Vasileios Lioutas

☐ +1 (613) 581-8083 — ✉ contact@vlioutas.com — ⬡ lioutasb — in vasileioslioutas — 🎓 230+ cites (h-index=8)

Summary

Machine learning researcher with 5+ years of experience developing cutting-edge AI systems, specializing in autonomous driving simulation and deep learning. Published 16 papers in premier venues (**ICML, ICLR, NeurIPS, ACL**) with 230+ citations. Led development of novel simulation architectures for realistic multi-agent driving behaviors, successfully transitioning research into commercial products. Currently advancing controllable driving simulation methods through doctoral research at UBC while collaborating with industry partners.

Education

- **Ph.D. in Computer Science** — Expected April 2025
  University of British Columbia — *Vancouver, BC*
  - Advisor: Dr. Frank Wood
  - Thesis: Towards Realistic Controllable Driving Simulators
  - Research Focus: Developing generative models for simulating realistic, safe and controllable multi-agent driving behaviors for autonomous vehicles

- **M.Sc. in Computer Science** — 2020
  Carleton University — *Ottawa, ON*
  - Advisor: Dr. Yuhong Guo
  - Thesis: Sequence Modeling with Linear Complexity
  - GPA: 12.00/12.00 - Senate Medal for Outstanding Academic Achievement

Industry Research Experience

- **Inverted AI** — September 2020 - Present
  PhD Research Scientist (Mitacs Intern) — *Vancouver, BC*
  - Contributed to developing novel deep learning methods (ITRA, TITRATED, CriticSMC, DJINN) for realistic traffic simulation
  - Conducted experiments to optimize and improve model performance
  - Principal contributor in the research and development of the main commercial research products of the company (DRIVE ↗, INITIALIZE ↗, SCENARIO ↗)
  - Developed production code in multiple collaborative projects, conducting code reviews and maintaining unit tests
  - Published 4 first-author papers and supported at least 7 other research projects
  - Main contributor to the open-source driving simulator called TorchDriveSim ↗

- **Huawei (Noah's Ark Lab)** — May 2019 - August 2020
  Machine Learning Research Associate (including 4-month summer internship) — *Montreal, QC*
  - Performed research in Multilingual Neural Machine Translation and Model Compression
  - Implemented many research methods from the literature
  - Successfully delivered compressed neural models according to production requirements
  - Published 3 papers in top-tier conferences and filed 1 patent application

- **MEDIAFORCE.ca** — February 2018 - August 2018
  Machine Learning Engineer — *Ottawa, ON*
  - Built two real-time recommendation systems (k-NN and deep learning)
  - Designed complete ML pipeline: data collection, processing, model updates, and API serving

Technical Expertise

- **ML Focus**: Supervised Learning • Reinforcement Learning • Transformers • Generative Modeling (Diffusion Models, VAEs, etc.) • Variational Inference

- **Machine Learning Tools**: PyTorch • TensorFlow

- **Systems**: CUDA • Distributed Training • ML Optimization

- **Languages**: Python (Expert) • C++ • Java • SQL

- **Tools**: Weights & Biases • Pytorch-Lightning • MLflow • AWS/GCP • git • Singularity • Docker

Key Projects

- **TorchDriveSim** ⤤   2023
  Open-Source Framework for 2D Driving Simulation   *32 stars, 9 contributors*
  - Fully differentiable execution supporting rendering ego-rotated and ego-centric bird's-eye views, various kinematic models, agent types, traffic controls and goals.
  - Adopted by the research community working in autonomous driving
  - Utilized by TorchDriveEnv ⤤, a lightweight reinforcement learning benchmark for autonomous driving

- **TaLK Convolutions** ⤤   2020
  Open-Source Novel Neural Architecture   *29 stars*
  - Developed a sequence modeling architecture with linear time complexity to the number of tokens
  - Implemented custom CUDA kernels for Pytorch to support parallelization
  - Produced state-of-the-art results in various natural language tasks

Awards & Leadership

- NSERC CGS-D Scholarship (2021-2024)

- Best Paper Award, Autonomous Driving: Perception, Prediction and Planning Workshop (2021)

- Graduate Support Initiative (GSI) Award, UBC (2020-2024)

- Senate Medal for Outstanding Academic Achievement, Carleton University (2020)

Selected Publications

[1] **V. Lioutas**, A. Scibior, M. Niedoba, B. Zwartsenberg, and F. Wood, "Control-ITRA: Controlling the Behavior of a Driving Model", *Under Review*, 2025

[2] J. Lavington, K. Zhang, **V. Lioutas**, M. Niedoba, Y. Liu, D. Green, S. Naderiparizi, X. Liang, S. Dabiri, A. Scibior, B. Zwartsenberg and F. Wood, "TorchDriveEnv: A Reinforcement Learning Benchmark for Autonomous Driving with Reactive, Realistic, and Diverse Non-Playable Characters", *arXiv:2405.04491*, 2024

[3] **V. Lioutas**, J. Lavington, J. Sefas, M. Niedoba, Y. Liu, B. Zwartsenberg, S. Dabiri, F. Wood, and A. Scibior, "Critic Sequential Monte Carlo", *ICLR*, 2023

[4] M. Niedoba, J. Lavington, Y. Liu, **V. Lioutas**, J. Sefas, X. Liang, D. Green, S. Dabiri, B. Zwartsenberg, A. Scibior, and F. Wood, "A Diffusion-Model of Joint Interactive Navigation", *NeurIPS*, 2023

[5] **V. Lioutas**, A. Scibior, and F. Wood, "TITRATED: Learned Human Driving Behavior without Infractions via Amortized Inference", *TMLR* and *ML4AD workshop at NeurIPS*, 2022

[6] A. Scibior*, **V. Lioutas***, D. Reda, P. Bateni, and F. Wood, "Imagining The Road Ahead: Multi-Agent Trajectory Prediction via Differentiable Simulation", *ITSC* and *ADP3 workshop at CVPR (Best Paper Award)*, 2021

[7] A. Rashid*, **V. Lioutas*** and M. Rezagholizadeh, "MATE-KD: Masked Adversarial Text, a companion to Knowledge Distillation", *ACL*, 2021

[8] A. Rashid, **V. Lioutas**, M. Rezagholizadeh, and A. Ghaddar, "Towards Zero-Shot Knowledge Distillation for Natural Language Processing", *EMNLP (Oral Presentation)*, 2021

[9] **V. Lioutas** and Y. Guo, "Time-aware Large Kernel Convolutions", *ICML*, 2020

[10] **V. Lioutas**, N. Passalis, and A. Tefas, "Explicit ensemble attention learning for improving visual question answering", *Pattern Recognition Letters*, 2018

Selected Patents

[P1] **V. Lioutas**, A. Rashid, and M. Rezagholizadeh. "Method and system for training a neural network model using adversarial learning and knowledge distillation", US Patent App. US20230222353A1, March 2023