Tom Boustedt

MSc Student, Machine Learning

KTH, Royal Institute of Technology

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Education

Exchange Student, Computer Science (60 ECTS credits)

Paul G. Allen School of Computer Science and Engineering, University of Washington
September 2024 – Present
GPA: 3.9/4
Relevant Coursework: AI-Robotics, Convex Optimization, Artificial Intelligence, NLP, Explainable AI

MSc, Machine Learning (120 ECTS credits)

KTH Royal Institute of Technology, Stockholm, Sweden
August 2024 – Present
GPA: 4.5/5
Relevant Coursework: Foundations of Machine learning, Advanced Machine Learning

BSc, Media Technology (180 ECTS credits)

KTH Royal Institute of Technology, Stockholm, Sweden
August 2021 – June 2024
Thesis: "Transparent Optimisation for Planning Governance in Autonomous Driving Systems" (Advisor: Sandipan Das, Carol Yi-Yang)

Research Experience

Research Assistant, Fred Hutch Cancer Center

January 2025 – Present
Project: Out-of-Distribution Conditional Sampling for Synthetic Cell Generation
Supervisor: Gary Zhao, PhD

- Developing diffusion models focused on Out-of-Distribution (OOD) conditional sampling techniques for generating synthetic cell data
- Built upon finetuned foundation model for encoding/decoding and a transformer for denoising
- Sampling method is built upon noise pertubation to be able to sample from distribution with target parameters.
- Leading weekly research meetings discussing current research
- Mentoring an undergraduate student on model development and implementation techniques

Technical focus: PyTorch, diffusion probabilistic models, generative modeling, OOD Sampling

Research Assistant, University of Washington

January 2025 – Present
Project: Advanced Video Prediction for Turbulent Systems

Supervisor: Owen Williams, Associate Professor

- Developed on an existing model (VMRNN- LSTM for temporal unsderstanding and Mamba for spatial) focused on video prediction to be able to better perform on multi-scale time-series data such as turbulent flows.
- Implemented efficient data pipelines for processing high-dimensional video sequences
- Currently developing an extension replacing the LSTM letting it train more efficiently while improving it's long term capabilities.

Technical focus: PyTorch, state space models, Time Series, FNOs, Wavelet decomposition

Thesis Worker, Autonomous Vehicles, Scania

January 2024 – June 2024
Thesis: "Transparent Optimisation for Planning Governance in Autonomous Driving Systems"
Supervisors: Sandipan Das, PhD and Carol Yi-Yang, PhD student

- Developed an integrated model architecture that merges prediction and planning in autonomous driving systems
- Designed a context-aware optimisation approach using scenario-specific data to dynamically adjust kinematic driving constraints
- Created a transparent framework that enhances model explainability by making weight adjustments interpretable and linked to specific scenarios
- Implemented and evaluated a non-linear optimisation module with interpretable cost functions for vehicle control

Technical focus: Autonomous driving, Explainable AI

Research Assistant, KTH Royal Institute of Technology

March 2023 – December 2023
Project: 3D Vision and Pose Estimation
Supervisor: Kiran Chhatre, PhD Student

- Collaborated with the CST research group on large-scale 3D pose estimation and prediction systems
- Designed and implemented data pipelines for processing multi-camera recordings and motion capture data
- Built and curated a comprehensive dataset of 3D human poses

Technical focus: Computer vision, 3D reconstruction, motion analysis, data curation

Technical Skills

Frameworks & Libraries

PyTorch, TensorFlow, NumPy, Pandas, Scikit-learn, Matplotlib, OpenCV

Tools & Platforms

GitHub, Linux, AWS, Docker, Jupyter, LaTeX, Weights and Biases (wandb)

Machine Learning Specialties

Deep Learning, Diffusion Models, Computer Vision, Time Series Analysis, Generative Models, Explainable AI

Teaching Experience

Mentor, Intize

January 2021 – Present

- Provide weekly mentorship to gifted students in advanced mathematics and programming concepts
- Develop customized learning plans based on individual student strengths and interests
- Introduce students to research thinking and scientific methodology through hands-on projects
- Guide students through complex problem-solving techniques and computational methods

Certificates

IBM Data Science Professional Certificate

References

Kiran Chhatre, PhD Student

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Dr. Sandipan Das, PhD

Autonomous Vehicles, Scania Group
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