Srushti Raste

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Summary

- Robotics & Electronics Graduate Engineer with specialization in robotic design, control, motion planning, and circuit design.
- 4+ years of experience in PCB design, CAD, Embedded systems, Programming, Sensors & Actuators and SLAM.
- 2+ years of experience in Machine learning for robotic control, focusing on autonomous vehicles and biomechanical systems.

Education

M.S. Robotics & Autonomous Systems | Boston University, USA | GPA: 3.6/4.0 Sept 2023 – Jan 2025
Relevant Coursework: Robot Learning, Vision, Robotics & Planning, Soft Robotics, Cyber-Physical Systems, Medical Robotics, Mathematical Modeling of Mechanical Systems, Biological Feedback Control, Robotics & Autonomous Systems.

B.Tech. Electronics Engineering | K.J. Somaiya College of Engineering, Mumbai | GPA: 8.87/10.0 Aug 2019 – May 2023
Relevant Coursework: Embedded Systems, Digital Signal Processing, Microprocessors, Circuit Analysis & Design, VLSI Design, Hardware description language (VHDL & Verilog), Control Systems, Sensors & Automation, PLC, C Programming.

Projects

Object Manipulation in Musculoskeletal Simulations with RL | Python, Machine Learning, MuJoCo Oct 2024 - Dec 2024
- Simulated a musculoskeletal arm model in MuJoCo using MyoSuite library to perform manipulation task for humanoid robots.
- Trained the agent using the PPO and SAC algorithms, optimizing it with custom reward function and hyperparameter tuning.
- Evaluated the performance of both algorithms by analyzing differences in policy loss, value loss, and reward curves.

Autonomous Vehicle Control and Learning | Imitation Learning, Motion Planning, RL Sept 2024 - Dec 2024
- Collected data using a control agent in the CARLA Simulator and trained a neural network to imitate the expert behavior.
- Designed a modular pipeline including lane detection, waypoint-based path planning, motion control using Stanley and PID controller.
- Developed a Deep Q-Network, utilized replay buffers, and evaluated performance metrics to ensure successful autonomous driving.

Seven Segment Display with Robot Formation of Six Robots | Swarm Robotics, Pose Estimation, ROS2 Oct 2023 - Dec 2023
- Developed a 6-robot system to mimic 7-segment display using ROS2, AprilTags, RPi, and camera for communication and localization.
- Integrated ESP32 modules running MicroROS to bridge communication between ROS2 and Arduino-controlled Elegoo robots.
- Implemented PID control for precise movement and accurate straw positioning using servos to form display numbers.

Work Experience

Research Assistant | Morphable Biorobotics Lab, BU Mechanical Engineering | Boston, MA Sept 2024 - Present
- Designed and soldered a flexible PCB for a wearable haptic glove, enabling tactile feedback as part of a PhD research initiative.
- Facilitated experiments and conducted human user studies to evaluate the glove's performance.
- Co-author on a research paper submitted to IEEE Robotics and Automation Letters (RA-L).

R&D Intern | Mechanics of Slender Structures Lab, BU Mechanical Engineering | Boston, MA Jun 2024 - Aug 2024
- Designed a Yoshimura-patterned origami bellow bending actuator for grasping in soft brachiating robots.
- Fabricated 12 actuators with varying bellow counts and materials for the body and SL layer, achieving bending angles up to 90 degrees.
- Conducted constant curvature and grip strength tests to evaluate bending characteristics and measure force output.

Electronics Engineer | KJSCE Robocon | Mumbai, India Nov 2020 - Dec 2021
- Served on the core team of KJSCE ROBOCON and competed in the National DD Robocon 2021 competition.
- Engineered two robots, overseeing PCB design using Altium Designer, soldering, wiring, and circuit debugging.
- Implemented communication protocols (UART, SPI, I²C, CAN) and wireless modules (HC-05, HC-06, Zigbee).

Skills

- **Programming**: C, C++, Python, MATLAB, Arduino IDE, LabVIEW
- **PCB Design & CAD**: Altium Designer, SolidWorks, EasyEDA, Eagle PCB, Proteus
- **Robotics**: Robot Kinematics, Dynamics, Control, ROS, SLAM, Motion Planning (RRT, RRT*, & Hybrid A*)
- **Simulation** : Simulink, Webots, CARLA Simulator, MuJoCo, MyoSuite, LTspice
- **Machine Learning Frameworks** : PyTorch, TensorFlow, Stable-Baselines3, OpenAI Gym
- **Prototyping**: 3D Printing, PCB Designing, Soldering, Laser Cutting