

# Md Saif Ahmad

Evanston, IL

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## 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

**Technical Expertise:** Robotics, Physics Simulations, Control Software Development

**Robotics:** ROS2, SLAM, Rviz, Gazebo, CoppeliaSim, Path planning

**Programming:** Python, C++

**Tools:** Simulink, MATLAB, GT-Suite, Vector CAN DB++

**Machine Learning Frameworks:** Tensorflow, Pytorch, SKlearn

**Version Control:** Git, Perforce, TortoiseSVN

## PROJECTS

### Vision-Guided Grasp and Place with Franka Robot

[ROS2, MoveIt 2, Intel RealSense, OpenCV, YOLO]

Dec 2025

- Built a vision-guided manipulation workflow that detects geometric objects, matches them to targets, and autonomously grasps and places them on a Franka robot.
- Integrated **ROS 2** nodes to stream **Intel RealSense** data into **YOLO**-based detections and pass the resulting object/target poses to custom **MoveIt** APIs for motion planning and execution, achieving **90%** successful placements in real-world trials.

### Prompt-to-Pose Grasp Planning in Cluttered Scenes

[Python, Grounding Dino, SAM2, GraspNet]

Dec 2025

- Wrote a Python pipeline that takes a user text prompt, uses **Grounding DINO** to localize the target in clutter, refines it with **SAM2** to generate a precise mask and segmented point cloud, then runs **NVIDIA Contact-GraspNet** to output ranked **6-DoF parallel-jaw grasp poses** (pose + gripper width).

### Optimization of bearing parameters | [C++]

Jan 2020

- Optimized parameters for Deep groove ball bearing to attain maximum Dynamic load capacity and minimum wear using Genetic Algorithm

## EXPERIENCE

### Simulation Engineer - Daimler Trucks [Full Time - 5yrs]

October 2020 – July 2025

[MATLAB, Simulink, GT-Suite, Python, Pytorch]

Bangalore, India

- Physics modelling of electric Vehicle in Simulink and GT Suite - Developed models capturing Vehicle dynamics, electrical and thermal aspects of Electric Vehicle. Improved the models to attain **95 percent accuracy** against the measurement.
- ECU software development and optimization - Developed and validated BMS State-of-Charge algorithms (EKF, Kalman-Bucy, UKF, plus a PyTorch-based real-time Deep learning recalibration model) to correct sensor-driven SOC drift and reduce reliance on OCV-SOC lookup tables, improving SOC accuracy by **7 percent**.
- Plant modelling for Hardware in loop ECU testing - Led a team of three people responsible for providing physics models to ECU Hardware testing teams **within 10 months**
- Concept powertrain development - Performed simulations for various drive cycles and climate condition in MATLAB, Simulink and GT Suite environment used to make decision on optimized Battery, Motor and Fuel Cell Size. Further used them for parameter tuning of control algorithms.

## 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, <https://doi.org/10.1115/1.4050883>

Precise Robust SoC Estimation Using Adaptive Filters-Based Techniques — Electric Trucks. SAE Technical Paper No: 2024-28-0152, 2024, <https://saemobilus.sae.org/papers/precise-robust-soc-estimation-using-adaptive-filters-based-techniques-electric-trucks-2024-28-0152>

## COURSEWORK

Embedded Systems in Robotics (ROS 2), ML & Sensing, Robotic Manipulation, Sensing