence Revolution," (Carnegie Endowment for International Peace, 2016), https://carnegieendowment.org/files/CP283_Vempati_final.pdf.

¹⁷ Masood Ur Rehman Khattak, "The Indian Army's Land Warfare Doctrine-2018: A Critical Analysis," *IPRI Journal* XX, no. 1, (2020), <https://ipripak.org/wp-content/uploads/2020/06/Article-5-IPRI-Journal-XX-I-Ind-Arm-New-Lan-ED-SSA-FINAL.pdf>.

¹⁸ Kritika Roy, "Rationales for Introducing Artificial Intelligence into India's Military Modernization Programme," in *The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk*, Volume III, South Asian Perspectives (Stockholm International Peace Research Institute, 2020), https://www.sipri.org/sites/default/files/2020-04/impact_of_ai_on_strategic_stability_and_nuclear_risk_vol_iii_topychkanov_1.pdf.

¹⁹ Aamna Rafiq, "Militarisation of Artificial Intelligence and Future of Arms Control in South Asia," *Strategic Studies* Vol. 41, No. 2, (2021), https://issi.org.pk/wp-content/uploads/2021/08/4_SS_Aamna_Rafiq_No-3_2021.pdf.pdf.

Defense AI Council (DAIC), which was founded in February 2019, has been tasked with accelerating the transition of AI projects from the experimental phase to the operational arena to ensure AI integration into the Indian military. Rajnath Singh, the Indian Defense Minister, stated that by 2024, DAIC will complete 25 AI-specific defense projects.²⁰ To further advance AI militarization in India's defense industry, the country established the Defense AI Project Agency (DAIPA) and Artificial Intelligence for Air Defense (AI4AD). The Wargame Research and Development Centre (WARDEC) in India offers the Indian army a simulation-based training facility for wargames utilizing virtual reality and AI.²¹ This vast network of centralized, interconnected organizations serves the purpose of advancing India's AI development and its integration in the defense sector. AI incorporation into the Indian military can be identified in several domains including Cybersecurity, Intelligence, Surveillance and Reconnaissance (ISR), Decision Support Systems, Autonomous Systems, Battlefield Planning and Simulation, and Predictive Maintenance. India has maintained a dual strategy in its surveillance and reconnaissance programs of AI militarization, focusing on domestically produced Unmanned Aerial Vehicles (UAVs) as well as working with its international allies and acquiring UAVs from Israel.²² In order to improve border security and monitoring, India has also used sophisticated analytics, face recognition technologies, and autonomous surveillance equipment. Additionally, India has ostensibly focused on the use of artificial intelligence to improve cybersecurity. Among India's AI-enabled weapons, UAVs hold the utmost importance. In recent years India has placed palpable

²⁰ Rajat Pandit, "India finally taking some steps to leverage AI for military applications," *The Times of India*, Feb 14, 2022, <https://timesofindia.indiatimes.com/india/india-finally-taking-some-steps-to-leverage-ai-for-military-applications/articleshow/89559262.cms>.

²¹ Vaibhav Jha, "Explained: Project WARDEC – India's upcoming AI-powered wargame centre," *The Indian Express*, May 21, 2022, <https://indianexpress.com/article/explained/explained-project-wardec-india-ai-powered-wargame-centre-7928387/>.

²² Masood Ur Rehman Khattak, "Strategic Significance of Indo-Israel Defence Collaboration: Implications for Pakistan's Security," *IPRI Journal XVI*, No.2, (2016), <http://www.ipripak.org/wp-content/uploads/2016/11/4-Masood-ur-Rehman.pdf>.

importance on obtaining new and modern UAVs possessing AI technology. In this regard, India specifically focused on the procurement of UAVs from its allies including Heron Drones from Israel.²³ Lakshya, Nishant, and Rustom are the most well-known domestically produced UAVs developed by DRDO. DRDO and IdeaForge also launched Netra quadcopter for reconnaissance and surveillance missions. India is also developing the Ghatak²⁴ and Rustom-2 UAVs,²⁵ which will be used for strike purposes along with target detection, and information gathering.

India is also focusing its energies on developing AI-integrated land-based weapons. India unveiled Muntra, its first unmanned tank, in 2017 with the ability to undertake missions in harsh environments and challenging terrains.²⁶ As technology and capabilities advanced, many tank variations like the Muntra S, Muntra M and Muntra N were introduced in the next years. Additionally, 200 autonomous DAKSH robots with the capability of disarming explosives and mines are now in service by the Indian Army. MARF (Multi Agent Robotic Framework), which when operationalized, will perform as a team of troops to support the Indian Army on the battlefield.²⁷ In recent years, the Indian Navy has made concrete efforts to integrate artificial intelligence into key areas such as prescriptive maintenance, surveillance and security,

²³ Vijainder K Thakur, "Decisive Edge For IAF? India Negotiating with Israel to Locally Manufacture 'Weaponizable' Heron Mk2 Drones," *The Eurasian Times*, October 24, 2022, <https://eurasianimes.com/india-is-negotiating-with-israel-aerospace-to-locally-heron-mk2-drones/>.

²⁴ Ibid.

²⁵ Dinakar Peri, "Indigenous UAV Rustom-2 to complete user trials by August 2023," *The Hindu*, October 19, 2022, <https://www.thehindu.com/news/national/indigenous-uav-rustom-2-to-complete-user-trials-by-august-2023/article66032155.ece>.

²⁶ "DRDO develops India's first unmanned tank, Muntra; rolls it out of Chennai lab," *First post*, July 29, 2017, <https://www.firstpost.com/india/drdo-develops-indias-first-unmanned-tank-muntra-rolls-it-out-of-chennai-lab-3870693.html>.

²⁷ Vincent Boulanin, Lora Saalman, Petr Topychkanov, Feisu and Moa Peldán Carlsson, "AI and the military modernization plans of nuclear-armed states," in *Artificial Intelligence, Strategic Stability and Nuclear Risk* (Stockholm International Peace Research Institute, 2020), https://www.sipri.org/sites/default/files/2020-06/artificial_intelligence_strategic_stability_and_nuclear_risk.pdf.

marine domain awareness, and inventory management.²⁸ 30 AI projects are currently being developed with the objective of AI incorporation into the Indian Navy.²⁹ India in the last few years took perceptible measures in the domain of stationary applications by integrating artificial intelligence in its Early Warning, Information, Predictive Maintenance, and Control Systems.³⁰ The DRDO created the "Himshakti" integrated electronic warfare system, which would be capable of signal jamming as well as signal interception, surveillance, analysis, position targeting, and direction assessment.³¹ Additionally, CAIR has designed and manufactured robots to detect any damage to the components of its HAL Tejas fighter plane. Predictive maintenance systems would provide incessant testing and maintenance services to the Indian fighter jets.

Artificial Intelligence Integration in Pakistan's Security Apparatus

In the recent past, Pakistan has made palpable progress toward technical advancement, new technologies, and the use of AI in its defense industry. However, Pakistan's AI development and militarization have lagged behind those of its rivals, most notably

²⁸ Sam Guthrie, "Conventional and Nuclear Applications of Artificial Intelligence: A Brief Examination of India and Pakistan" in *The 2019 UK PONI Papers* (Royal United Services Institute, 2019), https://static.rusi.org/201912_rusi_uk_poni_papers_2019_web.pdf.

²⁹ Mayank Singh, "Indian Navy ropes in new-age tech with 30 Artificial Intelligence projects in the works," *The New Indian Express*, January 28, 2022, <https://www.newindianexpress.com/nation/2022/jan/28/indian-navy-ropes-in-new-age-tech-with30-artificial-intelligence-projects-in-the-works-2412338.html>.

³⁰ Sanatan Kulshrestha, "The Indian perspective on the massive damage potential of advanced military technologies," in *The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk, Volume III, South Asian Perspectives* (Stockholm International Peace Research Institute, 2020), https://www.sipri.org/sites/default/files/2020-04/impact_of_ai_on_strategic_stability_and_nuclear_risk_vol_iii_topychkanov_1.pdf.

³¹ "Defence ministry inks Rs 3,000 crore deal for warfare system," *The Times of India*, March 25, 2023, <https://timesofindia.indiatimes.com/india/defence-ministry-inks-rs-3000-crore-deal-for-warfare-systems-for-hilly-areas/articleshow/98981817.cms>.

India. Despite commencing several projects and ventures, Pakistan has not militarized artificial intelligence to the same extent as India. First, Pakistan has not yet released a public or official document outlining its plan for using AI in its defense industry. This document, which was made public by India, is particularly significant since it outlines the goals, strategy, and timetable for such an undertaking. Another challenge to Pakistan's swift integration of AI in its defense sector is the policy of confidentiality and concealment. The government has not revealed the actual figures for AI-related defense projects. This results in a lack of available data for analysts who are not able to fully assess the nature and prowess of Pakistan's AI-related defense projects.

Among the projects that were made public by the government, the Strategic Command and Control Support System established within National Command Center (NCC) hold the utmost importance as it is delegated the task of ascertaining progress in the domain of cybersecurity by employing artificial intelligence.³² National Center of Artificial Intelligence (NCAI) as well as Center of Artificial Intelligence and Computing (CENTAIC) are also important components of the organizational edifice of Pakistan's AI militarization. Both organizations are expected to conduct research and bring about technological advancement, especially in the domain of artificial intelligence, to enhance the intelligence gathering and operational capabilities of Pakistan's military. CENTAIC is also anticipated to assist Pakistan Air Force in the design and production of modern stealth fighter jets as well as autonomous unmanned aerial vehicles (UAVs).³³

Pakistan also possesses a comprehensive assortment of AI-enabled weapons to maintain sufficient deterrence to thwart India's designs of regional dominance. Like India, Pakistan has also maintained the dual strategy of acquiring autonomous weapons

³² Mansoor Ahmed, "Pakistan's Tactical Nuclear Weapons and Their Impact on Stability," Carnegie Endowment for International Peace, June 30, 2016, <https://carnegieendowment.org/2016/06/30/pakistan-s-tactical-nuclear-weapons-and-their-impact-on-stability-pub-63911>.

³³"PAF establishes center for Artificial Intelligence," *Profit*, August 31, 2020, <https://profit.pakistantoday.com.pk/2020/08/31/paf-establishes-center-for-artificial-intelligence/>.

from allies as well as domestically developing its arsenal. Pakistan in the recent past procured AI-enabled Wing Long II UAVs as well as 6 units of LY-80 SAM missiles from China.³⁴ These LY-80 SAM missiles have the capability of hitting the target at an altitude of 400 meters to 10000 meters. Pakistan also domestically developed a range of UAVs possessed with AI technology including Buraaq, Uqab, Mukhbar, Shahpar and Shahpar II.³⁵ Among these UAVs, Shahpar II is the latest and most lethal UAV as it is a Medium Range Long Altitude (MALE) combat UAV with autonomous take-off and landing capabilities.³⁶ Alongside AI-assisted UAVs, Pakistan has also made significant progress in integrating artificial intelligence in its missile systems as Pakistan's latest missiles including Shaheen III and Ra'ad ballistic missile systems are equipped with cutting-edge AI technology.³⁷ Shaheen III missiles have the capability of carrying both conventional and nuclear payloads to a range of 2750km.³⁸ These missile systems ensure the defense of Pakistan while also providing the country with offensive capabilities.

AI militarization Impact on Deterrence Dynamics

The South Asian nuclear rivals are also likely to benefit from these emerging technologies. Both are exploring the avenues of the advancement in AI as the above section has demonstrated. The

³⁴ Mandeep Singh, "Pakistan Army inducts Chinese made LY-80 Surface to Air Missile System for Protecting Strategic Assets," *Delhi Defence Review*, April 5, 2017, <https://delhidefencereview.com/2017/04/05/pakistan-army-inducts-chinese-made-ly-80-surface-air-missile-system-protecting-strategic-assets/>.

³⁵ Khansa Qureshi, "Increasing Relevance of Drone Technology and Pakistan's Position," Centre for Aerospace & Security Studies, March 3, 2023, <https://casstt.com/increasing-relevance-of-drone-technology-and-pakistans-position/>.

³⁶ Tanmay Kadam, "Pakistan 'Shows Off' Its Indigenous Shahpar-2 Combat UAV That Can 'See, Surround & Smash' Enemy Targets," *The Eurasian Times*, November 22, 2022, <https://eurasianimes.com/pakistans-indigenous-shahpar-2-combat-uav-ready/>.

³⁷ Ghazala Yasmin Jalil, "Missile Race in South Asia: Security Challenges for Pakistan in the 21st Century," *Strategic Studies*, Vol. 40, No. 1, (2020), https://www.jstor.org/stable/pdf/48732326.pdf?refreqid=fastly-default%3A7a1b9f51e807170af03067ae3f3e3f0e&ab_segments=&origin=&initiator=&acceptTC=1.

³⁸ "Pakistan carries out successful flight test of Shaheen-III ballistic missile," *Dawn*, April 9, 2022, <https://www.dawn.com/news/1684188>.

Global AI Index Report published on June 28, 2023 ranks India on the 14th position and Pakistan on the 59th position in AI capacity at the international level.³⁹ This overall ranking is based on various detectors like Talent, Infrastructure, Operating Environment, Research Development, Government Strategy and Commercial scale.⁴⁰ India and Pakistan are both pursuing advanced technologies and capabilities that pose a significant threat to each other's defense, especially within the confines of nuclear deterrence. Learning from past crises, they are now venturing into unexplored territory, necessitating wise judgment regarding their doctrines, nuclear and conventional capabilities, and the potential unforeseen consequences in future conflicts.

The two states maintained strategic stability in their adverse relations through development of nuclear weapons, as the nuclear deterrence theorist suggested that nuclear weapons make war unthinkable due to the Mutually Assured Destruction at their disposal.⁴¹ When it comes to conventional military balance between India and Pakistan, India maintains an edge, that asymmetry was balanced by Pakistan by acquiring nuclear weapons and achieving second strike capability. The nuclear competition between three South Asian powers China, India and Pakistan have gained momentum. It is India that is actively engaged in expanding its nuclear weapon stockpiles and develop new delivery systems as nuclear-powered ballistic missile submarines (SSBNs) and cruise missiles.⁴² Pakistan will follow suit to retain deterrence stability. Deterrence balance rather than parity could be a viable strategy for Pakistan to prevent major wars in the South Asian region. Nuclear weapon states pursue their vital security interests in developing emerging technology of unmanned vehicles and cyberwarfare

³⁹ "The Global AI Index," *Tortoise*, accessed December 25, 2023, <https://www.tortoisemedia.com/intelligence/global-ai/>.

⁴⁰ *Ibid.*

⁴¹ Michael MccGwire, "Nuclear Deterrence," *International Affairs* (Royal Institute of International Affairs 1944-) 82, no. 4 (2006): 771–84. <http://www.jstor.org/stable/3874158>.

⁴² Kile, S. N. and Kristensen, H. M., "Indian Nuclear Forces" and "Pakistani Nuclear Forces," SIPRI Yearbook 2019: Armaments, Disarmament, and International Security (Oxford University Press: Oxford, 2019): 325–31 & 332–37.

where military AI has a crucial role to play. It is perceived that India and Pakistan may get into competition on military AI as suggested by comparative study on adoption of AI in South Asia. It is perceived that India's advances in acquiring AI technologies may be modest when compared to the United States, Russia, and China.⁴³ But, this could accelerate as India increases its strategic partnership with major powers while impacting Pakistan. Pakistan's advances in military AI are less visible because of under resourcing of research in these domains. Inefficiency in defense research can be a hurdle to develop and adopt emerging AI technologies in a reasonable time frame. But the academicians are of the view that both countries are aware of its potential in defense and acquisition of AI in military can enable them to acquire mutual strategic balance.

AI acts a double-edged sword as it can enhance nuclear command and control, early warning, ISR on the one hand and physical security of nuclear power on the other, overall increasing state's security. Many security analysts may consider that these technological advances also make the survivability of second-strike capability vulnerable to preemptive strikes. Such technological advances may also have implications on deterrent force posturing between the rivals, which in turn may further complicate the deterrence stability between the nuclear rivals. Moreover, many security analysts commonly argue that possible integration of AI into nuclear arsenals or postures may have profound effects on the strategic stability in South Asia by altering the deterrence equation and strategic balance.⁴⁴

Stability Instability Paradox

The Stability Instability Paradox is described by the international relations theorist as a situation where two nuclear states manage to avoid nuclear or conventional war, yet residual instability persists in the form of indirect confrontation or crisis.⁴⁵ After the

⁴³ Ibid.

⁴⁴ Ibid.

⁴⁵ Michael Krepon, "The Stability-Instability Paradox in South Asia • Stimson Center," Policy Paper, Stimson Center, January 1, 2005, <https://www.stimson.org/2005/stability-instability-paradox-south-asia/>.

development of nuclear weapons, Pakistan and India have not fought a full-scale war. However, they have been involved in numerous crisis situations, spanning from the Kargil crisis to the twin peak crises, and culminating in events such as the Pulwama and Balakot incidents. During these crisis episodes, the policy makers on both sides successfully averted war and moved in opposite trajectory of escalation ladder. This shows that two states experienced stability at the nuclear level where they have not engaged in full scale war, yet there remains instability at the sub-conventional level. India with its conventional superiority and sophisticated advancement in modern technologies may consider fighting a limited war under the nuclear overhang potentially endangering a risk of escalation to a nuclear level. It is perceived that Pakistan nuclear weapons and the production of effective countermeasures effectively prevent India from waging even a limited war in South Asia. Crossing the nuclear threshold is not a viable option for states because of the severity of stakes involved is what stability-instability paradox suggests. When states balance nuclear capabilities and acquire second strike capabilities that act as basis of war prevention and escalation control. The incorporation of AI in the military and defense sector is further complicating the deterrence equation as the major issue of Kashmir is still unresolved making things more complicated between two states.

India has embarked on a journey to integrate AI in its defense sector, ranging from air, land and sea to space and cyber space. As India is advancing significantly in AI-powered military capabilities, it paves the way for technological asymmetry between the two South Asian rivals. Moreover, the stability-instability paradox also suggests that despite the existence of nuclear deterrence between the two states at the bigger level, the instability exists owing to the potential use of conventional weapons and possibility of escalation between two in conventional war fronts as the Balakot incident highlights.⁴⁶ Hence, one may perceive to argue that any South Asian state with superior AI capabilities may have a greater ability to prevail in conflict or have a relative edge, thereby

⁴⁶ Tayyaba Khurshid, "From Crisis onset to De-escalation: Examining Role of Crisis Management in the Pulwama Crisis," *NDU Journal* 37 (April 30, 2023): 25–33, <https://doi.org/10.54690/ndujournal.37.134>.

altering deterrence dynamics. But one may also question whether or not such technologies could become effective against the classic effects of nuclear deterrence. The militarization of AI may enhance strategic ambiguity as the capabilities and intentions of either of the South Asian rivals may not be known to each other. These ambiguities at the conventional front can also introduce uncertainties in the minds of decision makers affecting their perception of balance and credibility of other side deterrent force posturing. As India acquires advancement in military uses of AI, Pakistan is also compelled to follow suit. This may result in an arms race and crisis instability. Finally, as AI militarization leads to autonomous weapons, the future warfare may replace human decision makers leading to unintended escalation and miscalculations causing more instability in the already volatile South Asian region. Hence, it necessitates that Pakistan embarks upon its journey for acquiring such nascent technologies needed for deterrence balance vis-à-vis its potential adversary.

Conclusion

It is perceived that the 21st century has seen a rapid rise in the integration of artificial intelligence within the US military, prompting a response from China. China's increased use of AI in its military has raised concerns for India, leading to its significant push towards AI-driven militarization. This expansion is visible across various domains such as Intelligence, Surveillance, and Reconnaissance (ISR), Cybersecurity, Decision Support Systems, Battlefield Planning and Simulation, as well as the utilization and procurement of semi and fully autonomous UAVs. India's assertive adoption of AI in defense creates security concerns for Pakistan, which faces a historical backdrop of conflicts, including India's involvement in specific regions and the looming threat of severe consequences from any confrontation. The India's AI-driven militarization, coupled with ideological factors, has the potential to disturb the deterrence equation in South Asia.

However, Pakistan's own advancement in AI militarization has been hindered by economic limitations and other factors, leading to a notable power imbalance between the two nations. This technological asymmetry in AI militarization poses substantial

threats to South Asian deterrence dynamics, including an escalation in an arms race, conventional and nuclear disparities, increased unpredictability, heightened chances of misjudgments, and cyber threats. Given this landscape, Pakistan needs to redirect more resources towards integrating AI into its military infrastructure. Economic revitalization is crucial for driving research and development aimed at swiftly integrating AI into Pakistan's defense sector. AI-focused strategies adopted by India pose a serious threat to Pakistan's national security and deterrence, compelling Pakistan to prioritize the integration of AI within its defense infrastructure without further delay. The broader implications on deterrence dynamics needs to be explored further as the militarization of AI will mature in South Asia.