Md Saif Ahmad

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🌐 Portfolio : saifahmad.github.io| ⭘ github.com/saifahmadgit | 🔗 linkedin.com/in/saif-ahmad

EDUCATION

Northwestern University – Evanston, Illinois	M.S in Robotics (Sept 2025 – Sep 2026(expected))
IIT Guwahati – Guwahati, India	M.Tech in Mechanical Engineering (July 2018 – May 2020)
Aligarh Muslim University – Aligarh, India	B.Tech in Mechanical Engineering (July 2013 – May 2017)

SKILLS

Robotics: ROS2, SLAM, Perception, Navigation, Computer Vision, Path Planning,Legged Locomotion, Control, Optimization
Software Development: C++, Python, C, MATLAB, Git, Linux, Embedded programming, Perforce, Vector CANdb++
Machine Learning: Pytorch, Tensorflow, SKlearn, Deep Reinforcement learning, Autoencoders
Simulation: Simulink, Gazebo, Issac Sim, Issac Lab, Genesis, CoppeliaSim, GT Suite

PROFESSIONAL EXPERIENCE

Modelling and Simulation Engineer - Daimler Trucks [Full Time] October 2020 – July 2025
[MATLAB, Simulink, GT-Suite, Python, Pytorch, Tensorflow, Vector CANdb++, Perforce] Bangalore, India

- Built EV powertrain digital twins in Simulink and GT-Suite, covering battery, motor, driveline with ECU integration.
- Performed vehicle-level EV simulations for range, performance, and thermal KPIs, guiding powertrain sizing and control tuning.
- Validated and refined vehicle models using CAN telemetry, leveraging data-based calibration to achieve 95% predictive accuracy.
- Collaborated with the energy management team to develop fuel-cell/battery power-split strategies, improving range by 8%.
- Led development and delivery of Hardware-in-the-Loop plant models for a new CAN architecture, managing a 3-engineer team.
- Built EKF/UKF-based state-of-charge estimators with the BMS team, reducing sensor-bias drift, published in SAE.
- Improved driver model via gain-scheduled PID + feedforward, lowering tracking error and enhancing energy/thermal predictions.
- Integrated supplier + in-house ECU software as S-functions and also developed baseline (rebuilt) controllers to enable closed-loop simulation and parameter tuning when production SW was unavailable.
- Performed Software in Loop and Model in loop simulations for Powertrain software validation and improvement.
- Developed a battery fault-detection algorithm using an LSTM autoencoder in PyTorch, addressing lack of labeled fault data.

PROJECTS

Quadruped Locomotion on Unitree Go2 (Ongoing)
[Reinforcement Learning, PPO,Python, ROS2, PyTorch, Genesis, Issac Sim, Issac Lab] Dec 2025 - Present
- Developing PPO-based reinforcement learning policies for dynamic quadruped locomotion.
- Working on sim-to-real transfer for the Unitree Go2 using domain randomization to address sensor noise and control latency.

EKF SLAM pipeline in C++ from scratch (Ongoing)
[ROS2, SLAM, C++] Jan 2026 - Present
- Programmeing a complete ROS2 pipeline in C++ for SLAM on a Turtlebot, from scratch.

Franka Emika Panda Arm Robot - Vision-Guided Grasp and Place
[ROS2, MoveIt 2, Intel RealSense, OpenCV, YOLO] Dec 2025
- Built a vision-guided manipulation pipeline for the Franka to detect, match, and autonomously grasp and place objects.
- Integrated Intel RealSense inputs, YOLO, and MoveIt via ROS 2 for autonomous grasp-and-place control.

Prompt-to-Pose Grasp Planning in Cluttered Scenes
[Python, Grounding Dino, SAM2, GraspNet] Dec 2025
- Developed a prompt–based pipeline that identifies target objects in clutter, segments them, and predicts feasible grasp poses.
- Used Grounding DINO and SAM2 to generate segmented point clouds, then applied NVIDIA Contact-GraspNet to compute ranked 6-DoF parallel-jaw grasp poses.

Optimization of bearing parameters
[C++, Genetic Algorithms] Jan 2020
- Optimized parameters for ball bearing to attain maximum Dynamic load capacity and minimum wear using Genetic Algorithm

PUBLICATIONS

Multi-Objective Robust Optimization of Deep Groove Ball Bearings Considering Manufacturing Tolerances Based on Fatigue and Wear Considerations. Journal of Tribology, ASME, Paper No: TRIB-20-1403

Precise Robust SoC Estimation Using Adaptive Filters-Based Techniques — Electric Trucks. SAE Technical Paper No: 2024-28-0152, 2024