Vishavjit Singh Khinda

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EDUCATION

Master of Science in Robotics and Autonomous Systems August 2024 - May 2026
Arizona State University, Tempe, AZ GPA: 4.00/4.00

Bachelor of Technology in Mechanical Engineering August 2019 - May 2023
National Institute of Technology, Jalandhar, India GPA: 7.75/10.00

PROJECTS

Supervisory Motor Control System using PLC, Ignition, and Modbus TCP | ASU Spring 2026

- Deployed a motor direction control system on OPTA PLC using FBD and Structured Text (IEC 61131-3) programming with SR latches, direction interlocking, and OR logic for simultaneous physical switch and HMI command handling.
- Established Modbus TCP communication between OPTA PLC and Ignition HMI by configuring Holding and Input Registers, enabling bidirectional real-time data exchange over Ethernet.
- Built customized Ignition SCADA HMI with real-time motor status indicators and momentary direction command buttons, enabling remote supervisory control of a 24V DC motor alongside physical toggle switches.

FANUC Teach Pendant Palletizing Program | ASU Spring 2026

- Programmed a FANUC industrial robot to autonomously pick and place a 2×3 grid of components using a single taught position register and nested loop logic, which makes it scalable to any grid size.
- Implemented offset programming technique to compute all pick and place positions, significantly reducing setup time by eliminating the need for multiple taught points.

Automated Wafer Manufacturing Work Cell | ASU Spring 2026

- Designing and commissioning a multi-robot automated work cell integrating a Dobot M1 SCARA robot with a custom 3D printed wafer gripper, Elephant Robotics Cobot Pro 600, two conveyor belts, proximity sensors, a camera vision system, laser engraving and an Allen-Bradley Micro 820 PLC to replicate a semiconductor wafer manufacturing process.
- Programming Allen-Bradley micro 820 PLC to coordinate robot motion, conveyor control, and sensor-triggered process transitions, while building an Ignition SCADA HMI for real-time supervisory visibility and deploying a camera system to capture and inspect wafer images on the second conveyor belt.

Smart IIOT Manufacturing System for Predictive Quality Control | ASU Fall 2025

- Architected and deployed a complete 5-layer IIOT system for real-time semiconductor wafer defect detection, using wafer dataset as device layer, integrating MQTT messaging, edge-based ML inference and PostgreSQL database as cloud layer.
- Created streamlit-based interactive dashboard acting as application layer, with real-time process parameter visualization, defect prediction, alert acknowledgment with multi-line production status resulting in enhanced operator decision-making.
- Achieved 94% wafer defect prediction accuracy with 70% recall value by training and deploying an edge-based XGBoost model on historical wafer data with <50ms inference latency.

3 DOF Robotic Arm with Kinematic Modeling | ASU Fall 2024

- Collaborated with a team of five members to design a low cost, programmable, 3 DOF robotic arm to perform autonomous pick-and-place operation of a small cubical object.
- Designed the links and gripper parts in SOLIDWORKS, 3-D printed using PLA and PETG materials, and integrated MG5465 servo motors and electro-mechanical control interfaces for precision joint actuation.
- Developed a robust inverse kinematic algorithm in Python that actuated the servo motors using PWM signals from a Raspberry Pi 5 microcontroller to execute the task with 98% accuracy and repeatability.

WORK EXPERIENCE

Rail Coach Factory, Kapurthala, India: Manufacturing Engineering Intern June 2022 - July 2022

- Assisted in operating CNC machines and other automated manufacturing equipment on a high-volume rail bogie production line (200 units/month), gaining hands-on exposure to industrial controls and automation.
- Worked with cross-functional engineering teams on production planning, work-flow optimization leading to 6% improvement in production line efficiency through data-driven process analysis.
- Helped troubleshoot issues in HVAC, pneumatic, and sensor systems on coaches using standard diagnostic procedures and checklists, supporting compliance with factory quality and safety standards.

TECHNICAL SKILLS

CAD and Simulation Tools: SOLIDWORKS, Simulink, COMSOL, ANSYS, Mujoco
Programming & Documentation: C, Python, SQL, MATLAB, ROS, Microsoft office (Excel, Word, PowerPoint)
Manufacturing & Prototyping: 3D printing, Lean six sigma, Geometric Dimensioning and Tolerance
Machine learning: Scikit-learn, NumPy, Pandas, Matplotlib, Pytorch
Industrial protocols: MQTT, HTTP, Modbus TCP/IP, Profibus, OPC UA, SECS/GEM, Ethernet IP, DeviceNet
Industrial Automation: Ignition (SCADA), Allen-Bradley Micro 820, Compact Logix 5000, FANUC Robot Programming
Interpersonal skills: Collaborative teamwork, Leadership, Problem solving, Time management, Effective communication

CERTIFICATIONS

SACA Certified Industry 4.0 Associate - Robot System Operations (Mar 2026), SACA Certified Industry 4.0 Associate - Advanced Operations (Jan 2026), Comprehensive Course on SolidWorks (Jan 2025), Six Sigma White Belt (May 2025), Geometric Dimensioning and Tolerancing (Aug 2025), Universal Robots e-Series Pro Track (Oct 2025), Machine Learning & Data Analysis with Python (Oct 2025)