Sauranil Debarshi

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EDUCATION

UNIVERSITY OF COLORADO
MS in Electrical Engineering (Systems and Controls)
Jan 2022 - Present | Boulder, CO
GPA: 3.925

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
BTech in Electronics and Communication Engineering
Grad. May 2019 | Guwahati, India

SKILLS

PROGRAMMING
• Python • C++ • MATLAB

SOFTWARE
• Robot Operating System (ROS)
• Simulink • Gazebo • Rviz

COURSEWORK

GRADUATE
Control Systems Analysis
Constrained Control
State Estimation for Dynamical Systems
Autonomous Systems
Computer Vision
Artificial Intelligence
Neural Networks and Deep Learning

UNDERGRADUATE
Advanced Control Systems
Signals and Systems
Digital Signal Processing

PROJECTS

• SudokuAI - A Constraint Satisfaction Problem (CSP) based on backtracking search, forward checking with Minimum Remaining Variable (MRV) and Least Constraining Value (LCV) heuristics.
• Adaptive PID-based controller for an active quarter car suspension model to improve ride comfort.

ACHIEVEMENTS

• Top 10 in Rackathon 2021 out of 108 teams. • Best overall paper, IEEE R10-HTC, 2021. • Project shortlisted in Top 100 ideas, 5G Hackathon 2020, Govt. of India. • Best undergraduate research project, ECE Department, 2018.

EXPERIENCE

SIMULINK AUTOMOTIVE QE TEAM | MathWorks
May 2023 - August 2023 | Intern | Natick, Massachusetts

- Created an automated test model generation system for an EV Charging Simulink project, integrating fault systems, test harnesses, and configuring model settings. This system significantly improved the efficiency of functional testing, reducing test time from two days to just one hour.
- Identified and resolved missing components within existing test models for EV Charging, aligning them with SAE J1772 standards. Implemented Simulink Tests for normal and emergency shutdown procedures, enhancing system reliability.
- Developed a functional test for a two-axle tractor-trailer example system using MATLAB-based Object-Oriented Programming (OOP) concepts. This approach effectively detected inconsistencies within the model, contributing to its overall refinement.
- Implemented regression tests for an Equivalent Circuit Battery Block, ensuring model consistency across different Simulink releases.

WIPRO-IISc LAB (WIRIN) | Indian Institute of Science
Dec 2019 - June 2021 | Project Assistant | Bangalore, India

- Designed an online learning Radial Basis Function (RBF) neural network-based robust controller for autonomous vehicles that reduced speed tracking errors in cruise control by 86.88% in the presence of external disturbances.
- Successfully adapted the RBF-based controller for lateral path-tracking, resulting in 60.8% decrease in root-mean-square (RMS) error compared to the Stanley controller.
- Built a robust Fault Tolerant Controller (FTC) for Cooperative Adaptive Cruise Control (CACC) that minimized the relative distance error by 57.57% the vehicles with actuator faults and disturbances to achieve better tracking performance.
- Developed an end-to-end vehicle dynamics software stack including powertrain, steering, brake, and vehicle body dynamics, enabling rapid research and development of Advanced Driver Assistance Systems (ADAS).

COLLABORATIVE ROBOTICS LAB (CORAL) | Indraprastha Institute of Information Technology, Delhi
Aug 2019 - Nov 2019 | Research Assistant | New Delhi, India

- Proposed and implemented a battle damage assessment algorithm for multi-UAV coalitions that reduced task completion time by 26.92% and resource requirement by 37.5% in search-and-prosecute missions.
- Designed and developed a ROS-based wireless mesh network (WMN) using UAVs and ground nodes that facilitated end-to-end communication for post-disaster management and large-scale airborne surveillance operations.

PUBLICATIONS

- S. Debarshi, S. Sundaram, and N. Sundararajan, "Robust EMRAN-aided coupled controller for autonomous vehicles," Engineering Applications of Artificial Intelligence, 2022. [Link]
- N. Roy, S. Debarshi and P. B. Sujit, "ROSNet: A WMN based Framework using UAVs and Ground Nodes for Post-Disaster Management," 2021 IEEE 9th Region 10 Humanitarian Technology Conference (R10-HTC), 2021. [Link]
- N. Roy and S. Debarshi, "UAV-based Person Re-Identification and Dynamic Image Routing using Wireless Mesh Networking," 2020 7th International Conference on Signal Processing and Integrated Networks (SPIN), Noida, India, 2020. [Link]