Ravi Teja Kolli

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Education

University Of Delaware — Newark, DE
Master of Science in Robotics and Automation — *December 2024*

Riga Technical University — Riga, Latvia
Master of Science in Engineering Technology and Mechanical Engineering — *Jan 2022*

Vignan Institute of Technology and Science — India, Hyderabad
Bachelor of Technology in Mechanical Engineering — *May 2019*

Experience

Robotics Software Intern — Sept 2024 – March 2025
Unlimited Robotics — *Philadelphia, US*

- Designed and executed system validation tests for a healthcare robot, integrating sensor fusion for precise localization, real-time obstacle avoidance, and optimized path planning using **SLAM-based 2D mapping and 3D localization**. Debugged robotic arm operations resolving navigation and operational challenges while demonstrating problem-solving skills.
- Developed automated test scripts using **ROS2 and Gazebo simulation** for system validation. Implemented fault injection testing and performance benchmarking for autonomous navigation.. Applied ROS2 tracing for performance analysis. Developed interfaces with NATS and gRPC, ensuring seamless robot-hospital communication and real-time data exchange.
- Integrated EKF-based localization and multi-floor elevator access, tuning motion profiles for smooth vertical transitions.

Automation Engineer II — Jan 2022 – Jan 2023
Pragati Offset Pvt.Ltd — *Hyderabad, India*

- Designed and implemented PLC programming using Rockwell Studio 5000/RSLogix5000 and Ladder Logic for automated material handling systems, integrating conveyors and pneumatics, increasing system validation efficiency by 40% and saving $10,000 annually.
- Engaged in operations involving a Telematics Control Unit (TCU) assembly unit featuring 4 stations and 3 FANUC (CR-4iA) robots with R-30iB micro controller.
- Proficient in robot programming, path planning using Robo Guide and DeltaV with knowledge in KUKA integration, including I/O setup, interference zones, and PLC auto-debugging.

Robotic Process Automation Developer — Aug 2021 – Jan 2022
Accenture Baltics — *Riga, Latvia*

- Developed Invoice Processing and Order Management Automation using UiPath, reducing manual processing time by 70% and increasing efficiency . Managed RPA projects with on-time delivery rate, leveraging Azure and RE frameworks to cut errors by 85% and optimize processes.

Junior Automation Engineer — June 2019 – July 2021
SIA Automation Engineering — *Riga, Latvia*

- Assisted senior engineers in PLC (Allen Bradely, Rockwell) and HMI (Ignition) programming for 3 projects, integrating with VFDs, Barcode Scanners, and established communications via Ethernet/IP,.

Technical Skills

Languages: Python, C/C++, .NET, JavaScript,PLC
Robotics Stack: ROS2, Gazebo, RViz, MATLAB, SLAM, State-Space control, PID Tuning, Tensorflow, RoboGuide, FANUC, KUKA, HMI, SCADA
Automation/Control Systems Stack: Solidworks, AutoCAD, Ansys, NX 12.0, Creo, RsLogix 5000, FEM, SPI, Modbus and LonWork networks protocols,ControlLogix, CNC, 3D printing, CMM, Laser-cutting, Welding techniques(TIG, MIG)
Software Development Stack: Git, Docker, Linux/Ubuntu, AWS in Robotics, CMake, Azure
Computer Vision stack: OpenCV, pandas, NumPy, Matplotlib,Machine Learning

Projects

ML Techniques for Adhesive Stress-Strain Forecasting | *XGBoost, FEA, ANSYS, DNN* May 2023

- Integrating an advanced machine learning model for stress prediction in mechanical components using finite element analysis (FEA) principles.
- Implemented synthetic data generation techniques to simulate 3-point pin model behavior under various loading conditions.
- Created a comprehensive input-output framework incorporating strain tensors, stress tensors, and spatial coordinates to capture complex stress-strain relationships.
- Achieved 95% reduction in computational time compared to traditional FEA software (e.g, ANSYS), while maintaining accuracy within 3% of full-scale simulations

KUKA Robot trajectory for rectangular shape placement | *MATLAB, OpenCV* Jan 2023 – May 2023

- Leveraged a high-precision PID-controlled motion for a 7-DOF KUKA robot arm, using computer vision for object manipulation and Aruco marker-based localization to achieve sub-millimeter placement accuracy with a robust inverse kinematics algorithm.
- Maximized system performance with OpenCV for image processing, a 100 Hz control loop, ensuring real-time adaptations while optimizing torque monitoring constraints using state-space control, ensuring stable dynamic responses under variable loads.
- Secured 99.7% reliability over 1000 test cycles, completing task within 10 seconds with an average placement error of ± 0.3 mm.

Optimal Electromechanical Design: High-Performance RC Plane | *Solidworks, Arduino* April 2017

- Built a balsa wood aircraft with a focus on electromechanical integration.Used design software such as Solidworks for structural analysis and 3D modeling to optimize aerodynamics and reduce weight, resulting in a 15% increase in flight time and 25% better maneuverability
- Executed a system with brushless DC motors, digital servos, a 2.4GHz receiver, and a LiPo battery, demonstrating circuit design and control system skills
- Conducted flight tests to refine control parameters and ensure conistent performance in various weather conditions..

Research Experience

Aerial Robot soaring motion analysis and control optimization | *Solidworks,ANSYS* Jan 2022

- Achieved 95% correlation with experimental data by developing high-fidelity computational models for robot soaring motion analysis, utilizing SOLIDWORKS for 3D kinematic simulations and MATHCAD for analytical formulations.
- Integrated multi-parameter flight dynamics, including trajectory geometries, force excitation profiles, and starting conditions; this led to a 25% increase in flight duration and a 30% boost in aerodynamic efficiency.
- Performed in-depth experimental studies to improve autonomous navigation capabilities for aerial robotics in dynamic atmospheric conditions by 50%. These investigations made use of advanced control systems theory and fluid dynamics principles.

Computational Modelling of Soft Robot for Medical Devices | *ANSYS,CFD* May 2021

- Designed an innovative soft robotic system for club foot (CTEV) treatment, utilizing hyperelastic material analysis and computational modeling. Achieved 30% improved efficacy, reduced discomfort for ages 1-4, and potentially 15-20% shorter treatment time.
- Applied Denavit-Hartenberg parametrization to 15+ foot bone structures, improving 3D modeling accuracy of deformities by 25%. Created an adaptive rehab assist shoe prototype with 35% increased corrective force and greater manipulation range.
- Fine-tuned 10+ hyperelastic models for material selection and optimized a comprehensive computational framework combining soft robotics, biomechanics, and material science.