

COBONEWS

VOL. IV, NO. 1, Jan 2024 Edition



Technology
Innovation Hub
of IIT Delhi

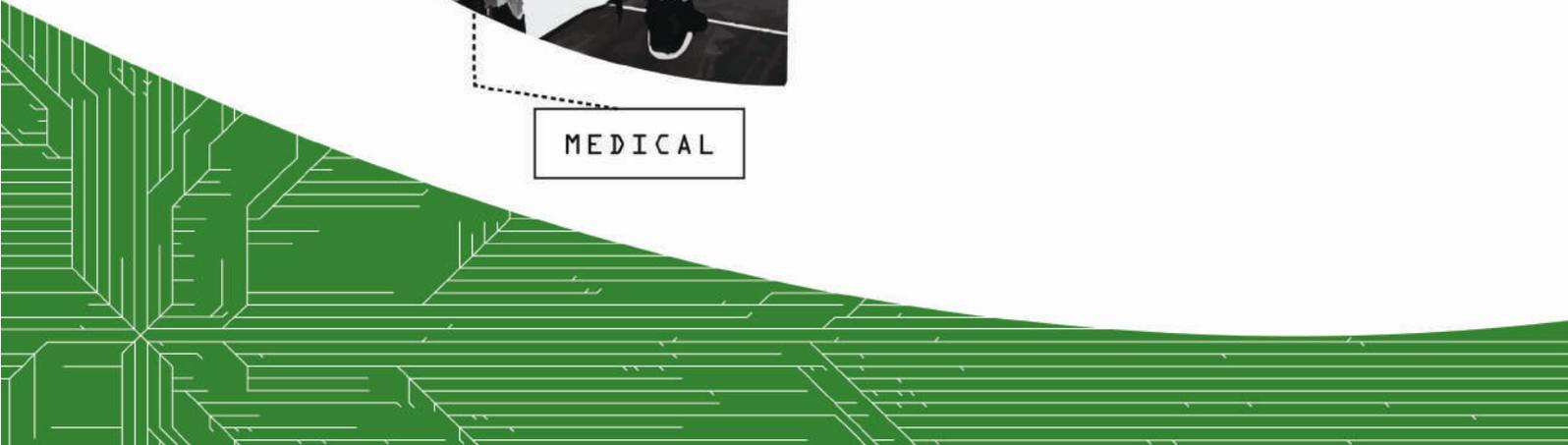
DEFENCE

INDUSTRY 4.0

20 20 20
23 24 25

AGRICULTURE

MEDICAL





Message from Director, IIT Delhi

Greetings from IIT Delhi and IHFC, and best wishes for a Happy New Year. In our fourth year, IHFC continues on a growth path. We have recently operationalized the Medical Cobotics Centre as a collaborative venture along with the technology hub of IIT Delhi. We hope this facility will enable and support cutting-edge research in cobotics for medical applications and create new research partnerships between doctors, engineers, scientists and startups.

In July 2023, we introduced a new M.Tech programme in Robotics. We hope many industries and companies will sponsor bright professionals for this programme. We have made efforts to frame courses for school students of CISCE and the Delhi Board on Robotics, AI and Coding. We also encourage school students to apply their knowledge in competitions like the Delhi Robotics leagues and the Delhi Hackathon.

We look forward to your suggestions, ideas and support in taking IHFC forward so that we can make an impact in society through cobotics.



Prof. Rangan Banerjee

Director IIT Delhi

Message from Director, NM-ICPS, DST, Govt. of India

As we enter the year 2024, it's gratifying to witness the progress that IHFC has made over the past four years. IHFC has consistently worked towards achieving success in the domain of Cobotics, meeting their mandated goals and expanding their impact. Their collaborative efforts have resulted in significant achievements such as the IHFC Grand Projects and the establishment of Drone and Medical Centers, showcasing the potential of collective expertise. IHFC's commitment to nurturing emerging talent and supporting startups aligns with their mission, setting a clear path toward their objectives.

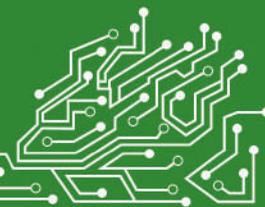
Here's wishing IHFC continued success in their endeavors.



Dr. Ekta Kapoor

Director, NM-ICPS
Department of Science and
Technology (DST),
Government of India





Message from Project Director, IHFC

I am happy to write another message for the January 2024 issue of CoboNews by IHFC, IIT Delhi. The year 2023 is memorable to me mainly due to the inauguration of one of our dream projects, Medical Cobotics Center (MCC), jointly developed with the Technology Innovation Hub (TIH) of IIT Delhi, i.e., iHub Anubhuti, in their campus at Okhla, New Delhi. It was praised by our funding agency, DST, when they saw two TIHs come together to build a state-of-the-art facility to serve the nation in the healthcare area. The main objectives of the MCC, besides training the young medical doctors using the already procured Human Patient Simulator (HPS), are to develop mid- and high-fidelity simulators indigenously based on the experiences of knowing the engineering aspects of the HPS and medical robotic devices by investing on start-ups who take interests. Few have already visited the MCC and committed to using it to take advantage of the HPS for clinical trials, as it simulates almost 90% of the physiological aspects of a human being. I am also happy that IHFC could connect to the young society through more than 20 organizations (start-ups and others) under our Nurture programme. They conducted training on basic robotics and drone technologies in various schools and colleges across several states of India, e.g., Uttar Pradesh, Bihar, West Bengal, Tamil Nadu, Chhattisgarh, Assam and others. Already, more than 7000 students have been trained, and another 10,000 are expected by March 2024, which will also include training for nurses, paramedical staff, and possibly young doctors. I am confident that such training will enhance the employability of our youth in the country.

Let us hope our fourth year of existence ends in June 2024 with more accolades and achievements to make the country proud in the World Scenario.

Happy New Year 2024!



Prof. Subir Kumar Saha

Professor, Dept. of Mechanical
Engineering, IIT Delhi

Message from CEO, IHFC

It's been a fabulous 2023 for IHFC, and we are proud to say we have come a long way along this path of success, but still, there are miles to go before we sleep...

The progress started as a vision towards making India Atmanirbhar by creating hubs, such as IHFC, under DST and NMICPS. The mission was to bring products to market which are indigenously created for the benefit of the country and humankind under its four verticals of Agriculture, Defense, Medical and Industry 4.0. The focus is on collaborative efforts in all by having a robust start-up ecosystem, upskilling and training, R&D. The start was grand, and the progress has been even grander. The versatility and calibre to create and develop a robust ecosystem bringing academia, industry and start-ups together is also clearly reflected in the now-launched Drone Technology Park and Medical Cobotics Centre (a collaborative effort between IHFC, IITD and IHub Anubhuti, IIT D)

With the essence and fundamentals of this mission clearly in place, IHFC has steadily involved itself in projects for the betterment of humans and society. Let it be the empowerment of young minds and students with training and upskilling or encouraging young start-ups with mentoring and funding, the focus to increase our ecosystem has been consistent, leading to the success of this mission three times than what was expected.

Ushering in 2024 with great anticipation, we look forward to this year being one of more international collaborations and internal collaborative efforts between the hubs and the industry. The keyword to drive this mission to a crescendo of success is collaboration, and IHFC will continuously strive towards the success of the same. Wishing you all a happy New Year and reaching new heights this year. Jai Hind!



Mr. Ashutosh Dutt Sharma

Chief Executive Officer
(CEO) IHFC, IIT Delhi





Innovation Hub for Cobotics (IHFC)

In the past few years, the world especially India, has rapidly seen advancement in sensing, computing, algorithm research, and development. This has further ushered in the growth of robotics research and its adaptation to the real world. Today, it's very obvious that robots are being used in every sector, from the life of a simple farmer planting and harvesting crops to the wholesaler who needs to manage his inventory in his vast warehouse of all agricultural produce. Using drones in agriculture, defence, and industry has taken a turn only for the better. Robots, in collaboration with doctors, are used in long intensive surgeries. All over the world, this kind of collaborative work with robots will increase with time. Robots will play an essential role in society in the coming years in all sectors, so intelligent robotic teammates have the potential to expand human capabilities, reduce the risk of harm, increase safety productivity, and ultimately, improve the quality of life for our people. Therefore, developing technology and products that enable the population to work alongside robots is the need of the hour.

With this aim, the I-Hub Foundation for Cobotics (IHFC), the Technology Innovation Hub of IIT Delhi, was established partnering with the Department of Science Technology (DST), Ministry of Science and Technology, Govt. of India under the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS). This brings together three significant pillars of success: Academia, Government and Industry. Established in June 2020 as a Section 8 company, IHFC has four mandates under its 4 Application Areas: Medical, Agriculture, Industry and Defence. The mandates are R&D, Entrepreneurship and Startups, Skills and Training and International Collaborations such as with Japan and NSF, USA. Under R&D, we are working on 7 Grand Projects, and a few are in International Collaboration with the National Science Foundation (NSF). We are hand-holding many startups, and many young entrepreneurs are already incubating and accelerating with IHFC under the READY (Research Entrepreneurship and Development for You) program. Our first successful startup from READY is TOTO, which is already in talks with many IHFC industry partners for commercialization, and there are many more in the pipeline.

Startups Incubated & Accelerated

BotLab Dynamics Kaidoko Simhatel Aviate

Rancho Labs SeiAnmai Technologies Systemantics

CYRAN AI Solutions Trouve Arka Aerospace Novae Avenue

LightRay (Retro Panda Labs) ENORD The Innovation Story (TIS) TSW Drones

Grand Projects

- Rehabilitation Robotics
- Human-Robot Interaction
- Healthcare Robotics
- Industry 4.0 & Beyond
- Drone Applications
- Intelligent Sensing and Secured Communication
- Nanorobotics

IHFC Major Highlights

Medical Cobotics Centre (MCC)

MCC is a Joint Facility of IHFC and IIIT Delhi (iHub Anubhuti), funded by the DST under the NMICPS mission.



Delhi Robotics League (DRL)

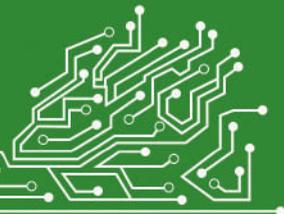
IHFC played a pivotal role in aiding these students to prepare for the challenges presented by the DRL Game



Delhi Hackathon

IHFC is also a knowledge partner for the Delhi Hackathon for the year 2023-25.





ERT Key Initiatives

1. Curriculum Development Based Learning and Skilling for K9-12 towards emerging technologies
2. Competition-based learning - DD Robocon, Delhi Robotics League, and Delhi Hackathon for school and college-going students
3. Academic Leadership and Immersive Learning Program for Teachers/Education Facilitators in Robotics/AI/ML
4. Integrated skill empowerment and certification for professionals
5. READY for the budding college students aspiring to be entrepreneurs - Research Entrepreneurship And Development for Youth (READY)

IHFC'S EDUCATION, RESEARCH AND TRAINING (ERT) VERTICAL

1. Integrated skill empowerment and certification for professionals



Course on Fundamentals of Cobotics

This course is primarily designed to introduce Cobotics to engineering students, science graduates, teachers and industry.

The Fundamentals of Machine Learning in Cobotics program covers a range of modules aimed at providing a comprehensive understanding of machine learning principles. Participants learn about predictive analytics, data preprocessing, linear and Bayesian classifiers, decision trees, clustering, and more. The program emphasizes both theory and practical applications, including Python programming.



Course on Drone Technology

The program focuses on classifying different drone configurations, understanding the working principles encompassing hardware, software, mechanical, electrical, and electronic components, and acquiring the necessary tools and components for building a drone.

2. Curriculum development for K9-12 towards Emerging Technologies

IHFC offer an innovative K-12 curriculum in Emerging Technologies, providing hands-on learning experiences in robotics, AI, coding, and automation. Our competition-based approaches encourage excellence in AI, robotics, and machine learning, preparing participants for the fast-paced world of cutting-edge technology, as seen in events like the Delhi Robotics League and Delhi Hackathon.





3. Academic Leadership and Immersive Learning Programme for Teachers/ Educators/ Facilitation in Robotics, Artificial Intelligence and Machine Learning

The Academic Leadership Program for School Principals is designed to equip educational leaders with essential 21st-century skills. Educators undergoes comprehensive training in Robotics, Automation, and Coding. These carefully structured sessions covered a wide range of topics, from fundamental principles to advanced techniques, fostering a profound understanding.

4. Research Entrepreneurship And Development for Youth (READY) Program

IHFC proudly introduces the "READY" pre-seed incubation program, offering internship opportunities to promising Indian engineering graduates and students. The program supports individuals interested in collaborative robotics. It connects young talent with academic and research experts. The goal is to advance innovation in robotics. Graduates can become startup founders, researchers, or professionals in Cobotics. The program bridges academia and industry, fostering progress in robotics. IHFC offers financial support, mentorship, and guidance for those aiming to make a positive impact in Cobotics and contribute to societal development

TOTO-Tele Operation Tele Observance Robot

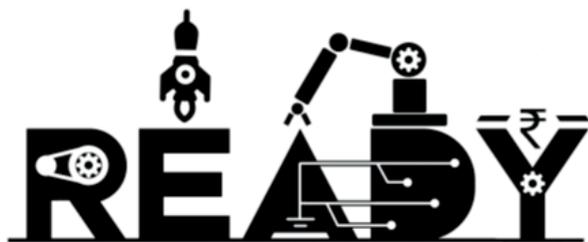


Srikrishna S, after being mentored in IHFC's READY Program, launched SeiAnmai Technologies. His debut product, TOTO, is a research and education mobile robotic platform

Snake Robot



Sripaad Mahankali developed a specialized disaster response search robot with advanced features



Galvinator

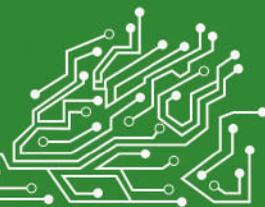


Jay Patil won at DD Robocon 2023. His IHFC IIT Delhi internship resulted in "Galvinator," an innovative wearable for gait analysis with potential rehabilitation clinic applications

Quick Wrap - ERT Highlights

- Conducted courses for corporates and professionals in Robotics, AI and ML
- Drone Technology Training imparted to defence personnel
- Collaborations with Delhi Board Secondary School (DBSE) for HE-21 SOSE schools for Robotics, coding and automatic curriculum development
- MoU with ICSE focusing on K9-12 Robotics and AI vertical
- Knowledge Partner and Entrepreneurship partner for DD Robocon, Delhi Robotics League and Hackathon





Register For Our Upcoming Competitions

Delhi Robotics League
(DRL)



Delhi Hackathon



DD Robocon



CoboTalks: A Monthly Academic Seminar Series

31

26th July, 2023



**Dr. Bishakh
Bhattacharya**

Professor, Department of
Mechanical Engineering, IIT
Kanpur

Title: Nuances of Designing
cognitive robots through case
studies at SMSS lab, IIT Kanpur

32

9th Aug, 2023



**Dr. Søren
Tranberg Hansen**

Science & Innovation
Consul / Deputy Head of
Mission, Innovation Centre
Denmark, India

Title: Collaborative Robotics
– An Indo-Danish Perspective

33

13th Sept, 2023



**Dr. Nayan M.
Kakoty**

Coordinator, DST-TEC, TU
Professor, IEEE Sr. Member
Department of ECE, School of
Engineering
Tezpur University

Title: Prosthetic Hand:
Commercial versions vis-à-vis
TU Bionic Hand

34

11th Oct, 2023



Dr. Surjya K. Pal

Chairperson, Centre of
Excellence in Advanced
Manufacturing Technology
Professor, Mechanical
Engineering Department
IITKGP, India

Title: Industrial Artificial
Intelligence

35

20th Dec, 2023



**Dr. Pushparaj
Mani Pathak**

Professor,
Mechanical & Industrial
Engineering Department,
Indian Institute of Technology,
Roorkee

Title: Drone Technology
Development for Open Cast
Mines

CoboTalks Voucher Winners!

- Madhuteja Javvaji
- B Shanker
- Nikesh Bisht
- Ibhaan Agarwal
- Shweta Sharma
- Akash Sondhi
- Tarun Verma
- Deepak Raina
- Mr. Bhabani Shankar Dey



Activity Highlights

LAUNCH OF MEDICAL COBOTICS CENTRE (SEPTEMBER 2023)

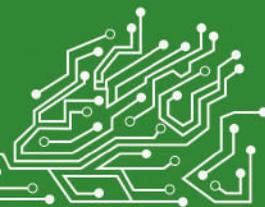
Medical Cobotics Centre is a collaboration between IHFC (I-Hub Foundation for Cobotics, IIT Delhi) and iHub Anubhuti (IIIT Delhi). MCC is a centre of excellence to provide education, training, and skill development for Medical/Engineering/Science Students, Doctors, Surgeons, Engineers, Paramedical Staff, and others, creating best-in-class infrastructure for Research and Development (R&D) in the field of Medicine, Healthcare devices and equipment as well as offer a robust Startup Ecosystem for nurturing startups in this domain.



IHFC AT INDIA MOBILE CONGRESS (OCTOBER 2023)

IHFC was selected along with six other TIHs to present our innovations at the India Mobile Congress 2023, held at Pragati Maidan, New Delhi. The presence of Hon. PM Shri Narendra Modi graced the event. It was a moment of great pride and honour for the entire IHFC team.





Other Highlights

July

IHFC hosted an online meeting on 12 Fast Track Projects, launched a startup and patent call with 8 finalized, and TCS expressed interest in collaboration and showcased its research and innovation track record

August

IHFC R&D project (Prof. Amit Shukla, IIT Mandi, Simhatel: Non-contact Condition Monitoring System) showcased at Pragati Maidan, Delhi in August



October

TIPS Workshop at IIT Kanpur

Showcased two prototypes from ongoing R&D Projects:

- The team from Tezpur BLDC motor prototype by Prof. Amit Kumar Jain and a team from IIT Delhi
- EMG-controlled Prosthetic arm by Prof. Nayan (Tezpur University)

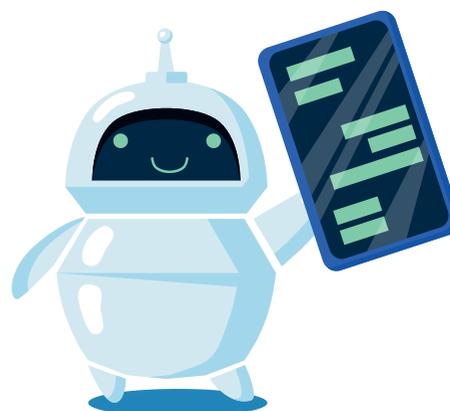
November

Workshop for Collaborative Healthcare Initiatives among Technology Innovation Hubs was conducted at MCC on Nov 29 in collaboration with IHFC and I-Hub Anubhuti



December

IHFC is funding a collaborative project between IIT Roorkee and South Eastern Coalfields Limited (SECL) to digitize coal mines. The initiative, titled 'Intelligent Unmanned Aerial Vehicle for Open Cast Minefield Surveillance,' aims to improve real-time monitoring and safety in coal mines





Around The World in Cobotics

BrainGate is developing a transformative neurotechnology that uses micro-electrodes implanted in the brain to let humans operate external devices like robotic arms with just their thoughts



BrainGate

Calico is a tiny robot that can be zipped around your body and become your intelligent robotic buddy in a variety of environments, ranging from industrial settings to homes and healthcare facilities



Calico

Nine humanoid robots gathered at the AI For Good Conference in Geneva, Switzerland, making it the world's first-ever human-robot press conference



Geneva Conference

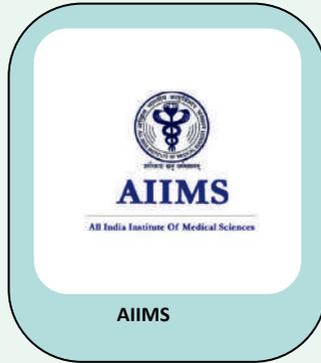


Meet Shimon, the robotic marimba player who uses AI and creativity algorithms to listen to, understand, and create music! Shimon and a few other robotic musicians are proud members of Georgia Tech's 'Robotic Musicianship Group'



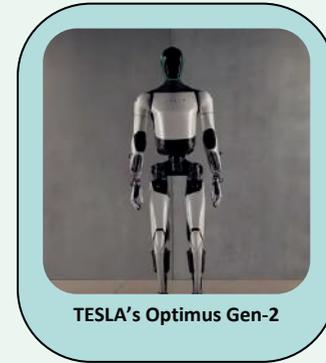
Robotic Musicianship Group

After the US FDA approval of the da Vinci system in 2000, India got its first urologic robotic installation at the All India Institute of Medical Sciences, New Delhi, in 2006. The following decade saw an unprecedented growth of robotic surgery in India



AIIMS

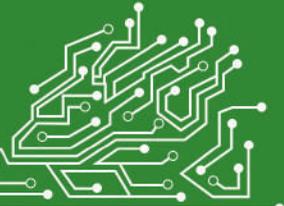
Elon Musk-led Tesla has given a sneak peek at the company's humanoid robot, Optimus. The second generation of the robot also features many improvements compared to the prototype



TESLA's Optimus Gen-2

India's robotics market is experiencing rapid growth, driven by increasing demand for automation in industries such as manufacturing and healthcare. In 2023, the projected revenue in the Robotics market for India is expected to reach US\$810.50m.





CoboNews Crossword #2

Rules:

- Use the clues to fill in the words above.
- Words can go across or down.
- Letters are shared when the words intersect.

ACROSS

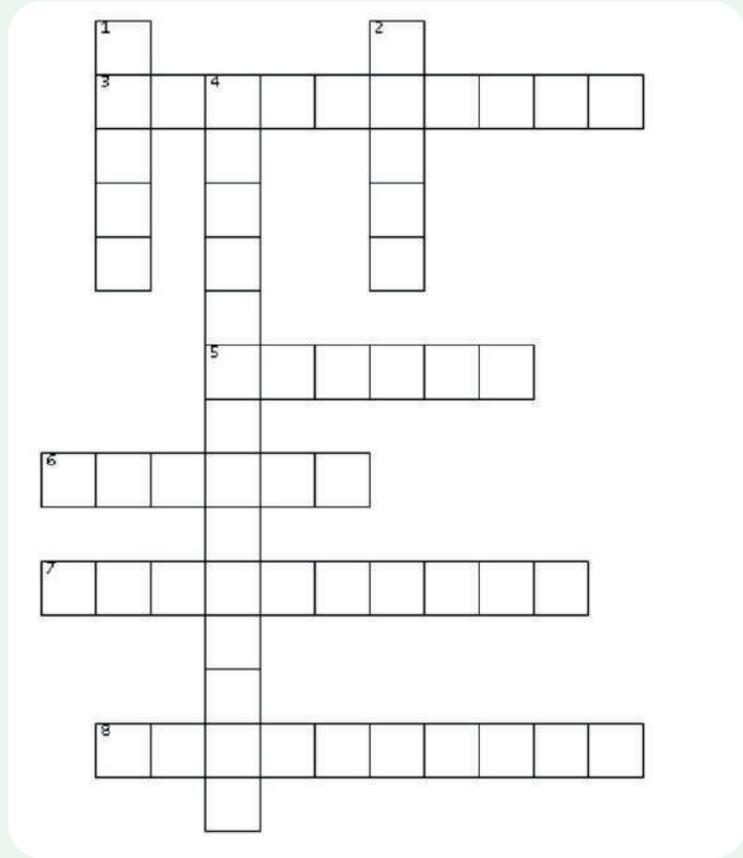
- Imitation of a process or system (10)
- Simple machine with a grooved wheel and a rope (6)
- Half-human, half-machine being (6)
- Study of motion (10)
- Artificial limb (10)

DOWN

- Renowned science fiction author known for robotics (5)
- Probability theory developed by Thomas (5)
- Integrated circuits processing digital data for computing (14)

Mail your answers to piya@ihfc.co.in by 20th January 2024. The First three correct entries will win IHFC goodies!

**Terms and conditions apply*



Congratulations to the winners of Cobonews Crossword #1





Delhi Hackathon Screening



August - IHFC ERT achievement celebration



Nurture Program



Team IHFC



Delhi Robotics League



Drone Skill Development Training Program at IIT Delhi Sonapat



Botlab Dynamics featured in Media



MCC Inauguration

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Gayatri Oke
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R&D and ERT Teams

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