फरवरी
February
2025

खंड/Vol. : 50 अंक/Issue : 37

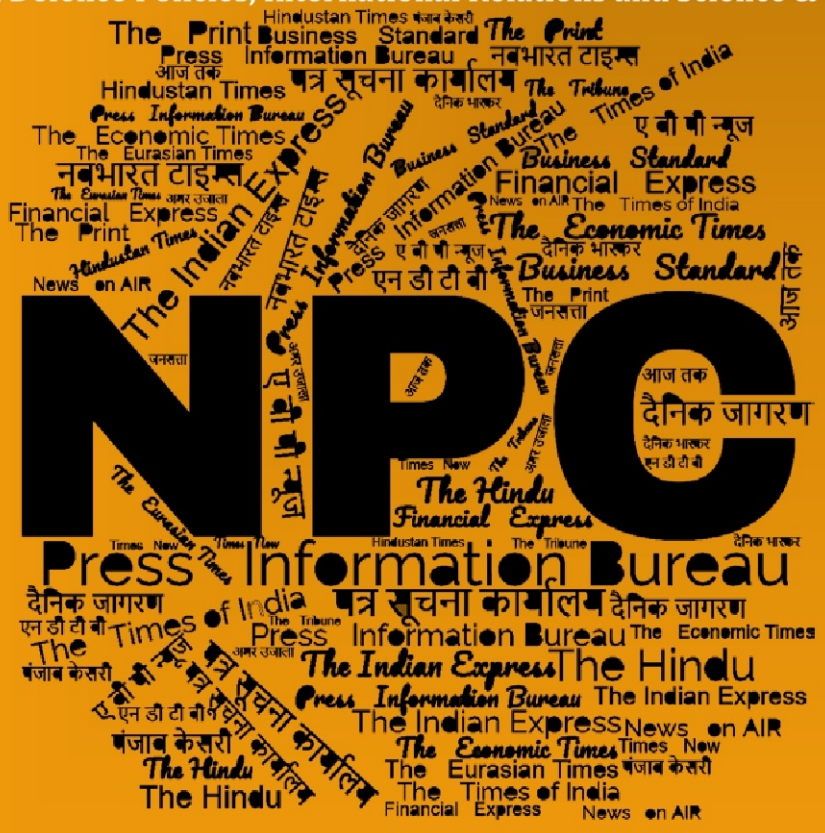
21/02/2025

समाचार पत्रों से चयनित अंश

Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology



रक्षा विज्ञान पुस्तकालय
Defence Science Library
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र
Defence Scientific Information & Documentation Centre
मेटकॉफ हाउस, दिल्ली - 110 054
Metcalfe House, Delhi - 110 054

CONTENTS

Defence News

Defence Strategic: National/International

Ministry of Defence signs ₹697.35 Cr contracts with ACE Ltd & JCB India Ltd for procurement of 1868 Rough Terrain Fork Lift Truck for Armed Forces

Source: Press Information Bureau, Dt. 20 Feb 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2104951

The Ministry of Defence has signed contracts with M/s ACE Limited and M/s JCB India Limited in presence of Defence Secretary Shri R K Singh for procurement of quantity 1868 Rough Terrain Fork Lift Truck (RTFLT) at a total cost of ₹697.35 crore for Indian Army, Indian Airforce and Indian Navy.

Rough Terrain Fork Lift Truck (RTFLT) is a critical equipment which will assist in various combat and logistics support tasks by avoiding manual handling of enormous number of stores and thus enhancing the operational effectiveness of Indian Army, Indian Air Force and Indian Navy.

The present case being a Buy (Indian) case will enhance national defence equipment manufacturing capabilities. This project has immense potential of direct and indirect employment generation by encouraging MSME sector through component's manufacturing. The procurement marks a pivotal step towards modernising India's defence infrastructure and empowering indigenous industries, which will be a proud flag-bearer of 'Aatmnirbhar Bharat'.

*

Ministry of Defence inks a contract worth ₹1220.12 Cr with Bharat Electronics Limited for procurement of 149 Software Defined Radios for Indian Coast Guard

Source: Press Information Bureau, Dt. 20 Feb 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2104928

The Ministry of Defence has signed a contract with M/s Bharat Electronics Limited (BEL), Bengaluru on 20th February, 2025, for procurement of 149 Software Defined Radios for Indian Coast Guard at a total cost of ₹1220.12 Cr under Buy (Indian-IDDM) category.

These state-of-the-art radios will enable secure and reliable information sharing, collaboration, and situational awareness through high-speed data and secure voice communication. This will strengthen the Indian Coast Guard's capability to fulfil its core responsibilities, including maritime law enforcement, search and rescue operations, fisheries protection, and marine environment protection. Additionally, these radios will enhance interoperability for joint operations with the Indian Navy.

The project is a strategic step toward bolstering the Coast Guard's operational capabilities and supporting the Government of India's Blue Economy objectives by reinforcing maritime security. Aligning with the Atmanirbhar Bharat initiative, the contract will enhance the country's manufacturing capabilities for advanced military-grade communication systems, generating employment opportunities and fostering expertise development.

*

Steel Cutting Of Third Fleet Support Ship For Indian Navy

Source: Press Information Bureau, Dt. 20 Feb 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2105099

QSteel Cutting ceremony of third of the five Fleet Support Ships (FSS) was held at M/s L&T Shipyard, Kattupalli on 20 Feb 25, in the presence of R Adm Satish Shenai, Flag Officer Commanding Tamil Nadu and Puducherry Naval Area and senior officials from Indian Navy, Hindustan Ship Yard Limited (HSL) and M/s L&T. The Indian Navy had signed a contract with HSL for acquisition of Five Fleet Support Ships (FSS) in Aug 2023, with delivery commencing mid-2027. Showcasing the strength of Public - Private partnership, HSL has contracted part construction of two FSS to M/s L&T Shipyard, Kattupalli to effectively utilise country's shipbuilding capacity and meet stringent timelines for delivery.

On induction, the FSS will bolster the Blue Water capabilities of the Indian Navy through replenishment of Fleet ships at sea. These ships, with a displacement of more than 40,000 tons, will carry fuel, water, ammunition and stores enabling prolonged operations without returning to harbour, thus enhancing the Fleet's extended reach and mobility. In their secondary role, these ships would be equipped for Humanitarian Aid and Disaster Relief (HADR) operations for evacuation of personnel and expeditious delivery of relief material during natural calamities.

With a completely indigenous design and sourcing of the majority of equipment from indigenous manufacturers, this project will boost the Indian Shipbuilding Industry and is in consonance with GoI initiatives of Aatmanirbhar Bharat, Make in India and Make for the World.

*

Govt plans shift to tri-services expo for indigenous tech

Source: The Economic Times, Dt. 20 Feb 2025,
URL: https://economictimes.indiatimes.com/news/defence/govt-plans-shift-to-tri-services-expo-for-indigenous-tech/articleshow/118397296.cms

The government is working on institutionalising a new defence industry exposition that will showcase indigenous technologies and will be the annual flagship event to promote exports and encourage business partnerships.

The mega industry event is likely to focus on land, air and naval systems, with the new concept doing away with the earlier practice of conducting a separate aerospace show under the AeroIndia brand. This year's edition of AeroIndia is likely to have been the last, sources said, adding that a consolidated show will make it easier for all stakeholders to attend and focus on business.

As per the current practice, India has been conducting two defence industry shows in alternate years, under the DefExpo and AeroIndia brands. While DefExpo has been conducted in several venues across the country, including Goa, Lucknow and Gandhinagar, AeroIndia has been held in Bengaluru.

However, given the limited space available at the Yelahanka air base in Bengaluru where the show is hosted, as well as difficulties in managing the traffic flow around the large-scale event, AeroIndia has been facing technical challenges.

This year, for example, some defence companies could not find adequate space to set up stalls to showcase their latest innovations. Despite the show area being expanded, space has been limited as Yelahanka has constraints, given that it is an operational air base.

Also, despite the show being hosted in Bengaluru for years, no permanent structures or facilities have been set up to meet the requirements of conducting a show of international standards. Another big issue has been traffic constraints as Yelahanka is located on the main road between Bengaluru city and the airport.

*

India made Sniper rifle trumps American in police commando competition

Source: The Print, Dt. 21 Feb 2025,
URL: https://theprint.in/defence/india-made-sniper-rifle-trumps-american-in-police-commando-competition/2504645/

The National Security Guard (NSG) Thursday won the All India Police Commando Competition in the sniper category, beating the commando wings of the central armed police forces and that of the states.

Moreover, a major milestone was achieved, ThePrint has learnt. The NSG fired a .338 Saber sniper rifle, made by Bengaluru-based firm SSS Defence.

.338 Saber sniper rifle, made by Bengaluru-based firm SSS Defence

Competing with the top sniper rifles from across the world in service with the Commando forces in the country, the .338 Saber managed to not only hit the target with perfect accuracy but also excelled all other parameters in the sniping competition.

It is learnt that the second position was won by Force One of the Maharashtra Police which was using the formidable American sniper rifle Barrett 50 Cal, which is known as the world's best and is in use with the American Special Forces and the Indian Army which had gone in for limited numbers to shore up capabilities at the Line of Control (LoC).

The Force One won the competition last year.

The Saber.338 is the only indigenously designed and manufactured sniper rifle in the most reputed of sniper calibers—.338 Lapua Magnum

It has an effective range of about 1,500 metres with an accuracy of sub 1 Minute of Angle MoA (an MoA is a group size of 3 cm x 3 cm at 100 metres).

The rifle comes with a 27-inch match barrel (made in India), monolithic chassis with 2 stage trigger, suppressor compatible with the suppressor designed and made in India.

The NSG also has a Barrett MRAD sniper but chose to go ahead with the one by SSS Defence.

Interestingly, a foreign country has already bought the snipers from SSS Defence and also placed a follow-on order, as reported by ThePrint earlier.

This was the first time India, which has been importing small arms for years to equip its defence and police forces, exported a rifle to another country.

*

AI now assists China's Air Force in picking fighter pilots. How will this give PLAAF an edge in aerial warfare?

Source: The Week, Dt. 20 Feb 2025,
URL: https://www.theweek.in/news/defence/2025/02/20/ai-now-assists-chinas-air-force-in-picking-fighter-pilots-how-will-this-give-plaaf-an-edge-in-aerial-warfare.html

In an attempt to ensure extreme precision in the pilot recruitment process, the Chinese People's Liberation Army (PLA) Air Force has incorporated highly advanced technologies, including artificial intelligence (AI) in the selection process.

AI tools are already part of military recruitment processes in countries like the US and the UK.

According to China Central Television (CCTV), the final phase of the selection consists of medical and psychological evaluations, designed to offer a comprehensive prediction and assessment of a candidate's long-term health and their ability to adapt to human-machine interactions.

Modem fighter jets, equipped with advanced weapon systems, operate at high speeds and with extreme manoeuvrability, causing great physical stress and cognitive overload to pilots. Apart from the physical strain, there is also the pressure to manage complex systems, including weapons and communication systems, while maintaining heightened situational awareness. All these necessitate

that the pilots chosen are up for highly stressful job. AI-enabled evaluation ensures that only those who are up for the job get selected.

The pilot selection process of 2025 has incorporated advanced technologies and equipment, such as contract-free 3D body morphology measurement, AI-assisted interview decision-making systems and wearable dynamic electrocardiogram monitoring.

“AI now plays a crucial role in interpreting candidates’ biological signals, revealing underlying health risks that might not be immediately apparent to human evaluators,” the CCTV report said.

The report said the AI systems act as a precise evaluator, data analyst and bridge for human-machine collaboration by interpreting the physical signals, bringing in a “data intelligence plus human insight” element to the entire selection process.

This "enables a more accurate, comprehensive approach to selecting future pilots, creating a ‘dual-engine’ selection model that blends data intelligence with personal insight," Zhang Yishuang, an expert on PLA Air Force recruitment, has been quoted as saying by CCTV.

“Under the guidance of AI, the selected candidates are expected to become more capable pilots,” Global Times quoted Chinese military analyst Song Zhongping as saying.

*

AI-powered defence innovations unveiled at IDEX 2025

Source: ANI News, Dt. 20 Feb 2025,
URL: https://www.aninews.in/news/world/middle-east/ai-powered-defence-innovations-unveiled-at-idex-20252025022015041 6/

The International Defence Exhibition (IDEX) 2025 spotlighted cutting-edge AI-driven technologies redefining modern warfare. Defence firms unveiled advanced systems designed to enhance targeting precision and communication efficiency, equipping armed forces with smarter tools to address evolving challenges.

Peter Ayre, Vice President of Business Development EMEA at Genasys, introduced LRAD, a next-generation long-range audible device capable of transmitting voice commands up to 5,000 metres. This innovation enables seamless communication with individuals lacking traditional radio or mobile access, making it a vital asset in military operations.

AI is at the core of LRAD, analysing environmental data to identify targets and optimise sound transmission. Machine learning allows the system to adapt to operational conditions, ensuring superior audio clarity. Widely adopted in naval operations, the device is mounted on warships for long-distance communication and integrates with Ethernet networks for remote control and smart connectivity.

Asad Kamal, CEO of Global Industrial Defence Solutions (GIDS), a state-owned Pakistani defence conglomerate, showcased the company's latest long-range defence solutions, including air-launched cruise missiles with a 290-kilometre range and a Multiple Launch Rocket System (MLRS) boasting a 140-kilometre reach with pinpoint accuracy.

The company is advancing naval cruise missile technology using AI and topographic mapping for precision targeting in maritime missions. Kamal also highlighted the "Shahpar-III" drone, which employs AI for enhanced targeting and combat data analysis. It is capable of flying 35,000 feet into the air and can carry a payload of 500 kilogrammes, including up to eight weapons.

In loitering munitions, AI-powered drones are designed to identify and track moving targets, such as soldiers and armoured vehicles, by processing real-time data. Equipped with advanced optics, these drones distinguish between friend and foe, detect potential threats, and execute high-precision strikes with minimal collateral damage.

Richard Hecht, Marketing Director at CONTROP Precision Technologies Ltd, said the company develops and manufactures electro-optical, precision motion control systems for surveillance, defence, para-military and homeland security missions.

These AI-powered systems provide high-resolution imagery in all lighting conditions and can track and identify objects--whether personnel, vehicles, or aircraft--while compensating for harsh weather conditions. By integrating AI analytics, they deliver precise target tracking and improved situational awareness for military forces.

*

China conducts nuclear, bio and chemical attack drills using drones, robot-dogs

Source: Firstpost, Dt. 20 Feb 2025,
URL: https://www.firstpost.com/world/china-conducts-nuclear-bio-and-chemical-attack-drills-using-drones-robot-dogs-13865182.html

The Chinese military recently conducted nuclear, biological and chemical (NBC) drills, involving UAVs, robotic dogs and explosive ordnance disposal robots. The country’s state-backed media reported Thursday (February 20) that the drill featured the deployment of robots as well as drones.

The People’s Liberation Army’s 73rd Group Army conducted the drills; however, the location of the exercise was not revealed in state media.

The exercises were conducted on a multi-role intelligent training field, with a system in place integrating technology and conventional modus operandi.

Qi Huali, a member of the brigade, was quoted by official media as saying, “Be it the advancement of simulation training or the wide deployment of unmanned equipment, both create new competitive avenues for us.”

“Simulation training enhances the coordination among various combat elements, and we have improved and optimised the integration of manned and unmanned tactics and then applied the best combat strategies to exercises for validation,” Qi added.

Usage of unmanned equipment on rise

A Chinese military expert was quoted by Chinese media as saying that Beijing was doubling down on the usage of robots and unmanned equipment, as it leads to reduced human loss and human dependence.

“Drones have significant capabilities, as they can reduce human casualties and increase the effectiveness of combat equipment,” said Song Zhongping.

The usage of AI in military affairs is also a key factor, added the expert. He said the PLA was focusing on the integration of Artificial intelligence (AI) and “intelligentisation”.

He stated that the AI and other emerging technologies will be incorporated into military equipment in coming years.

PLA introduces AI-powered screening

Earlier, government broadcaster CCTV reported on Wednesday (February 19) that the PLA has begun using AI to assess the biological signals of pilot candidates to determine long-term health risks and human-machine adaptability.

“AI now plays a crucial role in interpreting candidates’ biological signals, revealing underlying health risks that might not be immediately apparent to human evaluators,” the report said. “This data-driven approach allows the air force to predict long-term risks, ultimately ensuring that only the most suitable candidates are chosen.”

The PLA as of now conducts over 100 tests to assess a candidate’s ability to adapt to technology and health prospects.

*

Indian Army Scrambles To Shield Its Tanks From Drones & Top-Attack ATGMs; Trophy APS In Contention!

Source: The EurAsian Times Dt. 20 Feb 2025,
URL: https://www.eurasiantimes.com/indian-army-wakes-up-to-drone-threats-scrambles/

India’s Larsen & Toubro (L&T) announced in a February 15, 2025 press release that it has signed a Memorandum of Understanding (MoU) with Israel’s Rafael Advanced Defense Systems during Aero India 2025. The partnership aims to jointly offer and locally manufacture the Trophy Active Protection System (APS) for Indian defense platforms.

According to Arun Ramchandani, Senior Vice President and Head of L&T Precision Engineering & Systems, the partnership will make available a customized variant of the latest version of the Trophy APS for both current and future combat platforms to be inducted into the Indian Armed Forces.

Trophy APS

Rafael's Trophy APS is designed to protect armored vehicles from a wide range of threats, including anti-tank guided missiles (ATGMs), rocket-propelled grenades (RPGs), drones, and top-attack missiles such as Javelin and NLAW. The Trophy system features four ELTA EL/M-2133 F/G band radar antennas providing 360-degree coverage around the vehicle and electro-optical sensors for situational awareness and threat identification. It also includes passive and active countermeasures against different types of threats.

When a threat is detected, the system can respond using both soft kill and hard kill countermeasures. Soft-kill countermeasures include smoke grenade launchers or jamming systems to obscure the vehicle and disrupt enemy targeting.

However, Trophy is best known for its hard-kill countermeasures. Trophy calculates the threat's trajectory and deploys explosively formed projectiles (EFPs) or other countermeasures from rotating launchers to destroy the incoming projectile mid-air. It features an automated reloading mechanism for multiple engagements and can distinguish between threats that will hit the vehicle and those that won't, conserving countermeasures and minimizing collateral damage.

Recent Trophy APS Upgrade

When initially deployed on the Israeli Merkava Mk 4 tanks in 2011, the Trophy APS was not designed to counter drones and top attack missiles like the NLAW. In October 2024, Rafael unveiled an upgraded version of the Trophy active protection system with a top-attack defense capability that plugged a vulnerability against drones and top-attack missiles. Rafael claims a 90% effectiveness rate for Trophy.

Current Defensive Suites on Indian Tanks

According to publicly available information, India has 126 Arjun MK1 tanks, over 1,200 T-90S tanks, and about 2,400 T-72M tanks of various modifications in service. All the tanks currently rely on passive defensive measures. No APS is currently fitted on either the T-90 or T-72 tanks in active service. Both rely on passive protection: Kontakt-5 explosive reactive armor (ERA), composite armor, and smoke screens.

The war in Ukraine has underscored the inadequacy of passive protection systems against drones and top-attack anti-tank guided missiles (ATGMs). Indian tanks, which primarily rely on composite armor and explosive reactive armor (ERA), remain vulnerable to modern anti-tank weapons, particularly loitering munitions, precision-guided artillery shells, and next-generation ATGMs that strike from above. The ongoing conflict has demonstrated that active protection systems (APS) are now essential for tank survivability on the modern battlefield.

RFI for APS

In April 2021, the Indian Ministry of Defence (MoD) issued an Expression of Interest (EOI) to procure 818 modular Active Protection Systems (APS) for its T-90S/SK main battle tanks (MBTs), aiming to enhance their survivability against modern anti-tank threats.

The APS was required to feature both hard-kill and soft-kill capabilities:

- Soft-kill: The system needed to provide smoke discharge and infrared jamming effects, along with audio-visual warnings when the tank was lased or targeted.
- Hard-kill: The system had to neutralize shaped-charge threats, including rocket-propelled grenades (RPGs), anti-tank guided missiles (ATGMs), and high-explosive anti-tank (HEAT) rounds fired from tank guns. The required effectiveness was 90% against ATGMs, RPGs, and rockets and 70% against incoming 125 mm HEAT rounds.

At the time, the threat posed by drones and top-attack ATGMs to armored vehicles was not fully recognized.

However, in response to lessons from the Ukraine war, the Indian Army has reportedly issued a fresh Request for Information (RFI), updating requirements to include hard-kill protection against top-attack missiles and drones, in addition to traditional anti-tank threats.

Indian Army T-90S Tanks

The Indian Army has T-90S and T-90SK variant tanks powered by V-84MS 4-stroke, liquid-cooled, multi-fuel V-12 diesel engines with a power output of 840 horsepower (hp) at 2,000 rpm. The T-9OSK is the Commander's version of the T-90S, with additional communication and navigation equipment. It differs in radio and navigation equipment and Ainet remote-detonation system for HEF rounds

The tanks feature 7-speed (4 forward, 2 reverse) mechanical transmission. They have a top speed of about 60 km/h on roads and 45 km/h off-road, with a range of approximately 550 km on internal fuel. The engine is reliable but considered underpowered for the tank's weight (around 46-48 tons), especially in high-altitude areas like Ladakh. Post 2010, some T-90S tanks were retrofitted with the more powerful V-92S2 V-12 engine with power out of 1,000 hp at 2,000 rpm during mid-life upgrades.

According to reports, the T-90S features a "three-tiered" protection system. The first tier is the composite armor in the turret. Indigenously manufactured T-90S use the DRDO-developed Kanchan composite armor instead of Russian composite armor. The second tier is third-generation Kontakt-5 explosive reactive armor (ERA) bricks, which degrade the penetrating power of kinetic-energy APFSDS ammunition. These bricks give the turret a distinctive angled "clamshell" appearance. ERA bricks are also located on the turret roof to protect against attacks from above.

The third tier is a Shtora-1 countermeasures suite that includes two electro-optical/IR "dazzlers" on the front of the turret, four laser warning receivers, two 3D6 'smoke' grenade discharging systems, and a computerized control system. The Shtora has no hard-kill countermeasures. Russia has replaced it with Arena-M APS in the latest T-90M variant of the tank.

Trophy Competitors

The Israeli Trophy APS, developed by Rafael Advanced Defense Systems, is a leading contender in India's APS procurement process.

Other systems under consideration include the Russian Arena-M and Afghanit systems:

- Afghanit APS: Originally developed for Russia's T-14 Armata, the system was designed before the Ukraine conflict and lacks counter-drone capability, necessitating upgrades to address modern threats.
- Arena-M APS: A more advanced Russian system incorporating counter-drone and top-attack protection. Russia reportedly placed its first order for T-90M tanks equipped with Arena-M APS in August 2024. However, its full operational capability remains untested.

Additionally, India's Defence Research and Development Organisation (DRDO) is developing an indigenous APS for the T-90. Fabrication is underway, with testing expected in late 2025 or early 2026.

Zorawar Tank

Variants of the Trophy APS are designed for lighter armored vehicles, allowing L&T to pitch the system for its Zorawar light tank.

Conclusion

There is little doubt about the urgency of acquiring APS systems with comprehensive countermeasures against the evolving threats faced by current and future MBTs. Given the large number of tanks in the Indian Army, it would be prudent to pursue local manufacturing of a proven foreign APS, ensuring rapid deployment and self-sufficiency. At the same time, DRDO's indigenous APS development should continue in parallel, providing a long-term, homegrown solution for India's armored forces.

*

Science & Technology News

Harnessing AI to generate patterns of antibiotic resistance in real time

Source: The Hindu, Dt. 21 Feb 2025,
URL: https://www.thehindu.com/sci-tech/health/harnessing-ai-to-generate-patterns-of-antibiotic-resistance-in-real-time/article69239842.ece

A team of researchers from IIIT- Delhi have come up with AI-powered data integration and predictive analytics tools, to understand the patterns of antibiotic resistance in real time, enabling various agencies to act on them speedily. As part of a collaboration between Indraprastha Institute of Information Technology-Delhi, CHRI-PATH, Tata 1mg, and Indian Council of Medical Research scientists, the AI-driven tool AMRSense has been deployed to use routine data that is generated in hospitals to generate accurate and early insights on antimicrobial resistance counched in the global level, national level and hospital level.

In a paper,'Emerging trends in antimicrobial resistance in bloodstream infections: multicentric longitudinal study in India', published in The Lancet Regional Health - Southeast Asia, authors,

Jasmine Kaur, Harpreet Singh, and Tavpritesh Sethi show results from analysing six-year data from 21 tertiary care centers in the Indian Council of Medical Research's AMR surveillance network retrospectively, establishing relationships between antibiotic pairs and the directional influence of resistance in community and hospital-acquired infections.

Innovation, as a solution to the growing crisis of antimicrobial resistance

"There is a shared mechanism of resistance between antibiotics, we already know. Usually to do that, people use genomics, but that's an expensive proposition," explains Dr. Sethi. "We have proposed a way, which is inexpensive, because it uses these routine data sets from hospitals. We show that by using routine data effectively, we can discern relationships between different antibiotics pairs and the direction AMR is taking – whether it is rising or not. Say, for instance, if resistance to one specific antibiotic is going up, some months down the line, it is quite likely that resistance to an antibiotic pair might also shoot up. With these connections, we generated actionable pieces of evidence."

Dr. Sethi adds: "We have tried to go beyond the traditional way of looking at AI - asking how can it enable better decision-making for a given patient in a clinical setting or a public health setting. We think AI can also be used to understand AMR stewardship and surveillance aspects, from the hospital level, upwards. Hospitals already routinely send out patient isolates, for example, blood, sputum, urine, pus, etc., for culture sensitivity testing in order to make informed decisions on treatment courses. We are saying that these reports can be used to construct AI-based pipelines and methods that can lead to AI-driven or AI-enhanced antimicrobial stewardship."

The AMROrbit Scorecard that the team developed also won an award at the 2024 AMR Surveillance Data Challenge. Can we use these scorecards to make it more timely? Dr. Sethi explains: "It plots the orbit of resistance, say of every hospital or department, alongside a global median of resistance and a global rate of change. So around those global values, how well does a department, a hospital, or a certain country fare? That is what the scorecard will be able to provide real time data for."

The ideal quadrant for any hospital or country to be in is where there is low baseline resistance and low rate of change as well, explains Jasmine Kaur, of IIIT-D, and lead author of the paper. Orbits spiral in or out, but the AI tool can offer information facilitating timely interventions that can bring it to a desirable range of resistance.

India can lead the way in tackling antimicrobial resistance

How accurate and reliable are these AI models? "In our paper, we have shown that our models did capture the trends as observed in the period we collected data for. However, unless we have future data, we can't really say, like, for example COVID- 19 upended things, right? The only evidence we have currently is that globally it seems that our models are capturing the increasing rate of resistance in various studies."

Clinicians can make informed decisions based on the visual image that OMROrbit provides them using the data generated by the hospital, explains Ms. Kaur. It has been proven that it can augment ongoing surveillance at various levels. Various kinds of comparisons can be done using the tool, she adds. For instance, if it is a chain of hospitals, then the tool can be used to compare AMR rates

between different departments, cities and centres across the country. “The only possible limitation would be in circumstances and settings that do not have consistent, granular surveillance data. Then the AI model will not make sense. This could occur in countries where surveillance data is not digitally accessible.,” she adds.

“We know there are other environmental factors such as anibiotics being used as growth factors in the poultry industry or leachates in the soil, that can also lead to AMR. The ideal would be, if at the public health level, we should be able to use the data we have from the hospitals, matching it with antibiotic sales, and community-level data, and study the environmental factors too. We hope to do that soon, Dr. Sethi explains.

*

आईआईटी, एनआईटी जैसे शीर्ष संस्थान अब अपने शोध और इनोवेशन की करेंगे ब्रांडिंग

Source: Jagran, Dt. 20 Feb 2025,
URL: https://www.jagran.com/news/education-top-institutions-like-iit-nit-will-now-brand-their-research-and-innovation-23888096.html

आईआईटी, एनआईटी सहित देश के शीर्ष उच्च शिक्षण संस्थानों में चलने वाले शोध और इनोवेशन के काम अब सिर्फ प्रयोगशालाओं और फाइलों तक सिमट कर नहीं करेंगे, बल्कि अब उन सभी कामों की ब्रांडिंग भी होगी। शिक्षा मंत्रालय ने इन कामों को प्रोत्साहित करने के लिए और देश में शोध-इनोवेशन का एक माहौल तैयार करने के लिए अब देश में हर साल अनुसंधान और विकास मेले को आयोजित करने का फैसला लिया है। जिसमें आईइंवेंटिव नाम दिया है।

इस साल का मेला आईआईटी मद्रास में होगा आयोजित

इस साल इस मेले का आयोजन आईआईटी मद्रास में होगा। जो 28 फरवरी से शुरू होगा और एक मार्च तक यानी दो दिनों का होगा। शिक्षा मंत्रालय के मुताबिक इस मेले में आईआईटी, एनआईटी, आईआईएससी के साथ ही एनआईआरएफ की रैंकिंग में शीर्ष के पचास संस्थान रखने वाले उच्च शिक्षण संस्थानों को भी आमंत्रित किया गया है। मेले में अपने शोध और इनोवेशन को प्रदर्शित करने के लिए अब 185 उच्च शिक्षण संस्थान ने अपनी सहमति दी है। माना जा रहा है कि इस पहल से देश में स्टार्टअप को लेकर एक माहौल भी तैयार होगा।

मेले में इसके साथ ही विमानन, रक्षा अंतरिक्ष, समुद्र प्रौद्योगिकी, चिकित्सा- स्वास्थ्य इंजीनियरिंग, एआई /एमएल प्रौद्योगिकी, स्मार्ट सिटीज और इंफ्रास्ट्रक्चर, एडवांस मैन्युफैक्चरिंग और ग्रामीण प्रौद्योगिकियां आदि पर भी चर्चा होगी। विशेषज्ञों के मुताबिक इस पहल से उद्योग-शिक्षा जगत के बीच प्रौद्योगिकी हस्तांतरण, लाइसेंस व सहयोग के नए-नए रास्ते तैयार होंगे। मेले में उद्योगों को भी आमंत्रित किया गया है। गौरतलब है कि अब तक शोध और इनोवेशन से जुड़े इन संस्थानों को अपने स्तर पर ही उद्योगों से संपर्क करना होता था। साथ उनके औद्योगिक उत्पादन के लिए बाजार भी खोजना होता था।

*

Will Microsoft's new AI chip change the quantum computing equation?

Source: Hindustan Times, Dt. 21 Feb 2025,
URL: https://www.hindustantimes.com/india-news/will-microsoft-s-new-ai-chip-change-the-quantum-computing-equation-101740077030190.html

Quantum computing, or the race to make it a reality, may have entered a new era with Microsoft's announcement that it has developed a new quantum computing chip, Majorana 1, that can potentially fit a million qubits (quantum bits). The discovery can make quantum computing a reality, at some point in the future.

Topological qubit is the technology used by Majorana 1, which essentially follows the method of braiding electrons to make stored information more stable and less susceptible to volatility such as temperature fluctuations.

Topological qubit is the technology used by Majorana 1, which essentially follows the method of braiding electrons to make stored information more stable and less susceptible to volatility such as temperature fluctuations.

Microsoft has achieved this by creating a new state of matter according to the company — essentially a new material made from indium arsenide and aluminium (the first is a semiconductor and the latter is a superconductor when cooled).

At the heart of Microsoft's creation is a concept called a topological qubit. That warrants some explanation. Traditional computing stores information in bits, encoded as either a one or a zero. Quantum computing is built around qubits that does both at the same time (a bit like Schrodinger's cat). The only problem is that the minute someone tries to read a qubit, it collapses into either a 1 or a 0 (this is called decoherence). A topological qubit prevents that from happening. The term is derived from the mathematical concept of topology, which deals with the properties of an object (or material) that stays constant under stress. Other companies working on quantum computing -- Google announced its own breakthrough in December -- address the problem through other means. For instance, Google uses a technique called quantum error correction.

Majorana 1 — named after Majorana nodes, a sort of Holy Grail for physicists because they are quantum bits that do not decohere; in turn named after Ettore Majorana, an Italian theoretical physicist who in 1937 discovered particles that can be their own anti-particles -- holds 8 topological qubits and is the first of its kind to have a significant scalability runway.

A '20-year pursuit'

Microsoft's leap in quantum computing chips closely follows Google's Willow chip, IBM's Quantum Heron now leveraging Qiskit quantum software, as well as the Zuchongzhi 3.0 developed by Chinese scientists late last year.

"After a nearly 20-year pursuit, we've created an entirely new state of matter, unlocked by a new class of materials, topoconductors, that enable a fundamental leap in computing," said Satya Nadella, chairman and CEO at Microsoft. "The qubits created with topoconductors are faster, more

reliable, and smaller. They are 1/100th of a millimetre, meaning we now have a clear path to a million-qubit processor," he explained.

A key element of Microsoft's quantum chip is the Topological Core.A key element of Microsoft's quantum chip is the Topological Core.A key element of Microsoft's quantum chip is the Topological Core, which the company believes makes it more stable with error resistance incorporated at the hardware level.

"Whatever you're doing in the quantum space needs to have a path to a million qubits. If it doesn't, you're going to hit a wall before you get to the scale at which you can solve the really important problems that motivate us," said Chetan Nayak, Microsoft technical fellow, explaining the approach to developing Majorana 1.

Quantum computing references computation that harnesses principles of quantum mechanics — specifically superposition, entanglement, and quantum interference — to perform operations on data.

This contrasts with classical computers, which use bits representing either 0 or 1."Modern computer processors are quite efficient at performing the discrete computations they're usually tasked with. Though their efficiency nosedives when they must wait for data to move back and forth between memory and compute, they're designed to quickly switch over to work on some unrelated task," said Geoffrey Burr, an IBM Research scientist.

Quantum computers use qubits, which can represent 0, 1, or a combination of both simultaneously. Microsoft Azure describes differences between qubits and bits: "A qubit can represent a 0, a 1, or any proportion of 0 and 1 in superposition of both states, with a certain probability of being a 0 and a certain probability of being a 1."

"This is a huge milestone they have been pursuing for quite some time. Now comes the scaling for truly fault-tolerant quantum computing. It will take a while, but this is a foundational technology for humanity," said Gill Verdon, founder and CEO of Extropic AI, a company building computing solutions that merge with generative AI.

Quantum computing's big promise is the ability to do computations that would otherwise take today's traditional computers hundreds or thousands of years to complete. There is the promise and potential of solving real-world problems. But alongside come the negatives too, such as threats to modern-day cybersecurity systems with possible threats that could break current encryption and firewall methods.

Microsoft believes a million qubits should be the minimum threshold for quantum computers to be able to deliver solutions for real-world problems. They cite examples such as breaking down microplastics into harmless byproducts, developing self-healing materials for construction, or applications in manufacturing or healthcare.

The new materials stack made of indium arsenide and aluminium has largely been designed and fabricated by Microsoft engineers. A new approachThere are different ways in which quantum computing chips encode and manipulate quantum information. Topological qubit is the technology

used by Majorana 1, which essentially follows the method of braiding electrons to make stored information more stable and less susceptible to volatility such as temperature fluctuations.

Google Willow and IBM's Heron chips are classified as superconducting qubit chips while IonQ's chips use Trapped Ion qubit technology. The choice is made based on various factors, including ease of implementation, handling of complex data and resistance to errors depending on type of computation.At this time, commercial implementation of Majorana 1 is not on the table, in contrast to Microsoft's Maia 100 artificial intelligence chip that's available to enterprise clients via their Azure platform.

The idea for Majorana 1 is further research, for its own development, and use-cases for which they'll work closely with academia and laboratories. Microsoft is making the quantum computing chip itself, not relying on any chip-making partners such as Taiwan Semiconductor.Any commercial deployments will come in due course.

As AI philosopher David Shapiro wrote in a post on X, "the technological advancement hinges on Microsoft's ability to construct their quantum chip atom by atom using indium arsenide and aluminium, creating a new state of matter that's neither solid, liquid, nor gas."

Google believes commercial quantum computing applications are just a few years away. IBM says 2033 will be the year quantum computing will achieve commercial status.

Research by McKinsey & Company estimates that quantum computing tech will likely create value worth trillions of dollars within the next decade. In its latest annual Quantum Technology Monitor, it notes that four sectors — chemicals, life sciences, finance, and mobility — are likely to see the earliest impact from quantum computing, and could gain up to $2 trillion by 2035.

*