

MAYURESH SAVARGAONKAR

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An industrial engineer with a demonstrated history of working in think tanks, academia, and industry on Autonomous Vehicles (AVs), warranty analytics, and Lithium-ion batteries. My expertise lies in building solutions using machine learning, artificial intelligence, Bayesian methods, simulation tools, and engineering and physics principles for the world of automated and connected mobility.

Education

Ph.D. in Industrial Engineering	GPA: 4.0	2019-2023
Thesis: Towards Connected and Automated Mobility - Artificial Intelligence for Safe Autonomous Driving		
University of Michigan, Dearborn		
Master's in Industrial Engineering	GPA: 4.0	2016-2018
University of Michigan, Dearborn		
Bachelor's in Mechanical Engineering	GPA: 3.9	2011-2015
University of Pune (India)		

Research Interests

■ Autonomous Vehicles ■ Connected Mobility ■ AV simulation ■ Explainable Artificial Intelligence ■ Customized Deep Learning ■ Spatio-Temporal Modeling ■ Warranty Analytics ■ Remaining Useful Life

Professional Experience

Graduate Student Research Assistant	2019-Present
University of Michigan- Dearborn	

Project: Virtual Verification and Validation of Autonomous Vehicles – Ford Motor Company

- Led a project for verification and validation of AVs using Software-in-Loop testing. The project uncovered over 35 unknown unsafe scenarios, some of which were later observed in real-life testing by Waymo.
- Increased safety readiness at Ford Motor Company by employing virtual test strategies. The unsupervised learning strategies can generate over 20,000 complex scenarios using simulated agents in less than 72 hours.
- Incorporated data-driven methods for improving risky situation realization in vehicle log data by over 20%. The developed method is a random forest regressor based on NHTSA and industry-used metrics.

Project: Artificial Intelligence in Connected Autonomous Driving Technology

- Released a self-driving dataset with over 600 scenarios that promote the use of infrastructure information in trajectory or motion planning and control.
- Formulated the first trajectory prediction algorithm that integrates road level Vehicle-to-Vehicle and Vehicle-to-Infrastructure information. The use of such information increased prediction accuracy by over 50%.
- Pioneered a web-based, on-demand, scenario generation interface that generates, saves, and tags self-driving sensor information. Saved sensor information includes RGB, Radar, LiDAR, depth, and semantic segmentation.
- Integrated a statistical post-processing method that improves the performance of pre-trained perception networks by over 29% without re-training for object detection.

Project: Bayesian models for Warranty Analytics – Ford Motor Company

- Developed a Machine Learning model that predicts warranty claims for Ford Motor Company's reliability division with a 2% error over 18 months.
- Successfully provided uncertainty quantification using Bayesian optimization and unsupervised clustering.

Project: AI-driven models for Prognostics in Lithium-ion batteries

- Researched over 6 artificial intelligence models for online and robust state-of-charge estimations in Lithium-ion batteries with over 99% accuracy.
- Leading a research group of 3 doctoral students to develop time-series models that analyze the quality of each manufactured Lithium-ion cell in a manufacturing environment. The group has over 4 publications.

Project: Developing Synthetic Test Capabilities for Ford Motor Company's Level 4 Highway Pilot Feature

- Deployed a simulation-based testing framework for Ford's self-driving stacks. The project is estimated to save over 10,000 hours of real-life testing.
- Setup communication bridges with average latency of 10ms for interfacing Ford's autonomous driving system with a simulator. This was done by establishing Robotic Operating System (ROS) and TCP/IP pipelines using a dedicated python library.
- Replicated vehicle CAN interface for real-time communication with driving policies in Simulink. Over 200 CAN signals were replicated using CARLA.
- Designed OpenDrive maps for simulated testing of Ford's Highway Pilot and Advanced Driver Assistance features.

Industrial Engineering Program Manager
Production Modeling Corporation

2017-2019

Project: Cost, Value, and Feasibility analysis for FCA, Ford, BMW, and Volvo Laser Scanning Programs.

- Reduced laser scanning and modeling defects by over 20% using lean techniques for continuous improvement.
- Organized a team of 6 for designing and developing parametric conveyor models in AutoCAD.
- Used agile methods for project liaisons between India, Mexico, and the USA, saving > 100hrs/month of redundancy.
- Created risk mitigation plans and performed root cause analysis to avoid production delays using a 5 Why's system.

Top Publications

1. **Mayuresh Savargaonkar** and Abdallah Chehade. VTrackIt: A Synthetic Self-Driving Dataset with Infrastructure and Pooled Vehicle Information, 2022. (Under Review).
2. **Mayuresh Savargaonkar**, Abdallah Chehade, Ala A. Hussein. A Novel Neural Network with Gaussian Process Feedback for Modeling the State-of-Charge of Battery Cells. IEEE Transactions on Industry Applications, 2022.
3. Abdallah Chehade, **Mayuresh Savargaonkar**, Vasily Krivstov. Conditional Gaussian Mixture Model for Warranty Claims Forecasting. Reliability Engineering & System Safety, 2022.

Awards

Professional Awards

- Dearborn Difference Maker 2022 ■ IISE-QCRE Best student paper 2020 ■ Graduate Student Scholarship (\$12000)
- Ph.D. Student Fellowship

Profession Memberships and Associations

- IEEE ■ IISE ■ INFORMS ■ President IISE Dearborn Chapter ■ Treasurer Alpha Pi Mu-Dearborn Chapter

Skills

Programming Languages: Python, MATLAB, R, C++

Software: CARLA, ROS, Unreal Engine, SUMO, Simulink, Tableau, Git, CATIA V5R16, Inventor, ANSYS, MS Office, Linux

Python Libraries: TensorFlow, Keras, PyTorch, NumPy, Pandas, Matplotlib, Scikit-learn, OpenCV

Deep Learning Models: RNN, LSTM, VAE, GANs, DNN, CNN, reinforcement learning, q-learning, decision trees, random forest, Bayesian models, Gaussian mixture models, transformers

Technical Skills: Verification and Validation, Machine Learning, Artificial Intelligence, Computer Vision, Object Detection, Bayesian Learning, Text Analytics, Optimization, Design of Experiments, Statistics, ISO 21448, ISO 26262, DVP&R, PFMEA, DF&A, Software Engineering, Computer Science, Data Science, Data Analysis, Data Mining

Professional References

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