Artem Moskalev

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My research focuses on geometric deep learning and language models, with a keen interest in developing geometry-aware methods that efficiently learn from unlabeled data. I am driven by the challenge of scaling AI to tackle complex scientific problems that conventional methods struggle to solve.

Education

University of Amsterdam   **Amsterdam**
PhD in Machine Learning   August 2019 - August 2023
Advisor: prof. Arnold Smeulders
Research agenda: geometric deep learning, self-supervised learning, inductive biases
Thesis: Representation Learning with Structured Invariance

Skolkovo Institute of Science and Technology   **Moscow**
MSc in Applied Mathematics   September 2017 - June 2019
Advisor: prof. Anh-Huy Phan
Research agenda: inverse problems, signal processing, computational imaging
Thesis: Trainable regularization for Wiener filter deconvolution (top 3%)

Work Experience

Johnson and Johnson   **AI/ML for Drug Discovery**
Research Scientist   April 2024 - Current
Postdoctoral Researcher   September 2023 - April 2024
In JnJ, I work on combining geometric deep learning and large language models for molecular representation learning.

Samsung   **AI Algorithms Lab**
Machine Learning Intern   May 2018 - August 2018
In Samsung I worked on computer vision and image processing. In particular, we tackled image enhancement and restoration with generative models.

Moscow State University   **Neuroscience Department**
External Research Assistant   February 2016 - March 2017
My work as a research assistant involved mathematical modeling and embedded software engineering. I implemented PDE models to describe the behavior of the neurons under the mechanical influence.

Selected Publications

[1]   Artem Moskalev et al. "SE(3)-Hyena Operator for Scalable Equivariant Learning". In: *ICML workshop on Geometry-grounded Representation Learning and Generative Modeling (ICML-GRaM)*. 2024.

[2] Artem Moskalev et al. "On genuine invariance learning without weight-tying". In: *ICML workshop on Topology, Algebra, and Geometry in Machine Learning (ICML TAG-ML)*. 2023.

[3] Artem Moskalev et al. "Contrasting quadratic assignments for set-based representation learning". In: *European Conference on Computer Vision (ECCV)*. 2022.

[4] Artem Moskalev et al. "LieGG: Studying Learned Lie Group Generators". In: *Advances in Neural Information Processing Systems (NeurIPS)*. 2022.

[5] Artem Moskalev, Ivan Sosnovik, and Arnold W.M. Smeulders. "Relational Prior for Multi-Object Tracking (**Oral**)". In: *2nd Visual Inductive Priors for Data-Efficient Deep Learning Workshop*. 2021. URL: https://openreview.net/forum?id=1MZnMuu8mg4.

[6] Ivan Sosnovik, Artem Moskalev, and Arnold Smeulders. "DISCO: accurate Discrete Scale Convolutions (**Best Paper Award**)". In: *British Machine Vision Conference (BMVC)*. 2021.

[7] Ivan Sosnovik, Artem Moskalev, and Arnold W.M. Smeulders. "How to Transform Kernels for Scale-Convolutions". In: *2nd Visual Inductive Priors for Data-Efficient Deep Learning Workshop*. 2021. URL: https://openreview.net/forum?id=rTpTF_-fOwm.

[8] Ivan Sosnovik*, Artem Moskalev*, and Arnold W.M. Smeulders. "Scale Equivariance Improves Siamese Tracking". In: *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*. 2021.

Student and Intern Supervision

Junjie Xu: Explicit and implicit geometry learning for large-molecule property prediction
Mehdi Yazdani-Jahromi: Transformer prior for pretraining state-space models
Evgenia Ilia: Efficient self-supervised learning for real-world tabular data
Harm Manders: Dense contrastive learning for microscopy cell segmentation
Lotte Bottema: Deep sequence modeling for trajectory forecasting
Nadia Isiboukaren: Space-Time-Slot correspondence for video object segmentation
Jorrit Ypenga: Domain-regularization for siamese object tracking

Teaching Experience

Statistics, Simulation and Optimization　　　　　　　　　　**University of Amsterdam**
Teaching Assistant, 6EC　　　　　　　　　　　　　　　　　　　2019 - 2022

Introduction to Image Processing　　**Skolkovo Institute of Science and Technology**
Lecturer　　　　　　　　　　　　　　　　　　　February 2019 - March 2019
A mini-course for graduate students to introduce the basics of digital image processing.

Relevant Skills

Programming and Computing

- Code: python, bash, R, SQL, C++ (basic)

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- Frameworks: pytorch, pytorch-geometric, huggingface, JAX, sklearn, cvxpy, amplide
- Scholar: `scholar.google.com/citations?user=mh1CSCEAAAAJ&hl`
- GitHub: `github.com/amoskalev`

Languages

- Fluent in English and Russian

Additional Achievements

- Best paper award BMVC 2021 (one best paper for the whole conference)

- Reviewer at NeurIPS, ICML, ECCV/ICCV, Computer Vision and Image Understanding Journal

- Skoltech graduate merit scholarship

References

Available upon request.