Institute of Advanced Research
The University for Innovation
IAR University
Established under the Gujarat Private Universities Amendment Act 2011 and recognized under section 22 and 2(f) of UGC

SSIP

INSTITUTION'S INNOVATION COUNCIL
(Ministry of Education Initiative)

A Report on

"Deep Tech Innovation Challenge"

Theme: Robotics

(Academic Session: 2026-27)

Organizing Committee:

IIC and SSIP Cell

Organizing Coordinators:

Mr. Milan Trivedi

Dr. Shuvomoy Banerjee

Report Prepared by:

Mr. Milan Trivedi

IIC Convener, IAR University

Date of the event: 26/08/2026

Name of Event	**"Deep Tech Innovation Challenge" - Theme: Robotics**
Event Type (Co-curricular/ Extra Curricular)	**Co-curricular**
Platform	**Offline (On-Campus, IAR University)**
Date & Time:	**26 August 2026, 12:00 PM to 2:00 PM**
Total Number of participants:	**Participants from IAR University:** **Students: ___46___ UG Students** **Faculty/Coordinators: IIC & SSIP Team** **Event Speaker:** **Mr. Milan Trivedi, IIC Convener, IAR University**
Guest/Expert invited	**Mr. Milan Trivedi, IIC Convener, IAR University**
Event Coordinator	**Dr. Shuvomoy Banerjee, Coordinator - R&D Cell of IIC**
Media coverage	**https://x.com/iaruniversity/status/2100267037729952142**
Link to session on online platform	**NA (Offline Session)**
Payment advice from the Accounts department:	**NA**
Sponsoring authority	**Institution's Innovation Council (IIC) & Student Startup and Innovation Policy (SSIP)**

Expert: Mr. Milan Trivedi - IIC Convener, IAR University

Brief biography of the expert:

Mr. Milan Trivedi serves as the Convener of the Institution's Innovation Council (IIC) at IAR University, where he drives the university's innovation, incubation and entrepreneurship agenda. In this role he coordinates IIC and SSIP activities across departments, mentors student teams working on technology-driven ideas, and organizes hands-on programmes that expose students to emerging and deep technology domains such as robotics, automation, IoT and artificial intelligence. His sessions are known for combining conceptual clarity with practical, industry-oriented context, making complex engineering subjects accessible to students across disciplines.

Objective of the Event:

The "Deep Tech Innovation Challenge" on the theme of Robotics was organized by the IIC and SSIP Cell of IAR University to introduce students to one of the most significant deep technology domains of the present decade, and to encourage them to convert their technical curiosity into innovation projects and startup ideas. The session aimed to:

- Familiarize students with the definition, working principle and sense-think-act loop of a robot, and distinguish robotics from ordinary fixed automation.
- Explain the anatomy of an industrial robot - manipulator, end effector, actuators, sensors, controller and power supply - as an integrated system.
- Build conceptual clarity on links, joints and degrees of freedom, and on why 6 DOF is the industrial standard.
- Introduce the ethical framework of robotics through Asimov's Laws, while clarifying that real-world safety is governed by engineering standards such as ISO 10218 and ISO/TS 15066.
- Present the standard robot configurations - Cartesian, Cylindrical, Spherical, SCARA and Articulated - and the criteria used to select one for a given application.
- Create awareness of the breadth of robotics applications across industry, healthcare, agriculture, defence, space and service sectors.
- Motivate students to take up robotics-based problem statements as deep tech innovation projects and to approach the IIC/SSIP cell for mentorship and funding support.

Brief Overview of the Session:

The event opened with a welcome address by the Event Coordinator, Dr. Shuvomoy Banerjee, Coordinator - R&D Cell of IIC, who set the context for the Deep Tech Innovation Challenge and explained why robotics has been chosen as the theme for this edition. He highlighted that deep tech innovation demands a strong grounding in fundamentals before ideation, and that the session was designed to give participants exactly that base.

Mr. Milan Trivedi then delivered the technical session titled "Fundamentals of Robotics - Anatomy, Laws, Configurations and Applications." He began by defining a robot as a reprogrammable, multifunctional manipulator designed to move material, parts, tools or specialised devices through variable programmed motions. He stressed that reprogrammability is the single feature that separates a robot from conventional fixed automation, and walked the audience through the four-stage sense - think - act - reprogram cycle. Historical milestones, including the first programmable robot patent by Devol in 1954 and the installation of Unimate as the first industrial robot in 1961, were used to trace the growth of the field to the roughly four million industrial robots operating worldwide today.

The first part of the session covered the anatomy of a robot. The speaker explained the six subsystems - the manipulator formed of links and joints as a kinematic chain, the end effector at the wrist such as a gripper, welding torch or suction cup, the actuators acting as the muscles of the

machine, the sensors providing encoder, vision, force and proximity feedback, the controller functioning as the brain, and the power supply. He illustrated the closed signal flow from sensors to controller to actuators to manipulator to end effector, and discussed how actuator selection differs between hydraulic drives for heavy payloads, pneumatic drives for fast pick-and-place, and electric servo drives for precision work. This was extended into a discussion of links, joints and degrees of freedom, covering revolute and prismatic joints and explaining why three degrees of freedom position the wrist in space while three more orient the tool, giving the standard six-axis industrial configuration.

The second part addressed the Laws of Robotics. The three laws proposed by Isaac Asimov in 1942, along with the later Zeroth Law, were presented in their order of priority as an early framework for thinking about machine ethics. The speaker was careful to underline that these laws are literary rather than engineering rules, and that real industrial safety is enforced through standards such as ISO 10218 for industrial robots and ISO/TS 15066 for collaborative robots, supported by physical guarding, light curtains and emergency stop systems. This segment generated considerable interest among students, particularly in relation to autonomous vehicles and AI-driven systems.

The third part dealt with robot configurations. Using the notation of the first three joint axes, the speaker compared the Cartesian (PPP), Cylindrical (RPP), Spherical or Polar (RRP), SCARA (RRP) and Articulated (RRR) configurations, describing the shape of the work envelope produced by each, its characteristic strength and its principal limitation. He explained that the work envelope is the most important selection criterion after payload, and that articulated arms account for the majority of installed industrial robots because of their dexterity, while SCARA units dominate high-speed electronics assembly and Cartesian gantries are preferred where very large working areas are required. A comparative table summarising configuration, notation, envelope, strength and limitation was shared with participants.

The fourth part surveyed applications. Industrial uses covered material handling and palletising, spot and arc welding, spray painting, assembly, machine tending and machine-vision inspection, summarised through the rule of the four D's - work that is Dull, Dirty, Dangerous or Dear. Non-manufacturing and service applications were covered next, including tele-operated surgical systems and rehabilitation exoskeletons, planetary rovers and satellite servicing craft, bomb disposal and unmanned vehicles, autonomous tractors and drone spraying in agriculture, nuclear decommissioning and remotely operated underwater vehicles, and domestic and warehouse robots. The speaker flagged collaborative robots, or cobots, and AI-driven mobile robots as the fastest-growing and most opportunity-rich segments for student innovators.

The session closed with a summary of advantages and limitations of robotic automation and an open interaction round. Students raised questions on selecting a configuration for a given problem statement, on low-cost prototyping platforms for robotics projects, on career pathways in the domain, and on the support available for building robotics prototypes on campus. Dr. Shuvomoy Banerjee concluded the session by briefing participants on how the R&D Cell of IIC and the SSIP scheme can support robotics-based ideas through mentorship, prototyping assistance and funding facilitation.

Outcome of the Event:

The Deep Tech Innovation Challenge on Robotics succeeded in giving participants a structured and complete introduction to the domain within a single session. Students gained a clear understanding of what constitutes a robot, how its subsystems interact, how joint configuration determines the work envelope, and where robotics is applied across sectors. The ethical and safety discussion gave them a balanced view of the responsibilities that accompany automation. Most importantly, participants left with a practical framework for evaluating whether a task is a suitable candidate for automation and with several concrete directions for robotics-based innovation projects. A number of students expressed interest in forming teams to develop robotics prototypes and in approaching the R&D Cell of IIC and the SSIP cell for further support.

Audience/Participants Feedback:

Participants responded positively to the session, particularly appreciating the logical progression from fundamentals to applications and the use of clear diagrams and comparative tables. Students from non-mechanical branches noted that the anatomy and degrees-of-freedom explanations were easy to follow despite the technical subject matter. The segment on Asimov's Laws and real-world safety standards was frequently cited as the most engaging part of the session. Several participants requested follow-up hands-on workshops on robot programming and prototyping, and asked that the presentation be shared for reference.

Report for Media:

The Institution's Innovation Council (IIC) and SSIP Cell, IAR University, successfully conducted the **"Deep Tech Innovation Challenge" on the theme of Robotics** on 26th August 2026 at the university campus.

Key highlights:

- Deep tech session on Robotics conducted under the IIC and SSIP initiative
- Expert session by Mr. Milan Trivedi, IIC Convener, IAR University
- Coordinated by Dr. Shuvomoy Banerjee, Coordinator - R&D Cell of IIC
- Complete walkthrough of robot anatomy - manipulator, end effector, actuators, sensors, controller and power supply
- Asimov's Laws of Robotics discussed alongside real-world safety standards ISO 10218 and ISO/TS 15066
- Comparison of Cartesian, Cylindrical, Spherical, SCARA and Articulated robot configurations
- Applications explored across manufacturing, healthcare, agriculture, defence, space and service sectors
- Students encouraged to take up robotics-based innovation projects with IIC and SSIP support

Explore. Build. Innovate. - Learn, Create, Transform!

#IIC #SSIP #IARUniversity #DeepTech #Robotics #Innovation #Automation #StartupIndia #StudentInnovation

Event Flyer:


The University for Innovation
INSTITUTION'S INNOVATION COUNCIL
(Ministry of Education Initiative)
SSIP
STUDENT STARTUP & INNOVATION POLICY
PRESENTS
ROBOTICS
Explore | Build | Innovate
DATE
26-08-2026
TIME
12:00 to 2:00
EVENT SPEAKER
Mr. Milan Trivedi
IIC Convener
EVENT COORDINATOR
Dr. Shuvomoy Banerjee
Coordinator-R&D Cell off IIC
LEARN • CREATE • TRANSFORM

Media Coverage: https://x.com/iaruniversity/status/2100267037729952142

Photographs of the event -









Acknowledgement –
The committee members acknowledges contribution of:

- Director, IAR
- Dean Academics
- Registrar
- Dean Research
- Heads, All the Department
- Student Volunteers

Enclosures:

- Annexure- I (Notice Circulated for the event)
- Annexure- II (Flyer of the event)
- Annexure- III (Expenditure and Invoices)
- Annexure- IV (Attendance sheet)
- Annexure- V (Feedback from Students)

Report Copied to: (attachment sent through email)

- Office of Director, and Registrar
- Office of Dean Research and Academics
- Heads of all the Department
- SSIP/IIC Coordinator

Signature
Dr. Roli Mishra
Chairperson, IIC, IAR

INSTITUTE OF ADVANCED RESEARCH GANDHINAGAR

Signature
Mr. Milan Trivedi
IIC Convener,IAR
(Event Coordinator)

Date: 27/08/2026
Place: Gandhinagar

Annexure - I

Attendance:

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Attendance of Students

Name of Event: Deep Tech Innovation challenge – "Robotics"
Venue: A1:302
Date: 27/08/2026

Sr. No.	Student Name	IAR Number	Program	Semester	Signature
1	Amit Ignatius	19200	BTech CE	1	
2	Patel dishant	19701	BTech CE	1	
3	Dhruv Mishra	18116	BTech CE	1	
4.	Chauhan Priyanshi	18629	Btech CE	1	
5	Dimple Jain	19647	"	1	
6.	Kamya Koria	18207	Btech CE	1	
7.	Kaumshut Patel	18063	"	1	
8.	Khushi Patel	18398	Btech CE	1	
9.	Dhvani Patel	18717	"	1	
10.	Diya Vagadia	19477	Btech CE	1	
11.	Diya Barot	18499	B.Tech.CE	1	
12.	Charmi Brahmbhatt	18034	BTech CE	1	
13.	Angel Talreja	19285	B.tech CE	1	
14.	Mahek Singh	20120	B.tech C.E	1	
15	Akshara Patel	19332	B.tech CE	1	
16	Kunj Mistry	18043	B.tech C E	1	
17	Rawal Yashvi	19406	Btech CE	1	
18	Patel Pankti	18031	B tech CE	1	
19	Patel Darshita	19402	B tech CE	1	
20	Soni Ishan	20207	Btech CE	1	
42	Sharma Dwashti	20095	B tech CE	1	
43	Shrushti Desai	20121	B tech CE	1	

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Attendance of Students

Name of Event: Deep Tech Innovation Challenge - "Robotics"
Venue: A1:302
Date: 27/08/2026

Sr. No.	Student Name	IAR Number	Program	Semester	Signature
21	Gosawami Chaitanya	19683	B.Tech-CE	I	
22	Fenil Korat	18940	B.Tech CE	I	
23	Prajapati Daksh	19306	B. Tech CE	I	
24	Rujpara Faizan	19188	B.tech CE	I	
25	Dhanga Mhejabeen	19195	B.tech.CE	I	
26	Karam Patel	19206	B.tech CE	I	
27	Diya Meghani	18118	B.Tech CE	I	
26	Harshil Vinparia	19261	B.Tech CE	I	
27	Charmi Patel	18110	B.Tech CE	I	
28	Dhrupalsinh Parmar	18033	B.Tech CE	I	D.M.Parmar
29	Keval V. Patel	19212	B.Tech CE	I	
30	Abhishek	19371	B.Tech (CE)	I	
31	ARPit Patel	19147	B.Tech CE	I	A.D.Patel
32	Karmveersinh	19462	B.Tech CE	I	
33	Kirtan Patel	18105	B.Tech CE	I	
34	Het Shah	20063	B.Tech CE	I	
35	Vraj Patel	18095	B.Tech CE	I	
36	Jayal Patel	19739	B.tech CE	I	
86	VRUSHIK GADIYA	19465	B.tech CE	I	
87	Divy Patel	18561	B.tech CE	I	
38	Naitik Gujjar	19350	B.tech CE	I	
39	Om prajapati	19675	B.tech CE	I	
40	Patel Swayam	19772	B.tech CE	I	
41	Patel Aryan	18080	B.tech CE	I	