WORKSHOP ON 'LEVERAGING AI FOR IN'

19 - 21 Jan 22

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 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 a three-day webinar on *'Artificial Intelligence (AI) for Data Driven Navy'* from 07 - 09 Oct 20. Eminent speakers from Harvard University, Georgia Institute of Technology, IIT Bombay, IIT Hyderabad, DRDO and also from various industries viz. Amazon, Capegemini, Deloitte, Jio and IBM had enriched the webinar by presenting the latest trends and applications of AI in the armed forces. AI webinar has provided an opportunity for the Naval Community to interact with the subject matter experts and to broaden the AI awareness from top level decision makers to end users.

3.   To promote and accelerate the objectives of building AI awareness in the Navy, it is intended to conduct the workshop from 19 - 21 Jan 22 with online participation from service personnel, academia and industry.

Call for Papers

4.   The theme of the workshop is '***Leveraging AI for IN***". Papers are invited from academia, Officers (both serving & retired) and industry experts on the following sub themes (write-up on the subthemes placed at enclosures): -

    (a)   **Sub Theme 1**. Building blocks for AI Innovation (Appendix 'A' refers).

    (b)   **Sub Theme 2**. Applied AI for Naval Applications (Appendix 'B' refers).

    (c)   **Sub Theme 3**. Cyber Risks & Vulnerabilities, Bias in AI (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 03 Jan 22.

7.   **Registration**. Registration is free of cost, and registration link will become active on 20 Dec 21 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 to enable wider participation in the workshop. Registered participants would receive the links to workshop on their registered mail IDs one day prior to the event.

8.   **Contact Details**.

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SUB THEME 1: BUILDING BLOCKS FOR AI INNOVATION

1.   The last three decades have seen an exponential progress in the field of Artificial Intelligence and Big Data. Terminologies such as Neural Networks, Deep Learning, Reinforcement Learning, Natural Language Processing, etc that were largely considered to be lingua franca of elite few, have today become common parlance.

2.   The range of topics and the opinions expressed on the Artificial Intelligence (AI) are so broad that clarity is needed on the central tenets, the opportunities AI presents, and the challenges it poses. It is imperative to understand these facets to identify the potential areas of application in order to prevent pitfalls of not having a cohesive long term AI strategic vision. Towards this, following areas have been identified to be explored further: -

        (a)   Insights into basics such as structured data, unstructured data, data cleaning, knowledge base, value added information outputs etc.

        (b)   Innovations in the AI enabled products that improves organisational offerings.

        (c)   Innovations in the AI enabled processes that improves organisational competency and operations.

        (d)   Transition from opportunistic and tactical AI decision-making to a more strategic orientation.

        (e)   Availability of robust and reliable technology infrastructure and most importantly the data value chain – from data capturing to cleaning, storage, governance, security, analysis, and dissemination of results – all in close to real time.

        (f)   Identifying areas where AI allows for improvements that far surpasses human capabilities.

3.   The authors may provide an overview of basic building blocks towards identifying opportunities and threats, providing valuable background and structure to important strategic decisions.

SUB THEME 2: APPLIED AI FOR NAVAL APPLICATIONS

1.   The impact of Artificial Intelligence (AI) is so extensive that any operations bereft of accompanying technological jump is sure to miss the scientific evolution of the future. AI and its limitless application in Naval operations has grabbed the imagination of strategic planners worldwide. The applicability of AI to Naval operations surpasses its usage in any other military domain due to the hostility, unpredictability and sheer size of the ocean environment.

2.   While these systems and vehicles would never be equivalent replacement for humans and traditional Naval vessels, evidence suggests that wherever these intelligent systems have been deployed, they have made existing manned operations more effective. Future innovations in such technology might lead to completely autonomous systems with lethal capabilities.

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

(a)   AI based decision support system that can correlate with other sensors and help estimate the risks and benefits of certain combat manoeuvres, even suggesting moves not considered by vessel's captain.

(b)   Augmenting Naval operations with support from decision making process by intelligently processing multiple sources of information, whilst cueing systems to assess and confirm potential threats.

(c)   Application of AI in Unmanned Naval Vehicles can extend from general navigations support to fully autonomous vehicles. These vessels or vehicles have become key part of naval operations of modern Navies around the world and are commonly deployed in non-lethal roles alongside conventional vessels.

(d)   The Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4SIR) oriented system can have single ecosystem that presents a seamless operating picture to the command team and assist them in decision making.

4.   We request participants to delve into the various facets of Maritime Domain that can be augmented by application of Artificial Intelligence, and submit papers on application of AI on any pertinent use cases, not restricted to above.

SUB THEME 3: CYBER RISKS & VULNERABILITIES, BIAS IN AI

1.   Artificial Intelligence (AI) and Machine Learning (ML) bring new vulnerabilities along with their benefits. Security is always at the vanguard whenever we start adopting a new technology. Same is the case with adoption of AI technology in various business processes in Navy. AI and ML offer all the same opportunities for vulnerabilities and misconfigurations as earlier technology advances, but they also have unique risks.

2.   AI and ML require more data, and more complex data, than other technologies. The volume and processing requirements mean that cloud platforms or central remote servers often handle the workloads, adding another level of complexity and vulnerability. According to a recent survey[1], adopters see cybersecurity risks as a major or extreme concern, but only 39% said they are prepared to address those risks. With advances in Embedded AI and implementation of AI models on graphics processing units (GPUs), session border controllers (SBC) and System on Chips (SoC), there is less of a dependence on the cloud for AI data processing. However, it compounded the problem space by opening new arena of risks and vulnerabilities for adversaries.

3.   Another major problem in AI technology is the Bias. Upbringing, experiences and culture shape people, and they internalise certain assumptions about the work around them accordingly. AI is the same. It is built out of algorithms devised and tweaked by those same people – and it tends to 'think' the way it's been taught. Bias could be algorithmic, which might be induced by the implementers, or it could be from the imbalanced data on which the AI algorithms are trained on.

4.   We request authors to delve into these potential areas of cyber risks, vulnerabilities and bias of AI and ML application in military.

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[1] Deloitte Survey – *Thriving in the era of pervasive AI – Jul 2020*

<u>SUBMISSION GUIDELINES</u>

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 2000 – 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."*