Vasileios Lioutas

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RESEARCH INTERESTS

I am broadly interested in questions related to computer vision, reinforcement learning, sequence modeling, and variational inference. My principal research interest lies in the area of behavior prediction, object tracking, and multi-agent safe driving. I am also interested in robotic vision where an agent given a visual observation will be able to successfully comprehend the environment.

EDUCATION

University of British Columbia, Vancouver, Canada
Ph.D. in Computer Science
2020 - Present
Supervisor: Dr. Frank Wood

Carleton University, Ottawa, Canada
Master of Computer Science (Data Science)
2018 - 2020 GPA: 12.00/12.00
Supervisor: Dr. Yuhong Guo
Master's Thesis: *Sequence Modeling with Linear Complexity*
Received the Senate Medal for Outstanding Academic Achievement

Aristotle University of Thessaloniki, Thessaloniki, Greece
Bachelor of Computer Science (Hons)
2012 - 2016 GPA: 8.01/10.00
Supervisor: Dr. Ioannis Vlahavas
Honours Thesis: *Customer Segmentation Using Methods of Multiple Correspondence Analysis*

INDUSTRY EXPERIENCE

Inverted AI, Vancouver, Canada **Sep 2020 - Present**
PhD Research Fellow
I am currently working on probabilistic methods for modeling realistic human behavior in autonomous driving.

Huawei Technologies, Montreal, Canada **May 2019 - Aug 2020**
Machine Learning Research Intern
Performed research in Multilingual Neural Machine Translation. I implemented many Embedding Compression methods from the literature and I successfully delivered compressed neural models according to production requirements.

Mediaforce.ca, Ottawa, Canada **Feb 2018 - Aug 2018**
Machine Learning Engineer
I was in charge of forming the Machine Learning department of the company. I developed two different Recommendation Systems (a k-NN based system and a Deep Learning system) that can work in real-time. I was responsible for designing and implementing the whole stack of the system including collecting the data (from multiple sources), storing the data in fast databases, preprocessing the data in real-time, updating the ML algorithms (in real-time), and creating the interfaces to use them (APIs).

Plushost.gr, Trikala, Greece **Aug 2014 - Aug 2015**
Intern Android Application Developer
I developed an Android Application framework compatible with CS-Cart 4.x. In addition, I developed a plug-and-play RESTful server API for CS-Cart platform supporting both anonymous and registered users.

ACADEMIC RESEARCH EXPERIENCE

Machine Learning Lab, Carleton University **2018 - 2020**
Research Assistant
Research Project: *Time-aware Large Kernel Convolutions*
In this project, I developed a novel adaptive convolution operation for performing sequence modeling that learns to predict the size of a summation kernel instead of using a fixed-sized learnable kernel matrix. This method yields a time complexity of $O(n)$, effectively making the sequence encoding process linear to the number of tokens.

AIIA Laboratory, Aristotle University **2016 - 2018**
Research Assistant
Research Project: *Visual Question Answering using Explicit Visual Attention*
In this project, I developed a way of training visual attention models that in contrast to the other approaches in the literature, these attention models were trained to explicitly learn where to attend in the image based on the given question. This helped to pass better, less noisy information to the main VQA model that is responsible for predicting the correct answer.

SELECTED RESEARCH PUBLICATIONS

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

[2] M. Niedoba, J. Lavington, Y. Liu, V. Lioutas, J. Sefas, X. Liang, D. Green, S. Dabiri, B. Zwartsenberg, A. Ścibior, et al.. A Diffusion-Model of Joint Interactive Navigation. In *NeurIPS*, 2023.

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

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

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

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

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

TEACHING EXPERIENCE

Department of Computer Science, Carleton University
Teaching Assistant

Computing for Arts Students - COMP1001A	Sep 2019 - Dec 2019
Artificial Intelligence - COMP4106	Jan 2019 - Apr 2019
Neural Networks - COMP4107	Sep 2018 - Dec 2018

ACADEMIC SERVICE

Reviewer for international journals and conferences
Montreal AI Symposium (2020), AIMWC (2020)

VOLUNTEER SERVICE

International Conference on Learning Representations (ICLR) **2020**
Volunteer

Neural Information Processing Systems (NeurIPS) Conference **2020**
Student Volunteer

Data for Good **2018**
Data Scientist, Volunteer

HONOURS AND AWARDS

Natural Sciences and Engineering Research Council (NSERC) **2021-2024**
Canada Graduate Scholarship - Doctoral (CGS - D)

University of British Columbia **2020-2024**
Graduate Support Initiative (GSI) Award

Carleton University **2020**
Senate Medal for Outstanding Academic Achievement – Graduate

Greek Open Source Community (ELLAK) **2015**
Honor Prize *1000 €*

RELEVANT GRADUATE COURSE-WORK

- **Machine Learning**, COMP5900Q
- **Advanced Machine Learning**, COMP5900X
- **Introduction to Deep Learning and Reinforcement Learning**, COMP5900R
- **Natural Language Processing**, COMP5505

TECHNICAL SKILLS

Programming: Python, C++ (PyTorch CUDA extensions), Java
Machine Learning Tools: PyTorch, TensorFlow
Databases: MySQL, MongoDB
DevOps Tools: git, Docker, Singularity, AWS, GCP

LANGUAGES

Bilingual in English and Greek