Harsh Ramniklal Kasundra

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Intrdoction

Robotics engineer specializing in autonomous systems with proven expertise in reinforcement learning, sensor fusion, and real-world deployment. Delivered 30% improved object detection in low-light conditions and developed end-to-end RL frameworks for autonomous vehicle control. Combines strong theoretical foundation in deep learning (PyTorch, TensorFlow) with hands-on experience in ROS2, computer vision, and industrial automation systems.

Education

TU Dortmund — Dortmund, DE
M.S. in Automatin and Robotics — 2023–2025
- Thesis: "Reinforcment Learning for Docking of the chronos Car with Trailer"

Dharmsinh Desai University — Nadiad, IND
B.tech. in Instrumentation and control Engineering, — 2019–2023
- Thesis: " Remote PLC Control and SCADA Monitoring for Color Blending Process"

Technical Skills

- **Programming:** Python, Matlab, C/C++
- **Frameworks & Libraries:** ROS2, PyTorch, TensorFlow, openCV ,SB3
- **Tools/Techs:** Gazebo, RViz, Mujoco, LaTeX, Git, conda, CMake, Docker
- **Languages:** English(Native), Hindi (Native), German (A2)

Experience

Forvia Hella — Lippstadt, DE
Research & Dev Intern at L-LAB — March 2025 - June 2025
- Researched and implemented event–RGB sensor fusion techniques for object detection for autonomous systems
- Developed multi-modal sensor fusion system using event and RGB cameras in DSEC setup, achieving 30% improved object detection in low-light conditions.
- Custom YOLO models trained for cyclist recognition with 85% precision in real world traffic scenarios.
- Implemented cross-modal bounding box transfer algorithms to map detection results from RGB frames to event camera data using geometric transformations.
- Developed data processing pipeline converting raw event data to H5 format and evaluated performance across ETRAM, RVT, RED, NER-Net and LEOD architectures

Masibus Automation And Instrumentation Gandhinagar, IND
Research & Dev Intern Dec.2022 - April 2023

- Optimized industrial control systems
- Identified root causes of system failures through in-depth analysis, resulting in a 15% reduction in downtime and a 20%increase in overall system efficiency.
- Managed and executed control system upgrades and modifications, ensuring seamless integration and minimal disruption to ongoing operations.

Projects

See full list of projects on Projects

Reinforcement Learning for Docking of the Chronos Car with Trailer Github link

- Developed a Reinforcement Learning–based control framework for autonomous trailer docking, integrating deep learning, simulation, and real-world deployment.
- Implemented a Deep Deterministic Policy Gradient (DDPG) agent for precise and stable trailer maneuvering.
- Designed a multi-objective reward function balancing accuracy, efficiency, safety, and smooth control.
- Built a simulation-to-real transfer pipeline using PyTorch and OpenAI Gym, validated in Real world using motion capture and ROS2 framework.
- Applied curriculum and transfer learning techniques to enhance convergence speed and robustness across varied configurations.

Hybrid Point-Grid RadarNet Github link

- Implemented a novel hybrid architecture combining point-based and grid-based neural networks for enhanced radar object detection in autonomous vehicles using OpenPCDet framework
- Achieved improved object orientation estimation by integrating point-wise feature extraction before grid rendering.
- Replicated the paper's architecture achieving up to 19.7% higher mean Average Precision (mAP) for vehicle detection compared to baseline methods.
- Utilized radar point cloud processing techniques including Graph Neural Networks (GNN) and Kernel Point Convolutions (KPConv).
- Trained and validated models on the VoD autonomous driving dataset.

Development of Local and Global Path Planners for TurtleBot

- Developed and implemented Global and local path planner for static environment
- Develop a global path planner that computes an optimal path from the start to the goal position within a static environment, ensuring that the route avoids obstacles and minimizes travel distance.
- Create a local path planner that operates in real-time, adjusting the robot's path to avoid dynamic obstacles and navigate around any unexpected changes in the environment.
- Implement the developed path planners on a TurtleBot, demonstrating their effectiveness in navigating a static environment.