WORKSHOP ON 'ARTIFICIAL INTELLIGENCE FOR FUTURE FLEET'

09 - 11 AUG 23

1. Artificial Intelligence has propelled significant economic development in the last few decades, and more progress is envisaged in the near future due to higher levels of investments and experts employed in the field. Defence forces around the world are making significant investments to stay ahead in the adoption of AI. In order to successfully adopt AI technologies at an organisational level, Indian Navy has to overcome certain key challenges viz. mitigation of AI talent gap, identification and development of suitable use cases, etc.

2. In order to achieve Navy-wide adoption of AI technologies, there exists a requirement for building AI awareness in the Navy through conduct of various workshops, seminars etc. The Centre of Excellence (CoE) for Artificial Intelligence and Big Data at Valsura, has been instrumental in progress of pilot projects pertaining to adoption of AI and BDA in various domains. As part of initiatives on proliferation of AI/ BDA technologies in Indian Navy, Valsura had conducted the following workshops on AI: -

(a) The maiden AI Workshop was conducted from 27-30 Nov 19. Distinguished speakers from DRDO, IIT (GN), Nirma University, DAICT along with speakers from various industries viz. Microsoft, Capegemini, Deloitte, and IBM had enlightened the participants of the workshop with latest emerging trends in the field of AI.

(b) A Three-day Workshop on *'Artificial Intelligence (AI) for Data Driven Navy*' from 07 - 09 Oct 20 was conducted wherein eminent speakers from Harvard University, Georgia Institute of Technology, IIT Bombay, IIT Hyderabad, DRDO and also from various industries viz. Amazon, Capegemini, Deloitte, E-Mudhra and IBM had enriched the Workshop by presenting the latest trends and applications of AI in the armed forces.

(c) The unit had conducted an AI workshop from 19 - 21 Jan 22 on the theme titled '*Leveraging AI for IN'* with online participation from service personnel, academia and industry. The workshop included presentations by esteemed speakers from renowned IT companies (viz. Google, IBM, Infosys, TCS, Wadhwani AI and Applied AI) who provided an industry perspective on AI and its application in the Navy.

(d) Continuing with the initiative, the unit also conducted a three day workshop on the theme titled ***'****Emerging AI Technologies for decision making*

in Maritime Domain' in hybrid mode from 16-18 Nov 22. The workshop included eminent leaders from industry viz. Google, Nvidia, TCS and prominent speakers from Academia viz MIT, IIT Bombay and Nirma University.

3. To further promote and accelerate the objectives of building AI awareness in the Navy, it is intended to conduct the fifth edition of AI workshop at INS Valsura from 09-11 Aug 23 in hybrid mode, with onsite as well as online participation from service personnel, academia and industry.

Call for Papers

4. The theme of the workshop is '**Artificial Intelligence for Future Fleet*'***. Papers are invited from academia, Officers (both serving & retired) and industry experts on the following sub themes: -

(a) Application of AI in Naval Operations (**Appendix 'A'** refers).

(b) Pervasive AI and Embedded AI for Defence Systems (**Appendix 'B'** refers).

(c) Trust and Ethics of AI in Defence Domain (**Appendix 'C'** refers).

5. **Selection of Papers**. The Papers would be examined by an expert panel and best papers in each theme category would be presented by the authors during the workshop. Further, selected papers would be published in a compendium over NUD for wider dissemination. Authors of selected papers will be intimated post scrutiny of papers.

6. **Instructions for Authors**. Papers (3000 - 5000 words) along with author's bio-data and passport size photo and author's certificate as per the submission guidelines placed at **Appendix 'D'** are to be forwarded by post and e-mail at *oicits.valsura@navy.gov.in* by 25 Jul 23.

7. **Registration**. Registration is free of cost, and registration link will become active on 23 Jul 23 on internet website of INS Valsura under https://indiannavy.nic.in/ and on intranet site (for *IN* personnel) in Naval Unified Domain (NUD). The workshop will be conducted at INS Valsura and proceedings of the workshop would be live streamed through Zoho/ Webex/ MS Teams to enable wider participation in the workshop. Participants registered through website would receive the links to workshop on their registered mail IDs one day prior to the event.

8. **Contact Details**.

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Appendix 'A'
(Para 4 refers)

SUB THEME 1: APPLICATION OF AI IN NAVAL OPERATIONS

1. The potential of Artificial Intelligence (AI) in Naval Operations has captured the attention of strategists all around the world. The hostile, unpredictable, and complex nature of the marine environment make Naval Operations an area more amenable to AI use than any other military branch. While AI based machines may never be able to completely replace human naval commanders and traditional navy ships, research indicates that, these intelligent machines have improved the effectiveness of manned operations multi-fold. Future advancements in these technologies could provide fully autonomous systems with the ability to conduct missions with minimal human interventions. The application of AI in naval operations and its impact on maritime security missions are to be examined in this study.

2. Artificial intelligence (AI) has numerous applications in naval operations, revolutionizing various aspects of maritime defense and enhancing operational capabilities. Some key applications of AI in naval operations include Autonomous systems, situational awareness, decision support systems, mission planning and optimisations etc. By leveraging AI capabilities, naval forces can enhance operational effectiveness, reduce risks, and adapt to the challenges of modern maritime defense.

3. In order to explore the feasibility of leveraging AI towards enhancing the effectiveness of Naval Operations the following areas have been identified as an indicative list for the authors, but not limited to: -

(a) Insights into how AI systems can be used for mission planning and optimisation.

(b) Insights into utility of AI systems for building decision support systems for high threat scenarios.

(c) Use of AI to analyze sensor data to identify and classify targets, distinguishing between friendly and hostile vessels, aircraft, or submarines.

(d) Technology scan for recent developments in AI which aligns with potential use cases of Naval Operations.

4. We request participants to delve into the various facets of AI in the context of Naval Operations.

Appendix 'B'
(Para 4 refers)

SUB THEME 2: PERVASIVE AI AND EMBEDDED AI FOR DEFENCE SYSTEMS

1. A wide range of intelligent gadgets have emerged in the recent past that does not require a connection to the cloud or high computing devices over the internet for state of the art analytics using artificial intelligence (AI). These devices with embedded AI are able to recognise and respond to sights, sounds, and other patterns and enhance user experience through AI. This ultimately leads to better efficiency and effectiveness at the organisational level.

2. The age of pervasive intelligence will be marked by a proliferation of AI-powered smart devices and machines that will learn from experiences, adapt to changing situations, and predict outcomes. Some devices may predict the requirements of the user and even work with other devices. These smart gadgets doesn't need internet access and won't experience the delay associated with sending data to the cloud for processing since AI is integrated into the system rather than restricted to the cloud. This will make it possible for apps that need a quick reaction and reliable performance even when connection is weak or non-existent.

3. In the context of defence systems, embedded AI plays a critical role in revolutionizing military capabilities and strategies. Embedded AI technologies can be integrated into various defense systems, including unmanned aerial vehicles (UAVs), surveillance systems, battlefield management systems, maritime systems and autonomous weapons platforms, to enhance situational awareness, decision-making, and operational effectiveness. Embedded AI can also transform the maritime domain by improving navigation, optimizing operations, enhancing safety and security, and enabling autonomous capabilities.

4. Possible areas to further explore are as follows: -

   (a) Various challenges/ use cases in developing the capabilities and technologies required to embed AI processing and achieve tactical edge.

   (b) Need for system miniaturization and new military-grade packaging.

   (c) AI moving out of the confinements of the data centre and becoming embedded in all types of platforms, including those used in the military.

5. We request participants to delve into the various facets in the context of Military and Maritime Domain.

Appendix 'C'
(Para 4 refers)

SUB THEME 3: TRUST AND ETHICS OF AI IN DEFENCE DOMAIN

1. Big data, artificial intelligence, and machine learning are some of today's most cutting-edge technologies, and they will most certainly dominate for the next few decades and beyond. Most experts think that breakthroughs in AI will affect our lives more than any technology since the discovery of electricity. However, there is a lot of controversy surrounding the usage of AI. The general public is sceptical about today's robots and autonomous devices equipped with AI controlling our lives. When it comes to AI's use in the military, these worries further attract traction and significance. There has been widespread concern that the militaries may lose control of its unmanned systems, particularly its armed unmanned systems.

2. Furthermore, and perhaps more importantly, because the speed of warfare today frequently exceeds the ability of the human brain to make the right decision, the World militaries requires big data, artificial intelligence, and machine learning to give its war fighters an advantage in combat, particularly in the area of decision making. The militaries of the world, has had a number of instances where decision-makers did not have the right information at the right time. Due to the fact that each country has different use cases, security environments, and levels of public trust, national military AI policies and principles must be developed by the local context and input from several stakeholders. The military has legitimate non-technical problems that need to be solved rather than having tech solutions forced upon them, even while the larger strategic context is crucial.

3. Possible areas to further explore under this sub theme are as follows: -

   (a) Insights into improving trust by collaborating with various stakeholders from the development stage itself.

   (b) Discussions on various use cases of AI in militaries which are having significant danger/ rumoured to pose threat to humans.

   (c) Possibilities of red teaming the technology to detect trust issues of the AI models.

4. We request authors to delve into areas not limited to above in the context of military/ maritime applications.

Appendix 'D'
(Para 6 refers)

SUBMISSION GUIDELINES

Authors are requested to follow the guidelines given below: -

1. The paper should be composed in 12 point Arial single spaced font for the main body of the text, and 10.5 point Arial single spaced font for footnotes using MS Word 2003 and above. The tentative length of the paper should be 3000 – 5000 words (excluding footnotes, acknowledgements, title and sub title). Use footnotes at the end of each page.

2. An abstract of about 200-300 words should be included to describe the main argument and the conclusions of the paper. The abstract should not contain footnote references.

3. The first sheet should carry details of the author's bio data (a brief resume of about 200 words), institutional affiliation, a passport-size photograph and the mailing and email address.

4. All diagrams, charts and graphs should be referred to as Figures and consecutively numbered (Fig.1, Fig.2, and so on). Tables should carry only essential data and should complement the text rather than repeat what has already been said. They should carry a short title, be numbered (Table 1) and carry the source at the bottom.

5. Each table must be referenced in the text. If actual statements or phrases are taken from another paper, the name of the author should be mentioned in the text and the chosen material should be placed within quotation marks with an appropriate reference. Alternatively, if another author's views are to be summarised, use the formulations: 'The views of xyz are summarized'; give a crisp summary. It is a good practice to reference sources of information extensively and effectively.

6. Author's acknowledgments(s) may be included at the end of the paper and before References/ Endnotes begin.

7. The paper should have sub-headings to make it more reader-friendly.

8. References/ Endnotes should be sequentially numbered.

9. The authors are responsible for accuracy of the reference.

10. If the same reference is to be cited after a few other references/ citations, write the name of the author followed by the citation number e.g.: Ram Kumar no.16.

11. Any submission not conforming to the above requirements is incomplete and is liable to be rejected by the Review Board.

12. By submitting the paper, the author agrees that '*INS Valsura reserves the rights to publish, re-publish the paper with due credits to the author(s*)'.

13. A Certificate of Authenticity, countersigned by the author, with the following details should accompany the paper: -

> *"The paper is the original effort of (author's name, rank, personal number) and the undersigned hereby attest that all material (tables, figures, diagrams, arguments) from primary and secondary sources has been duly cited. The paper bears no Plagiarism in any form. The paper has not been sent to any other publication and has not appeared in print or electronic medium before. The text of the paper does not contain any material above Unclassified."*