Shriman Raghav Srinivasan

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Education

Northeastern University — Boston, MA
Master of Science in Robotics; GPA: 3.78 — *September 2024 – August 2026*
- Relevant Courses: Control Systems Engineering, Legged Robots, Robot Mechanics & Control, Mobile Robotics

SRM Institute of Science & Technology (SRMIST) — Chennai, India
Bachelor of Technology in Mechatronics Engineering; GPA: 3.81 — *June 2018 – May 2022*
- Relevant Courses: Linear & Digital Control Systems, Fundamentals of Robotics, Automation & Intelligent Systems

Experience

Manufacturing Equipment Engineer Intern — April 2025 – December 2025
Tesla Inc. — *Fremont, CA*
- Owned DFMEA-driven reliability improvements for AGV operations, resolving control instabilities through systematic PID tuning, dynamic modeling, vibration mitigation, and RFID recalibration, targeting 35% downtime reduction
- Programmed penalty-optimized Theta* path planning with integrated motion control, enabling real-time dynamic rerouting and reducing routing complexity by 83% for 47 autonomous vehicles
- Validated actuator torque, drivetrain efficiency, and thermal limits through dynamic modeling, ensuring control system performance under varying operational conditions
- Deployed autonomous AMRs with SLAM and sensor fusion, developing closed-loop navigation systems enabling $2.04M projected annual cost savings

Robotics Engineer – Projects — July 2022 – August 2024
Hero MotoCorp Ltd — *Neemrana & Tirupati, India*
- Implemented PID-based control systems for robotic manipulators, improving motion stability and reducing positioning errors by 12%, resulting in increased precision for high-speed assembly tasks
- Designed Model Predictive Control (MPC)-based path planning algorithm for Autonomous Mobile Robots (AMRs), achieving 33.4% reduction in operational delays and enhancing real-time coordination
- Developed precision trajectory planning algorithms in MATLAB and Simulink, optimizing joint trajectories and reducing material wastage by 11.9%, saving $476,000 annually in adhesive costs
- Designed real-time vision-based control system for robotic spot-welding processes, achieving sub-50ms response times and reducing defect rates by 22.1%

Projects

Bipedal Walker: Nonlinear Feedback Control Design — January 2026 – April 2026
- Implemented nonlinear closed-loop feedback controller using zero dynamics and input-output linearization, achieving exponentially stable bipedal walking through Lyapunov-based stability analysis
- Designed stable walking gaits using Bezier polynomial parameterization of virtual constraints, applying Poincaré map analysis to verify orbital stability of periodic walking motions
- Modeled nonlinear hybrid dynamics of bipedal walking including continuous swing phase ODEs and discrete impact reset maps, fundamental to legged robot control design

Maze-Solving Robot: Multi-Controller Comparison — January 2025 – April 2025
- Developed MATLAB simulation framework comparing PID, LQR, MPC, and SMC controllers for unicycle robot navigation, with MPC achieving 23% lower mean tracking error and SMC demonstrating robustness to disturbances
- Implemented receding horizon MPC with 25-step prediction and 8-step control horizons, optimizing cost function balancing tracking error, control effort, and path proximity

GPS & IMU Sensor Fusion for State Estimation — September 2024 – November 2024
- Built sensor fusion framework for precise localization combining GPS and IMU data with Extended Kalman Filtering, improving state estimation accuracy by 17.4% for closed-loop control applications
- Designed real-time trajectory correction algorithms compensating for IMU drift, reducing positioning errors by 15.7% and ensuring reliable state feedback for control systems

Technical Skills

Technical: PID Control, Model Predictive Control (MPC), State Estimation (Kalman/EKF), Trajectory Tracking, Nonlinear Control, Lyapunov Stability, System Identification, Adaptive Control, Zero Dynamics

Programming: Python, C/C++, CUDA, MATLAB

Software: MATLAB/Simulink, Simscape, CasADi, Isaac Sim, Gazebo, Drake, RViz2, Git

Hardware: Servo Motors, Encoders, IMU, Force/Torque Sensors, PLCs, Motor Drives (SINAMICS, Kinetix), EtherCAT, CAN Bus

Libraries/Framework: ROS 2, ros2_control, OpenCV, PyTorch, Scipy

Certifications: Deep Learning, Reinforcement Learning, Mechanism & Robot Kinematics, Systems Engineering