



DST-AMRITA  
TECHNOLOGY  
ENABLING  
CENTRE




विज्ञान एवं प्रौद्योगिकी विभाग  
DEPARTMENT OF  
**SCIENCE & TECHNOLOGY**

# NEWSLETTER

JULY- DECEMBER 2023

DST - AMRITA TEC  
@ AMRITA





We are thrilled to present the latest edition of our newsletter, designed to keep you updated on the innovative projects, transformative initiatives, and groundbreaking research happening within the Amrita Technology Enabling Center (Amrita-TEC). As a hub of technological advancement and social impact, Amrita- TEC is dedicated to harnessing the power of technology to address real-world challenges and foster positive change in our communities.

In this issue, you'll find a wealth of engaging content highlighting the remarkable work of our team members, collaborators, and partners. From cutting-edge developments in artificial intelligence and machine learning to impactful initiatives in healthcare, education, and sustainability, each story showcases the potential of technology to create meaningful solutions and enhance lives.

Thank you for joining us on this exploration, discovery, and innovation journey. Let's continue pushing the boundaries of what's possible and creating a brighter future for all.

## DST Amrita Technology Enabling Center – MSME Support

DST-Amrita TEC has been closely working with Micro, Small, and Medium Enterprises (MSMEs) looking to boost their technological capabilities. We have offered tailored services, including guidance, training, and resources, to help MSMEs adopt advanced technologies, and promote innovation and productivity. This has helped provide exposure to a certain extent on latest technologies, upgrading of infrastructure. We have also helped them identify and solve problems, fostering global competitiveness through new technologies and guided them with streamlining their processes. We have a structured process that has helped us to excel to solve the MSME problems. We have successfully transferred the technology for Salt Bath Hardening furnace for the MSME needs. The kitchen knife manufacturing industry in Kerala requires a small Salt Bath Hardening Furnace to enable the quality of their products. The furnace should have a connected load of less than 20kW enabling it to operate without a dedicated transformer. Since the products are relatively small in size, the primary objective is to find an economical and efficient solution for their hardening process. MSME DFO Thrissur facilitated the DST-supported Technology Enabling Centre(TEC) managed by Amrita Viswa vidyapeetham University, Amritapuri, Kollam, Kerala to take it up for a solution. AMRITA - TEC, Amrita University successfully developed a solution and A Salt bath hardening furnace developed by AMRITA - TEC was handed over to M/S Safe Power.



Technology Transfer handed over to M/S Safe Power during Vendor Development Program 29 & 30, September 2023, Thrissur.

## Technologies Developed

### Netravaad



Netravaad, an innovative device designed to facilitate communication for individuals with speech impairments. The device incorporates a camera, display, speaker, controller, and rechargeable battery, providing six hours of usage on a single charge. Using the AI algorithm Sharani, the camera detects the user's eye signs and translates them into alphabets, words, or sentences, which are then displayed on the

screen. The device verbalizes the detected words through the speaker, allowing others to comprehend the user's communication. Future developments will focus on expanding Netravaad's language support to include regional languages like Malayalam and Hindi, enhancing inclusivity for a broader user base.

### AI-Powered Ocular Diagnostics

Amrita has developed the first Extended Reality ecosystem (XR ecosystem) in South Asia, integrating augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies. This innovative system has already benefited 150 patients and offers a range of applications, including visualizing organs as holograms for precise, patient-specific medicine. The XR system supports medical training with immersive tools for students, facilitates telemedicine operations, and enhances remote connectivity. Notably, the Pediatric Cardiac Unit utilizes 3D printing and extended reality for in-depth study and preparation before surgeries.



# Industry & Government Bodies Tie-Ups for Technology Enablement through TEC

## Interaction with SAP Labs India



SAP Labs India (SLI) is the fastest-growing subsidiary of SAP, a multinational company that provides customers with world-class business solutions. A delegation from SPI led by Ms. Sindhu Gangadharan, Managing Director, SAP Labs India visited Amrita Vishwa Vidyapeetham Coimbatore campus and had interactions with Dr. Sasangan Ramanathan, Dean-Engineering, and Dr. Prashant R. Nair, DST-Amrita TEC fellow.

## Interaction with Tata Technologies



An industry interaction was conducted with Mr. Rabindra sha, Chief Engineer, Tata Technologies with Dr. Krishnashree Achuthan, Director Amrita Technology Enabling Center, Mr. Sumeet Bahl, and Dr Ganesh Udupa, Professor. Discussions on Augmented Reality/ Virtual Reality and its potential for applications in industries were held.

## Interactions with regional industry partners



Amrita Technology Enabling Center has facilitated various industry partners with technology development and commercialisation. A glimpse of visit at the partners displaying their products at the exhibition. (Left) Mr. Sooraj Surendran, Survat Industries and Mr. Kiran Vijay KVEES Food, displaying products with his start-up.

## Industry Interaction MSME Vendor Development Program at Trissur



The Vendor Development Programme (VDP) was held in Thrissur MSME DFO Campus. The event was organized by MSME DEO, Thrissur, and SIDBI, Kochi, with support from SBI, Canara Bank, UBI, and NSIC. Amrita TEC (Technology Enabling Center) had a prominent stall at the venue. The various technological innovation and development services provided by Amrita TEC were explained to the entrepreneurs during the event. These discussions led to the generation of potential leads for future collaborative activities between Amrita TEC and MSMEs.

## Memorandum of Understanding with Cochin Shipyard Limited



Amrita Technology Enabling Center, through its various engagements with Cochin Ship Yard Limited, has further entered into an MoU with respective sustainable and environment-friendly technology development. Amrita TEC team, headed by Dr Krishnashree Achuthan exchanged the MoU with the authorities of Cochin Ship Yard. Sustainable technologies with respect to alternatives to plastics will be developed, trained and transferred to entrepreneurs, self-help groups and ecopreneurs.

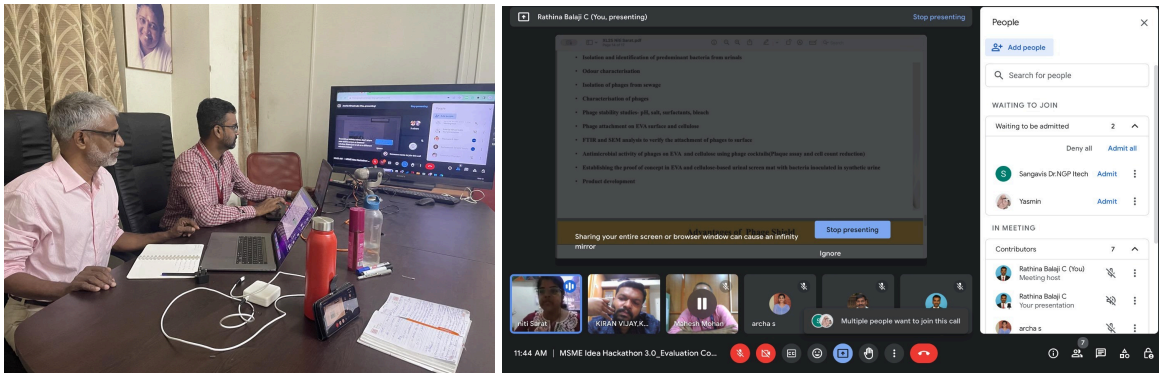
## Events and Engagements with various Stakeholders

### Women-Led Hackathon for MSME Challenges

A women-led hackathon was organized by the Amrita Technology Enabling Center, featuring a hands-on training session at Amrita Vishwa Vidyapeetham, Ettimadai, Coimbatore—the training aimed to assist women in brainstorming their ideas and preparing proposals. The session saw active participation from over 60 individuals, resulting in the submission of 68 ideas.



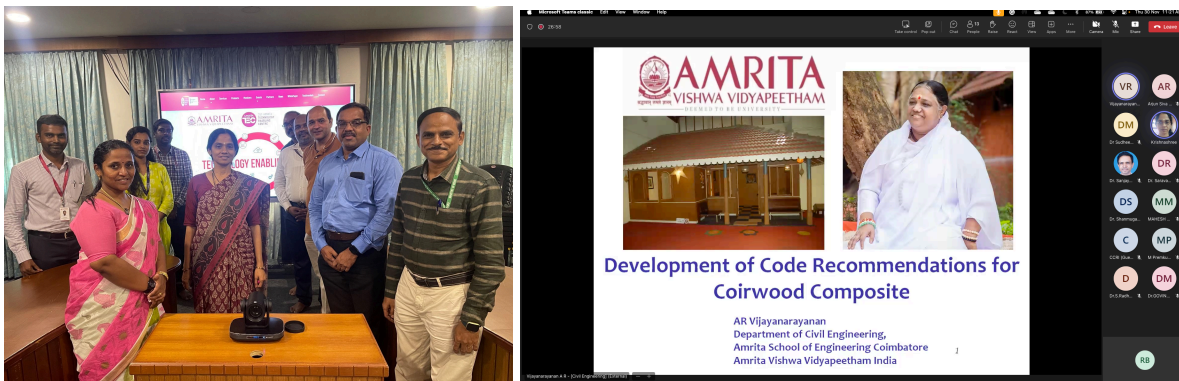
Hands-on training session organised at Amrita Vishwa Vidyapeetham, Coimbatore  
Further to it after the submissions, a review was conducted with an expert committee.



### Evaluation of the Idea Submitted by the Expert Committee

The esteemed committee meticulously evaluated the submitted ideas, focusing on the technological aspects, and provided constructive feedback to the participants. The commitment of the committee members ensured a thorough and fair evaluation process for the prospective ideas presented in the hackathon.

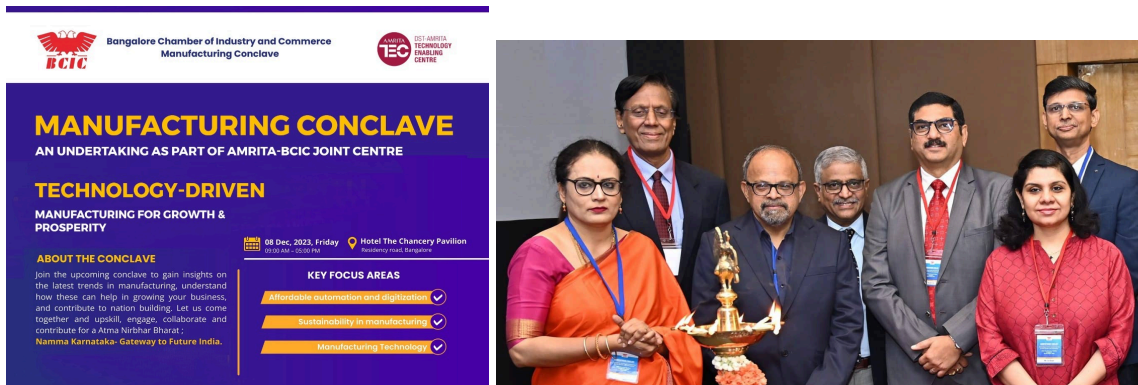
## Engagement with Central Coir Research Institute



Amrita Technology Enabling Center has conducted an exhaustive research on the coir industry through its field visit, exhibition visit, and interactions with entrepreneurs through the Central Coir Research Institute and Coir Board of India. Amrita TEC has facilitated various interactions for groundbreaking technologies to promote the coir as a sustainable alternative solution to conventional products that are harmful for the environment.



## Manufacturing Conclave jointly organised by Amrita TEC and BCIC, Bangalore.



Amrita Technology Enabling Center, in association with the Bangalore Chamber of Industries and Commerce, organised a one-day Manufacturing Conclave to gain insights on the latest trends in manufacturing, understand how these can help in growing your business, and contribute to nation-building. Let us come together and upskill, engage, collaborate and contribute for an Atma Nirbhar Bharat. During the conclave topics related to technology-driven manufacturing for growth and prosperity with a focus on affordable digitisation and automation, the experts addressed homegrown technology, sustainability, innovation and emerging manufacturing technologies, and scope and opportunities.

## Participation in Synergia Conclave



Mr. Sumeet Bahl, represented Synergia conclave Bangalore 2023, Lt Gen Hiroe Jiro Commanding General TERCOM Japan. The conclave was a multi-disciplinary think tank engagement that brought together various experts globally for drafting policy making and regulation.

# Training Programs & Workshops Organised

## TACTICS - Capacity Building Program on Cyber Safety



Technology Advancement and Capacity-building Training Initiatives or TACTICS is a comprehensive session for Industry, Organizations and entrepreneurs. It is designed to equip the participants with the knowledge and skills needed to protect themselves against cyber threats. The program aims to increase awareness and understanding of common cyber threats and provides best practices for securing personal and professional data. We provide best practices for securing personal and professional data, including password management, network security, and privacy protection. Additionally, we educate the participants on the safe and responsible use of social media and email and provide strategies for identifying and responding to phishing attacks and other cyber threats. Our ultimate goal is to enhance the cybersecurity posture of the industries and mitigate the risks associated with cyber threats. By participating in the program, participants can take proactive steps to safeguard their personal and professional data, prevent cyber attacks, and respond to security incidents. Amrita TEC organised these training sessions that benefited over 1000 members will benefit from this programme organised at various locations during the year 2023.

# Various Training Programs Organised by Amrita TEC

Amrita Technology Enabling Center has organised various training programs for the benefit of the industries, entrepreneurs, academia, student community, researchers and innovators. Expert talks on various fields that would benefit the ecosystem were organised to train the participants. The latest technology trends in manufacturing, construction and cloud computing were organised.

**WEBINAR ON**  
**Research Avenues in Nonlinear Dynamics and Complex Systems**  
 By Department of Mechanical Engineering, Coimbatore campus.  
**Saturday**  
**9th September, 2023**  
**At 04.00 PM - 05.00 PM**

**Topics of Discussion**

- Potential Research Areas, Scope and Problems in:
  - Nonlinear Dynamics and Complex Systems,
  - Complex Network Synchronization,
  - Behavior of Non-smooth Mechanical Systems,
  - Control of Flow-Induced Vibration,
  - Efficient Energy Harvesting,
  - Data-Driven Approaches,
  - Heart Pacemaker Modeling

**Speaker**  
**Dr. Bipin Balam**  
 Associate Professor,  
 Department of Mechanical Engineering

Registration Link: [bit.ly/3L8W32C](http://bit.ly/3L8W32C)

Zoom Meeting: Chaos in Pendulums

Meeting ID: 919 620 2323

Participants: DM, BD, SB, VM, RP, HR, NS, RB

**AMRITA**  
 VISHVA VIDYAPEETHAM

**ENGINEERING THE FUTURE:  
 NDE, SHM, NDT 4.0, AND IIOT IN CIVIL INFRASTRUCTURE  
 ASSESSMENT AND RESEARCH**  
 By Department of Civil Engineering, Coimbatore

**Topics of discussion**

- SHM for efficient civil infrastructures
- Convergence of NDT 4.0 principles and the Internet of Things (IIoT)
- Development in sensors and NDE devices
- Research opportunities in SHM and NDT

**Date & Time**  
**18 November 2023**  
**4:00 PM TO 5:00 PM IST**

**Dr. Paresh Mirgal**  
 Assistant Professor,  
 Department of Civil Engineering,  
 Amrita Vishva Vidyapeetham

Registration Link: [bit.ly/3qkxkxw](http://bit.ly/3qkxkxw)

Zoom Meeting: Structural "Health" Monitoring

Meeting ID: 919 620 2323

Participants: DM, DK, GR, SD, DP, RB

Topics: Patient, Component, Testing, Diagnosis, Treatment, Follow ups

Quote: "Structural health monitoring: because even buildings need a therapist to talk about their stress and tension."

**STEM in EP 2020**

**Dr. Prashant R. Nair**  
 Vice-Chairman - IQAC,  
 Amrita Vishva Vidyapeetham, Coimbatore

**CLOUD COMPUTING**

**THURSDAY**  
**10th AUG 2023**

**REGISTER NOW**

**04 - 05 PM**

<https://edudev.com/stem-master-class/>

Zoom Meeting: Amrita Technology Enabling Center

Meeting ID: 919 620 2323

Participants: Ruthina Balaji, Boty Thomas, DEK,THEENMOZH ASS..., ZFCID45 Harshana G, perween Assistant Pr..., Sumathi S, Dr. G. Chandipati Ass...

Slide Content:
 

- The focus of TEC will be on providing an innovation ecosystem, process and support system.
- At TEC, we ensure that the technologies/innovations developed reach the market through collaborations with companies, through market driven technology transfer & research.

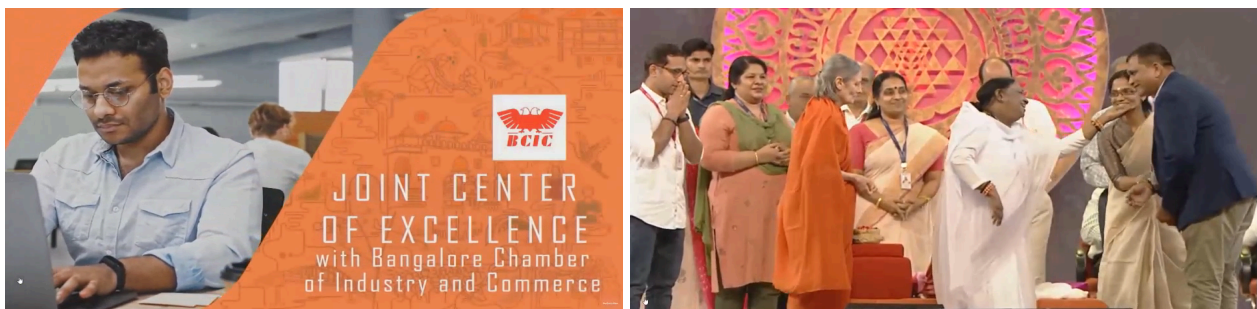
## Awards & Achievements

### Industry Joint Centre of Excellence Launched For Technology Empowerment

Over the past three years, Amrita Technology Enabling Center and Bangalore Chamber of Industry and Commerce (BCIC) have fostered a series of collaborative sessions. Building upon this continued engagement, a new concept note for the Center of Excellence has been proposed and launched by Amrita and BCIC, focusing on Startups, MSMEs, and Technology Development for Societal Good, with shared objectives.

The Center endeavors to identify areas of strength and harness resources from its extensive network of partners, including manpower and funding. It is committed to prioritizing activities and executing them within defined timelines. The engagement models encompass Corporate CSR, Government (Central and State), Academia-Industry Innovation Days, MSME Outreach, and comprehensive support systems for Startups.

The objectives span across various sectors, including Start-Ups, MSMEs, Corporate, and State, aiming to address problem statements with both domestic and global significance. The vision is to foster collaboration with industry partners, provide robust support systems for startups, conduct impactful IAM/Yoga sessions for corporate entities, and engage in cutting-edge research and whitepapers.



Launch of Joint Center of Excellence with BCIC

Stay tuned for updates as we embark on this transformative journey of innovation and collaboration!

## Award in Medical Point of Care Devices



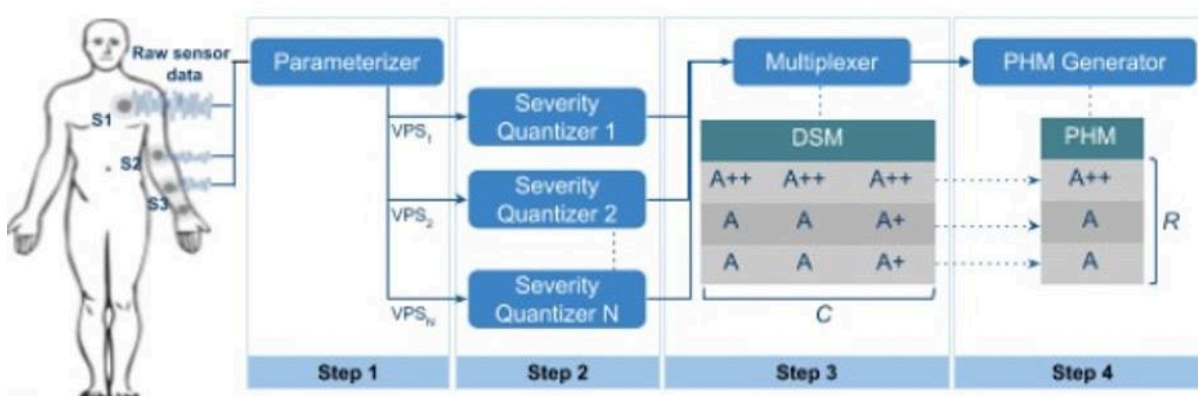
Medical, is India's largest B2B Medical Equipment Exhibition. Medical serves as a marketing platform wherein the equipment companies showcase their products and services to Hospital owners and decision-makers. The event also recognises the innovators through an evaluative process with an expert committee. Amrita 5 in 1

Health care device won the finalist award in the Point of Care Devices category.

## Patents Granted through TEC

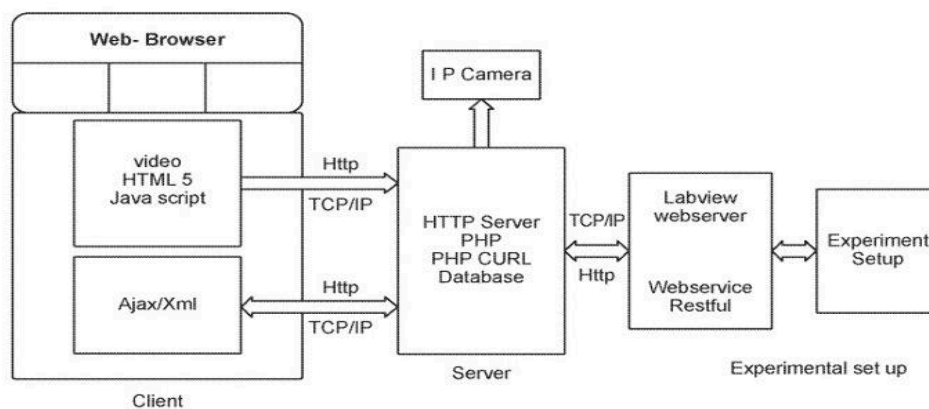
### Indian Patent 459006 Systems and Methods for Remote Health Monitoring and Management

With connected medical devices fast becoming ubiquitous in healthcare monitoring there is a deluge of data coming from multiple body-attached sensors. Transforming this flood of data into effective and efficient diagnosis is a major challenge. To address this challenge we designed, developed, and tested a predictive healthcare data analytics and communication framework called RASPRO (Rapid Active Summarization for effective PROgnosis) in a collaborative work with doctors. In RASPRO we built a novel three-step technique to derive high performance alerts from voluminous sensor data

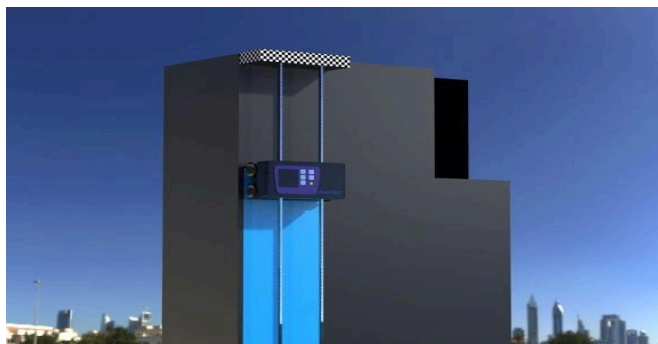


## Indian Patent 457984 Solar Monitoring System for Measuring Solar Radiation Intensity

A solar monitoring system for measuring solar radiation intensity comprising a tracking unit having two-axis movement comprising, an image capturing head mounted with first and second irradiation measuring units, and a controller. The first irradiation measuring unit comprises a direct normal irradiance (DNI) sensor and the second irradiation measuring unit includes a diffuse horizontal irradiance (DHI) sensor and a global horizontal irradiance (GHI) sensor. The controller receives inputs from the sensors or a software program configured to control orientation of the image capturing head so that the DNI sensor is always exposed to the sun, and the shading disc is always directly between the DHI sensor and the sun.



## Indian Patent 455612 An Automated System for Wall Painting

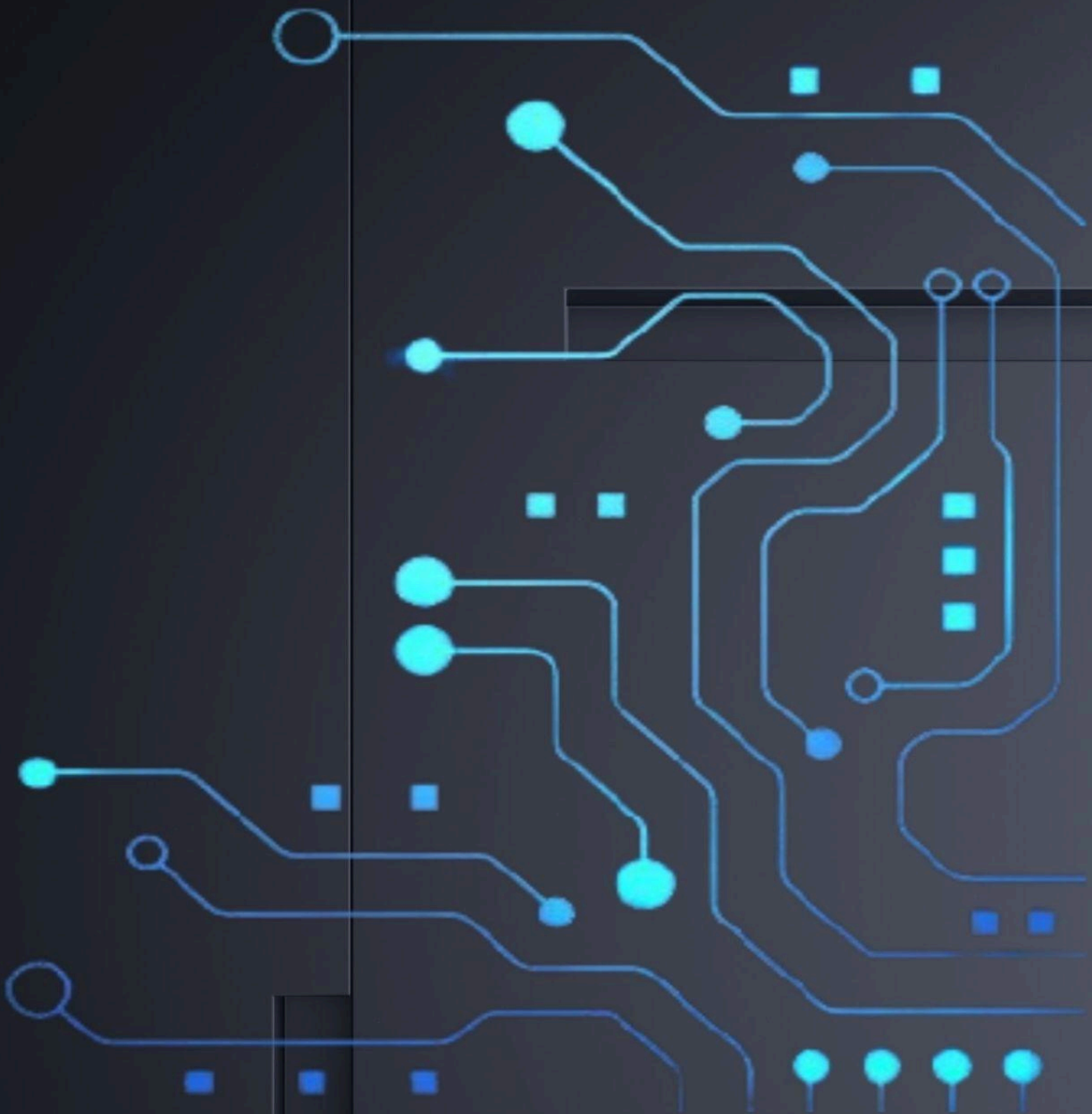


Amrita developed a robot which ascends tall walls upon which it gets mounted, independently, and simultaneously paints the surface without compromising the finish. This robot combines machine learning and computer vision with standard robotics methods to

achieve its goals. The student team had participated in James Dyson award international design competition. They were also a semi-finalist in the Accenture innovation challenge. The “WallpBot” has also been filed as a patent. The idea was to create the simplest possible solution to paint tall walls and save human counterparts from health hazards and painting accidents.

## Indian Patent 452646 Robotic Machine for Climbing Coconut Trees and Harvesting Coconuts

The present invention provides a robotic machine for climbing coconut trees and cutting coconuts, the robotic machine includes a machine unit and a ground station, wherein the machine unit comprises robotic arm, robotic body and base rod connecting the robotic arm and robotic body. The robotic arm includes an arm unit, a controller unit, a processing unit, a plurality of servomotors, a wireless camera, and DC motors. The robotic body includes circular body, plurality of wheels, plurality of torsion springs, battery and channel for the circular motion of the arm. The wheels enable the machine unit to hold and climb on the trunk of a coconut tree. The camera captures video in the vicinity of the cutter, and transmits the video to the ground station for displaying to the operator, and based on the video, the operator can command the machine unit and position the cutter to cut the coconut precisely.



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