Ajeenckya Mahadik

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Education

University of Wisconsin–Madison May 2026
Masters in Industrial & Systems Engineering (AIML Focused)
Coursework: Computational Learning Theory, Advanced Deep Learning, NLP, Machine Learning.

Shivaji University, India May 2020
Bachelors in Mechanical Engineering

Projects

Probabilistic AI System for Outcome Simulation

- Built a probabilistic forecasting system unifying LLM-derived event intelligence, weather signals, engineered features, and historical data into one integrated pipeline.
- Deployed an **3B-7B Parameter**LLM microservice that transforms real-time news into structured behavioral vectors, raising probability calibration by **12%**.
- Engineered a weather-impact modeling layer using **Mixture Density Networks** for temperature, humidity, wind, rainfall, and elevation, reducing scenario-prediction variance by over **17%**
- Upgraded the baseline neural netowrk with policy gradient regularization to a Bayesian architecture with Monte-Carlo sampling, achieving a Brier score of **0.286** and improving calibration by **12%** with accuracy **66%**
- Increased dominant-outcome detection by boosting recall from **82% to 84%** while significantly lowering overconfidence in high-variance situations.

Stochastic Routing Optimization

- Developed a stochastic TSP framework with rerouting under 50 scenarios, reducing delivery costs by **13%**.
- Integrated linear and quadratic penalties that improved on-time adherence by **15%**.
- Applied reinforcement learning–style reward shaping to strengthen adaptability across conditions.

Facial Expression Detection

- Designed a ResNet50–ViT hybrid pipeline on **300K+ images**, achieving **95.6% accuracy**.
- Applied transfer learning and k-fold method to improve recognition of low-resolution grayscale inputs.
- Outperformed CNN baselines by **8%** in emotion classification benchmarks.

Multi-Agent Route Optimization

- Implemented custom subtour elimination heuristics that cut computational load by **40%**.
- Built a multi-modal, **multi-agent TSP model** to simulate nationwide logistics routing.
- Demonstrated reduced cost and improved delivery times compared to single-agent baselines.

Skills

- **Machine Learning:** Transformers, LLMs,Zero/Few-Shot Learning, MDPs, Policy Gradient
- **Deep Learning:** PyTorch, TensorFlow, CNNs, Vision Transformers, Transfer Learning
- **Probabilistic Modeling:** Bayesian Inference, Variational Inference, XGBoost
- **Optimization:** Gurobi, Mixed-Integer Programming, Stochastic & Dynamic Optimization
- **Tools:** Python, SQL, Hugging Face, Scikit-learn, Pandas

Professional Experience

FIAT India Automobiles 2023–2024
Graduate Apprentice Trainee

- Optimized powertrain launch operations using structured cycle-time data analysis and constraint-driven line balancing, improving assembly efficiency by **9%**.
- Designed data-ready digital procedures and a full engine assembly workflow, enabling traceable process metrics and stronger compatibility with automation and analytics systems.

Powertrac Tractors 2022–2023
Maintenance Engineer

- Applied reliability analysis and downtime pattern evaluation to improve technician productivity by **12%** through data-centric problem solving.
- Designed shop layout and engineered error-reducing gauges and jigs, generating cleaner operational signals and more consistent maintenance data for future predictive systems.