

Miltiadis Kofinas

DEEP LEARNING RESEARCH SCIENTIST

Amsterdam, The Netherlands

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Education

PhD in Computer Science (Artificial Intelligence)

Amsterdam, The Netherlands

UvA (UNIVERSITY OF AMSTERDAM)

Apr. 2020 - June 2024 (expected)

- Title: Deep Future Spatio-temporal Forecasting
- Supervisor: Efstratios Gavves
- Expected graduation: September 2024

Diploma (M.Sc. equivalent) in Electrical and Computer Engineering

Thessaloniki, Greece

AUTH (ARISTOTLE UNIVERSITY OF THESSALONIKI)

Oct. 2010 - Nov. 2018

- Specialization Field: Electronics and Computer Engineering
- GPA: 7.57/10
- ECTS: 307
- Thesis: Scene Graph Generation using Message Passing Neural Networks and Graph Convolutional Networks
 - SUPERVISORS: POSTDOCTORAL RESEARCH ASSOCIATE CHRISTOS DIOU & ASSOCIATE PROFESSOR ANASTASIOS DELOPOULOS
 - Visual scene graph generation using an end-to-end neural network that incorporates a message passing neural network, propagating contextual information between objects and their relationships to iteratively refine its predictions, as well as a relationship pruning network that learns to identify and dismiss unlikely relationships.
 - Links to thesis: [Greek \(Original\)](#), [English \(Translated\)](#)

Research Experience

Research Assistant

Amsterdam, The Netherlands

UNIVERSITY OF AMSTERDAM

Mar. 2019 - May 2019

Project: Scene Graph Generation using Graph Transformer Networks

Supervisors: Assistant Professor Efstratios Gavves & Professor Cees G.M. Snoek

- Mathematical formulation of a novel abstract Graph Network layer for visual scene graph generation that explicitly utilizes both local and global information on the graph space.
- Experiments on various architectures to maximize relevant information propagation across graph vertices and edges.
- Implementation of a multilayer Graph Network that effectively stacks Graph Network layers to increase network performance.
- Use of global information via Transformer blocks that attentively gather global context.
- Introduction of a self-attentive relationship pruning network that effectively samples meaningful relationships.

KEYWORDS: VISUAL SCENE GRAPH GENERATION · GRAPH NEURAL NETWORKS · TRANSFORMERS · GRAPH PRUNING

Computer Vision & Machine Learning Engineer

Thessaloniki, Greece

P.A.N.D.O.R.A. ROBOTICS TEAM, ARISTOTLE UNIVERSITY OF THESSALONIKI

Oct. 2014 - Oct. 2015

- Development of a general-purpose image classification API using RGB-D sensor data to tackle victim detection.
 - Classification using a combination of HOG features, color histogram features from different color spaces (e.g. HSV, CIE Lab) and SIFT features with bag-of-words models.
 - Data augmentation using affine transformations, random sampling and color jittering.
 - Training and evaluation using support-vector machines (linear and non-linear), random forests and multilayer perceptrons.
- Motion detection using Gaussian mixture-based background/foreground segmentation algorithms.
- Soft obstacle detection from RGB-D sensor data using Haar wavelets and Hough transform.
- Hard obstacle detection from RGB-D sensor data using point cloud transformations for the creation of local elevation maps and various convolutional kernels for the creation of traversability maps.
- Development of a benchmark testing API for performance evaluation of computer vision algorithms under various environmental conditions (e.g. room lighting).

KEYWORDS: IMAGE CLASSIFICATION · NEURAL NETWORKS · SVMs · BENCHMARKING · MOTION DETECTION · OBSTACLE DETECTION

Reviewer

I have served as reviewer for the following venues: [LoG 2023](#), [NeurIPS 2023](#), [CVPR 2023](#), [ICLR 2023](#), [LoG 2022](#), [CDS 2022](#), [CVIU 2022](#), [PAMI 2022](#), [ICML 2021](#), [ECCV 2020](#).

Technical Skills

Programming Languages Python, C++, C, MATLAB/Octave, Java

Deep Learning Frameworks PyTorch, TensorFlow

Deep Learning Libraries PyTorch Geometric, PyTorch Lightning, WandB, Tensorboard, Hydra

Miscellaneous Git, Linux, SLURM, L^AT_EX, TikZ, OpenCV, ROS

Publications

CONFERENCE PAPERS

- Yongtuo Liu, Sara Magliacane, Miltiadis Kofinas, and Efstratios Gavves. **Amortized Equation Discovery in Hybrid Dynamical Systems**. In: *The Forty-first International Conference on Machine Learning (ICML)*. 2024 ([ArXiv](#)) ([Github](#))
- Samuele Papa, Riccardo Valperga, David M. Knigge, Miltiadis Kofinas, Phillip Lippe, Jan-jakob Sonke, and Efstratios Gavves. **How to Train Neural Field Representations: A Comprehensive Study and Benchmark**. In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. 2024 ([ArXiv](#)) ([Github](#))
- Miltiadis Kofinas†, Boris Knyazev, Yan Zhang, Yunlu Chen, Gertjan J. Burghouts, Efstratios Gavves, Cees G.M. Snoek, and David W. Zhang†. **Graph Neural Networks for Learning Equivariant Representations of Neural Networks**. In: *12th International Conference on Learning Representations (ICLR)*. 2024 ([ArXiv](#)) ([OpenReview](#)) ([Github](#)) [Oral] †: Joint first and last authors
- Qi Huang†, Emanuele Mezzi†, Osman Mutlu†, Miltiadis Kofinas, Vidya Prasad, Shadnan Azwad Khan, Elena Rangelova, and Niki van Stein. **Beyond the Veil of Similarity: Quantifying Semantic Continuity in Explainable AI**. in: *2nd World Conference on Explainable Artificial Intelligence (XAI)*. 2024 †: Equal contribution
- Miltiadis Kofinas, Erik J. Bekkers, Naveen Shankar Nagaraja, and Efstratios Gavves. **Latent Field Discovery in Interacting Dynamical Systems with Neural Fields**. In: *Advances in Neural Information Processing Systems 36 (NeurIPS)*. 2023 ([ArXiv](#)) ([OpenReview](#)) ([Github](#))
- Yongtuo Liu, Sara Magliacane, Miltiadis Kofinas, and Efstratios Gavves. **Graph Switching Dynamical Systems**. In: *The Fortieth International Conference on Machine Learning (ICML)*. 2023 ([ArXiv](#)) ([Github](#))
- Miltiadis Kofinas, Naveen Shankar Nagaraja, and Efstratios Gavves. **Roto-translated Local Coordinate Frames For Interacting Dynamical Systems**. In: *Advances in Neural Information Processing Systems 34 (NeurIPS)*. 2021 ([ArXiv](#)) ([OpenReview](#)) ([Github](#))

WORKSHOP PAPERS

- Aviv Shamsian†, David W. Zhang†, Aviv Navon, Yan Zhang, Miltiadis Kofinas, Idan Achituve, Riccardo Valperga, Gertjan Burghouts, Efstratios Gavves, Cees Snoek, Ethan Fetaya, Gal Chechik, and Haggai Maron. **Data Augmentations in Deep Weight Spaces**. In: *Workshop on Symmetry and Geometry in Neural Representations (NeurReps)*, *NeurIPS*. 2023 ([ArXiv](#)) [Oral] †: Equal contribution
- Samuele Papa, David M. Knigge, Riccardo Valperga, Nikita Moriakov, Miltiadis Kofinas, Jan-jakob Sonke, and Efstratios Gavves. **Neural Modulation Fields for Conditional Cone Beam Neural Tomography**. In: *SynS and ML Workshop, International Conference on Machine Learning (ICML)*. 2023 ([ArXiv](#))
- David W. Zhang, Miltiadis Kofinas, Yan Zhang, Yunlu Chen, Gertjan J. Burghouts, and Cees G.M. Snoek. **Neural Networks Are Graphs! Graph Neural Networks for Equivariant Processing of Neural Networks**. In: *Workshop on Topology, Algebra, and Geometry in Machine Learning (TAG-ML)*, *ICML*. 2023 ([OpenReview](#))
- Piyush Bagad†, Floor Eijkelboom†, Mark Fokkema†, Danilo de Goede†, Paul Hilders†, and Miltiadis Kofinas. **C-3PO: Towards Rotation Equivariant Feature Detection and Description**. In: *3rd Visual Inductive Priors for Data-Efficient Deep Learning Workshop*. 2022 ([OpenReview](#)) [Oral] †: Equal contribution
- Miltiadis Kofinas, Erik J. Bekkers, Naveen Shankar Nagaraja, and Efstratios Gavves. **Neural Fields for Latent Force Field Discovery in Interacting Systems**. In: *ICLR 2023 Neural Fields across Fields Workshop*. 2023

Teaching Experience

TEACHING ASSISTANT

Machine Learning I	University of Amsterdam, MSc AI	2020, 2021
Deep Learning	University of Amsterdam, MSc AI	2020
Deep Learning II	University of Amsterdam, MSc AI	2022, 2023

THESIS SUPERVISION

Daniël (Stijn) Hamerslag DRIVING ON DATA, OBJECT DETECTION IN URBAN DRIVING SCENES	University of Amsterdam, BSc AI Oct. 2020 - Jan. 2021
Daniel Perez Jensen PREDICTING RIVER FLOW IN ATACAMA REGION WATERSHEDS	University of Amsterdam, MSc AI Nov. 2021 - July 2022
Victor Kyriakou EQUIVARIANT TRAJECTORY FORECASTING WITH LATENT ORIENTATION GRAPH NETWORKS	University of Amsterdam, MSc AI Nov. 2022 - July 2023

Talks

Learning on Graphs Conference Amsterdam Meetup NEURAL NETWORKS ARE GRAPHS! GRAPH NEURAL NETWORKS FOR EQUIVARIANT PROCESSING OF NEURAL NETWORKS	Elsevier, Amsterdam 29 November, 2023
Geometric Deep Learning Study Visit ROTO-TRANSLATED LOCAL COORDINATE FRAMES FOR INTERACTING DYNAMICAL SYSTEMS	Vrije Universiteit, Amsterdam 2 June, 2022

Amsterdam Applied ML Meetup

ROTO-TRANSLATED LOCAL COORDINATE FRAMES FOR INTERACTING DYNAMICAL SYSTEMS

 [Hyperion Lab, Amsterdam](#)

6 Apr, 2022

LoGaG: Learning on Graphs and Geometry Reading Group

ROTO-TRANSLATED LOCAL COORDINATE FRAMES FOR INTERACTING DYNAMICAL SYSTEMS

 [Virtual](#)

1 Feb, 2022

— [Recording \(YouTube\)](#)

Honors & Awards

2nd Best Autonomous Robot, Robocup Rescue Competition

P.A.N.D.O.R.A. ROBOTICS TEAM

 [Hefei, China](#)

July 2015

Languages

Greek Native Language

English Certificate of Proficiency in English, University of Michigan

[Level C2](#)

French Diplôme d'études en langue française B2, Centre international d'études pédagogiques (CIEP)

[Level B2](#)

Academic References

Available upon request.