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## INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/14356  
DOI URL: <http://dx.doi.org/10.21474/IJAR01/14356>



### RESEARCH ARTICLE

#### ARTIFICIAL INTELLIGENCE AFFECTING STRATEGIC STABILITY

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#### Manuscript Info

##### Manuscript History

Received: 05 January 2022

Final Accepted: 09 February 2022

Published: March 2022

#### Abstract

Introduction of artificial intelligence(AI) in the nuclear weapons system exerts the stabilizing as well as destabilizing effect on strategic stability. AI enables informed decision making, development of more survivable delivery vehicle, physical and cyber security of nuclear assets, reduction in possibility of human error, surveillance of compliance of non-proliferation and disarmament treaties, integration of heterogeneous weapons for better performance, and underwater demining, etc. Simultaneously, by contrast, the threat to nuclear deterrence and nuclear assets from hypersonic glide vehicle leading to capability race, remote sensing over autonomous surface and underwater vehicles threatening invulnerable second strike capability, Patrov incident like situation's possibility and requirement of human interference, instability inherent in threat detection with the deployment of AI driven more survivable and less controllable platforms including UCAVs, UAVs, UUVs, SLBMs, etc. are threatening the strategic stability. Which must be mitigated for long-lasting global peace through the development of universally accepted code of conduct in line with 1949 Geneva convention and Universal declaration of human rights 1948, etc, deliberation for risk reduction in regional as well as global stages, track two and 1.5 diplomacy, enabling human intervention in nuclear weapon launch system, commitment for No first use policy, complex interdependence etc.

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#### Introduction:-

Steadily advancements in numerous technological areas including artificial intelligence, which can be defined as the simulation of human intelligence approaches by machine, has been influencing the global order. Artificial intelligence (AI) enabled decision support systems, in military aspect, can make conventional and nuclear weapons more autonomous, accurate, efficient and lethal. It is generally associated with the ongoing deliberation on the lethal autonomous weapons system under the framework of Convention on Certain Conventional Weapons 1981<sup>i</sup> (or Inhumane weapons conventions), which aims to ban or restrict the use of specific type of weapon that inflicts unjustifiable threat to humanity. But the potential of the military use of AI to affect international peace and security, by redistributing balance of power which can increase or decrease states' sense of security, explicitly relegates it outside the ambit of CCW convention.

Assimilation of artificial intelligence with arms and ammunition can exert both stabilizing as well as destabilizing influence on strategic stability<sup>ii</sup> on the basis of nation specific or regional context. For instance, if any hegemonic state incorporates AI to modernize its nuclear arsenal, it would further diminish the nuclear deterrence status of a

relatively weaker state. In this way, strategic stability is weakened. But by contrast, it is strengthened when any weak state embraces AI to enhance its nuclear weapons system, which dismantles its all prevalent asymmetrical security concerns. But, in multilateral aspect, strategic stability becomes more complex as well as ambiguous with the introduction of AI in multilateral nuclear deterrence relations.

#### **Positive Impact:**

Strategic stability is being influenced positively, in many aspects, with the adoption of artificial intelligence in both conventional as well as nuclear weapon systems.

1. Artificial intelligence gives nuclear decision makers more situational awareness and assists them in more informed decision making in critical situation by making early warning and ISR components faster and more reliable. It is noteworthy that the ISR components broadly includes command, control, communication, computer, intelligence, surveillance and reconnaissance (C4ISR); which are used to track friendly as well as hostile forces for anticipating the possible consequences of future maneuverings.
2. By fostering the development of more survivable delivery systems including hypersonic weapons, unmanned air vehicles, and unmanned submarines, AI can increase the confidence of deterrence capability of the nuclear armed state.
3. AI based system furthers the nuclear command and control and strengthens the protection of nuclear weapons and related infrastructure against cyber attacks, physical attacks, and system failure. Its application in predictive maintenance of nuclear system can enhance nuclear safety and security by reducing the risks of malfunctions, failure and human errors.
4. AI driven early warning and ISR components can also be used by the international community to surveil nuclear weapons related developments including enhancement in the mechanism of seismic monitoring of nuclear tests and states' compliance with prevailing bilateral and multilateral nuclear arms control and disarmament regimes such as Nuclear non-Proliferation Treaty (NPT), nuclear weapons free zone treaties, and new START of 2021, etc.
5. It can be used to integrate the command and control of all weapons to make an architecture of coordinated group of heterogeneous weapons system operational which can be further revolutionized by using AI enabled speech interface for better human-machine taming in decision support system.
6. AI driven machines can be deployed for dirty and dangerous risk-full operations such as underwater demining as well as rescue missions, etc.

#### **Negative Impact:**

Despite certain stabilizing effect in global peace and security fabrics, adoption of AI by both de-jure nuclear weapons states (NWS) as well as de-facto NWS is enormously threatening the strategic stability. Stabilizing effect of AI technology in one state's security exacerbates the security dilemma of another state in complex global order, which undoubtedly and categorically culminates in eruption of new arms race. But its pace depends upon threatened country's economic condition, possible technical solutions as well as domestic and international political stance. Moreover, application of AI, which is amorphous, non-verifiable, less-controllable and enabler, in any state's nuclear weapons system dismantles other's nuclear deterrence capability based on invulnerable second strike capability; which can increase the risk of nuclear war.

Artificial intelligence based technological advancements in nuclear weapon system having the capability to destabilize nuclear deterrence relations are as follows:

- **Missile system advanced with AI :** AI based advancements in missile system has paved the way of development of autonomous hypersonic glide vehicle as well as multiple independently reentry vehicle<sup>iii</sup> (MIRV<sup>iv</sup>), etc. which have the potential to penetrate any air defense system and attack nuclear assets with even conventional warheads. Deployment of stealth UCAVs and UAVs further exacerbates this concern. Consequently, it makes the nuclear deterrence capability of a weak state insufficient to ensure the security from nuclear attack and large scale conventional war too. Such condition forces the weaker states to renounce its "no first use" policy of nuclear weapons and it can further lead to inadvertent escalation of nuclear war.
- **Cyber offensive or terrorism:** AI enabled cyber offensive or cyber terrorism can cause the left of launch operations or damage any part of other's nuclear command, control, communication and Intelligence (NC3I) system. It does not only weaken the nuclear deterrence capability of a weaker country but launch of nuclear weapons by cyber nuclear terrorists can also lead to nuclear war. These risks leaves no other options except relentless modernization of nuclear arms and ammunition and enhancement of cyber security pertaining to nuclear weapons system. Thus, ultimately new arms race destabilizing strategic stability erupts.

- **Threat detection system with AI:** Adoption of artificial intelligence in threat detection system which includes missile defense, area-denial and anti-access aircrafts, warships and submarines, and electronic counter measures etc makes it more capable. But its repercussions undermines the deterrence capability of another nations, which has been relentlessly facing security threats. It further forces that country facing security concern to embrace more survivable and less controllable platforms including hypersonic glide vehicles, UCAVs, UAVs, UUVs, SLBMs, etc instead of conventional weapons to deliver its nuclear weapons by penetrating high advanced AI enabled defense system too.
- **Remote sensing at sea:** It is noteworthy that, in an era of limitations in underwater sensor technology, SSBNs are considered ultimate deterrence mechanism because of its maximum survivability along with second strike capability. But AI driven modernization in remote sensing on underwater vehicles as well as autonomous surface has the potential to threaten any country's invulnerable second strike capability. Furthermore, even if vast area of oceans is not covered with this, use of autonomous surface and underwater remote sensing system at checkpoints threatens the securities of those nations which have deployed SSBNs. In fact, all the submarines have capability to destroy any vessel following it, but it can not do anything with amorphous system of artificial intelligence.
- **Autonomous nuclear weapon delivery:** AI enabled autonomous delivery vehicles possessing features including high pin-point accuracy, hypersonic speed, and no easy detectability become very catastrophic by reducing human control over nuclear weapons delivery. Furthermore, complete autonomous nuclear delivery system without any type of human interference in command, control, communication as well as intelligence level can be more dangerous and lead to even very devastating nuclear war too, if Patrov incident<sup>v</sup> like situation arises again in this system. It is noteworthy that, on September 26, 1983, Soviet Union's nuclear early warning system suddenly reported the launch of one intercontinental ballistic missile followed by four more ICBMs from US bases. But, then Soviet Lt. Col. Stanislav Patrov had decided to cross verify this signal before taking retaliatory measures. This cross verification found the error in Soviet nuclear early warning system rather than any US nuclear missile launch in reality. Thus this human interference had prevented a possible catastrophic nuclear war amid cold war antagonism between two highly nuclear armed states. It could happen not only due to human intervention but also because of available time to take decision reasonably. But if it happens with autonomous delivery system, without any human interference, counter nuclear retaliations would be carried out promptly without any contemplation of consequences. Moreover, if human interference is also enabled in the advanced nuclear delivery system, lack of adequate time, due to hypersonic revolution in missile technology, to verify any early nuclear warning signal from other sources would force the human too to take retaliatory measures suddenly and imprudently.
- **Nuclear proliferation:** Artificial Intelligence based advancement in nuclear weapons system, in which more human intervention is not required, makes transfer and operability of autonomous nuclear weapons systems from one nuclear armed states to other states very easy and feasible. In this process host nation would not require much technical expertise, mere deployment of such autonomous nuclear weapon system would work with the risk of escalation of nuclear war due to further possibility of Patrov incident like situation. Moreover, advancement of the artificial intelligence in missile technology increases the risk for security of nuclear arms and ammunitions. That can force all countries for further modernization and vertical proliferation of nuclear weapons to maximum possible extent. Thus, nuclear armed states are forced to embrace policy of maximum deterrence instead of credible minimum deterrence.

#### **Mitigation of destabilizing effect of AI on strategic stability:**

For enhancement of global peace and security, mitigation of the destabilizing effect of AI on strategic stability is prerequisite. It is noteworthy that the unilaterally implemented technical, confidence building as well as policy measures such as preventing the adoption of AI technology inflicting security dilemma over other states can reduce the risk. But bilateral as well as multilaterally agreed confidence building measures can facilitate, by building trust among stakeholders, more reliable crisis management. Effective implementation of the legally binding international treaties such as NPT which prevents further horizontal proliferation of nuclear weapons and makes obligation of all NWS to denuclearize itself as soon as possible, nuclear weapons free zone treaties, and treaty on the prohibition of nuclear weapons 2017, etc and soft laws including expected obligations of states under missile technology control regime (MTCR), nuclear suppliers group (NSG), and political declarations or international code of conducts like Hague code of conduct (HCOC) against ballistic missile proliferation aiming to globally curb ballistic missile proliferation as well as supplementing MTCR etc promote nuclear and missile non-proliferation. Similarly, creation of unanimously accepted, international code of conduct for military use of AI in line with 1949 Geneva convention creating a framework for military operations as well as Universal declaration of Human rights (1948) etc would be

instrumental to get rid of negative impact of AI in strategic stability. It is noteworthy that Geneva convention stipulates that weapons and methods of warfare must not inflict superfluous devastation (article- 35) and during military operations, civilian population and objects must be cared constantly (article-57).

Furthermore, relevant, efficient and feasible deliberation on risk reduction at regional groupings such as NATO-Russia council, US-Russia dialogue on strategic stability, ASEAN regional forum's intersessional meeting on non-proliferation and disarmament, Organization for security and cooperation in Europe (OSCE), the conference on interaction and confidence building measures in Asia (CICA), Shanghai cooperation organization, etc. would be instrumental to consensus building, cooperation and joint actions leading to dismantle the AI based security dilemma, challenge to nuclear deterrence and subsequent capability race of nuclear arms. It can be furthered with the related discussion simultaneously on review conferences of NPT, conference on disarmament (CD), UN disarmament commission, as well as first committee of the UN general assembly too.

Early warning system must be detached from command, control and communication system for nuclear weapon launch by embracing human interferences between these two. In fact, humans would be ultimate interpreter of the signals given by early warning system. Multiple systems for cross verifications of any signal of early warning system should be developed in order to cope with the very short span of time availability due to AI revolution in missile technology etc for decision making for retaliations by human operators. Human machine interface must be designed in such a way that would provide human decision makers adequate situational awareness by reducing the risk of automation biases or under-trust problem.

Commitment for "No First Use" policy and lowering the alert status of even AI driven nuclear weapons system accompanied by transparency as well as information sharing have the potential to abolish the security dilemma and maintain the strategic stability. Which would be further enhanced with the military to military and scientific cooperation among States which can be affected from any advancements of AI in nuclear weapon system of any single country.

Furthermore, expert dialogues such as US-China Track-1.5 nuclear dialogue<sup>vi</sup>, Track-2 dialogue on limiting non-strategic nuclear weapons between US and Russia, Track-1.5 meeting for substantive advancements of nuclear disarmament (2020) convened in Japan<sup>vii</sup>, and Dialogue series, being convened by American academy of Arts and Science in partnership with the Pugwash conference on science and technology, among experts of USA, Russia and China to explore the area of cooperation in nuclear arms control must also focus on possible solution for getting rid of destabilizing effect of AI on strategic stability. Moreover, complex interdependence should be established to the maximum possible extent, it would promote the pacific settlement of disputes instead of war and nuclear catastrophe.

Thus, artificial intelligence is double edge technology possessing the potential to inflict stabilizing as well as destabilizing effect on strategic stability. But by getting rid of destabilizing effect of it on nuclear weapon system, long-lasting global peace and stability can be established.

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