# TRAINING REPORT

# Two-Day Faculty Training Program on Doosan Digital Twin Robotic System

**Organized at:**

Digital Twin Laboratory

Vidya Pratishthan's Sharadchandra Pawar Center of Excellence in Artificial Intelligence

**Training Dates:** 15th June 2026 and 16th June 2026

**Training Partner:** I-Tech Robotics, Pune

**Trainers:**

- Mr. Om Gunjal
- Mr. Parag Patil

## 1. Introduction

Vidya Pratishthan's Sharadchandra Pawar Center of Excellence in Artificial Intelligence has recently established a state-of-the-art Digital Twin Robotics Laboratory equipped with advanced industrial automation and robotics technologies. To enable faculty members to effectively utilize these facilities for training, research, and industrial projects, a two-day hands-on training program was organized on 15th and 16th June 2026 in collaboration with I-Tech Robotics, Pune.

The training focused on industrial robotics, digital twin technology, PLC integration, machine vision, simulation, and emerging Industry 4.0 technologies.

## 2. Laboratory Infrastructure Covered During Training

The newly established laboratory includes:

- Doosan Collaborative Industrial Robot
- Siemens S7-1200 PLC
- Visual Components Digital Twin Software
- 10 Arduino Development Boards
- 10 Raspberry Pi 5 Development Kits
- 10 NVIDIA Jetson Nano AI Computing Kits
- Machine Vision System
- Meta Quest 3 AR/VR Headsets

## 3. Objectives of the Training

The major objectives of the training program were:

- To familiarize faculty members with Doosan Industrial Robot operations.
- To understand robot programming and industrial applications.
- To learn PLC and Robot integration using Siemens S7-1200.
- To develop Digital Twin simulations using Visual Components.
- To understand machine vision-based automation.
- To explore AI, IoT, and Edge Computing integration using Raspberry Pi and Jetson Nano.
- To study AR/VR-based industrial training and simulation environments.
- To prepare faculty members for conducting student training, internships, and industrial projects.

## 4. Day 1 Activities (15th June 2026)

### Session 1: Introduction to Industrial Robotics

Mr. Om Gunjal introduced the participants to industrial automation concepts, collaborative robotics, safety standards, and Industry 4.0 technologies.

Topics Covered:

- Fundamentals of Industrial Robotics
- Robot Coordinate Systems
- End Effectors and Tooling
- Robot Safety Features
- Collaborative Robot Applications

**Session 2: Doosan Robot Programming**

Participants received hands-on training on:

- Robot Teaching Methods
- Waypoint Creation
- Motion Programming
- Pick-and-Place Operations
- Tool and Workpiece Calibration
- Safety Configuration

**Session 3: Industrial Applications Demonstration**

The trainers demonstrated various industrial applications including:

- Welding Automation
- Spray Painting Operations
- Machine Tending
- Bearing Assembly
- Palletizing Operations

Faculty members gained practical experience in configuring and executing robotic tasks.

**5. Day 2 Activities (16th June 2026)**

**Session 1: Siemens PLC Integration**

Mr. Parag Patil conducted detailed training on integrating the Doosan Robot with Siemens S7-1200 PLC.

Topics Covered:

- PLC Communication Concepts
- Digital Input and Output Mapping
- Robot Triggering through PLC
- Industrial Automation Sequences
- Real-Time Monitoring and Control

**Session 2: Digital Twin Development using Visual Components**

Participants learned how to create digital representations of robotic workcells using Visual Components software.

Topics Covered:

- Digital Twin Fundamentals
- Layout Creation
- Robot Import and Configuration

- Simulation of Manufacturing Processes
- Collision Detection
- Process Optimization
- Virtual Commissioning

**Session 3: Vision-Based Automation and Sorting**

The trainers demonstrated machine vision applications including:

- Colour-Based Sorting
- Shape-Based Sorting
- Vision Guided Robotics
- Object Detection Techniques
- Industrial Inspection Concepts

**Session 4: Emerging Technologies Integration**

A detailed discussion was conducted on integrating the robotic system with:

- Arduino Platforms
- Raspberry Pi 5
- NVIDIA Jetson Nano
- AI and Machine Learning Applications
- IoT-Based Monitoring Systems
- AR/VR Applications using Meta Quest 3

The participants explored possibilities for research projects, student internships, and industrial consultancy activities.

## 6. Key Learning Outcomes

After completion of the training, faculty members were able to:

- Operate and program the Doosan Industrial Robot.
- Integrate the robot with Siemens S7-1200 PLC.
- Create and simulate Digital Twin environments using Visual Components.
- Understand machine vision-based automation systems.
- Design colour and shape-based sorting applications.
- Develop Industry 4.0-based automation projects.
- Explore AI, IoT, and Edge Computing integration using Raspberry Pi and Jetson Nano.
- Utilize AR/VR technologies for industrial simulation and training.

## 7. Future Scope

The Digital Twin Robotics Laboratory will support:

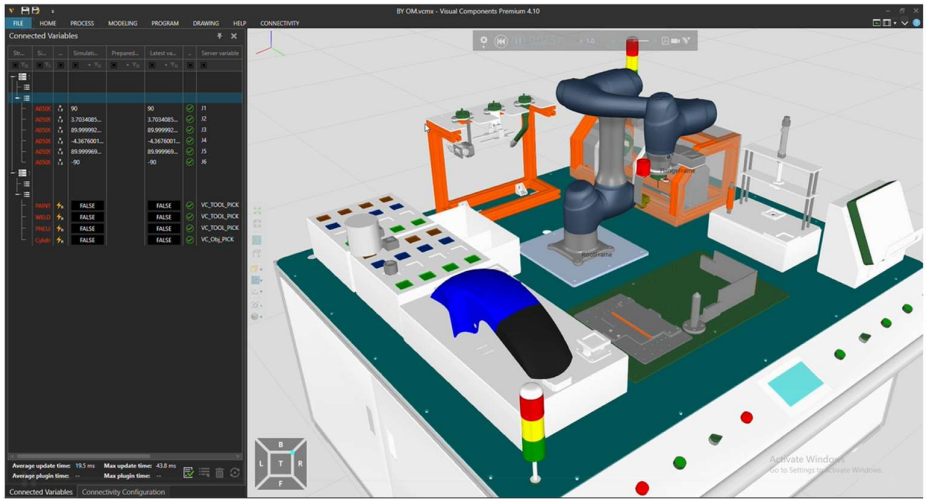
- Student Training Programs
- Industrial Internships
- Research and Development Activities
- Industry Sponsored Projects
- Faculty Development Programs
- Industry 4.0 and Smart Manufacturing Initiatives
- Robotics and Automation Competitions
- AI and Machine Vision Research

The facility will play a significant role in enhancing practical learning and bridging the gap between academia and industry.

## 8. Conclusion

The two-day training program conducted by I-Tech Robotics, Pune successfully provided faculty members with comprehensive knowledge of industrial robotics, digital twin technology, PLC integration, machine vision, and Industry 4.0 applications. The hands-on sessions delivered by Mr. Om Gunjal and Mr. Parag Patil enabled participants to gain practical exposure to advanced automation technologies.

The training marks an important milestone in strengthening the capabilities of Vidya Pratishthan's Sharadchandra Pawar Center of Excellence in Artificial Intelligence and will facilitate future academic, research, and industrial collaborations in the fields of Robotics, Automation, Artificial Intelligence, and Digital Twin Technologies.

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