Ivan Sosnovik

Principal AI Research Scientist
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Research focus: Generative AI, computer vision, structured neural networks, and symmetry-informed learning. Develop language and vision models that incorporate physical priors and structured representations of the world, aiming at robust and generalizable applications.

Work Experience

09.2024 – Present **Autodesk**, Principal AI Research Scientist
Develop next-generation AI for the Architecture, Engineering, and Construction (AEC) industry.

06.2023 – 08.2024 **Amazon Generative AI Innovation Center**, Applied Scientist
Explored and implemented new applications of large language models and foundation models for vision in 2D and 3D. Collaborated with world-leading companies to improve online shopping search and recommendation systems, and simplified pipelines in chemical engineering.

03.2022 – 05.2023 **Amazon MLSL**, Applied Scientist
Worked on a wide range of AI projects: video analysis model which anticipating a possible 60% time saving for the BBFC compliance team [**link**], a photo moderation model with the potential to contribute to a 25% reduction in customer support escalations for a leading food delivery service in Europe, multimodal video summarization for movies, anomaly detection in assembly lines, fine-grained image analsysis for quality control, photo and video content moderation, etc.

06.2021 – 10.2021 **Amazon MLSL**, Applied Scientist Intern
Worked on representation learning for 3D garment reconstruction.

Education

2017 – 2022 **PhD, Artificial Intelligence**,
University of Amsterdam, Amsterdam, The Netherlands
"Symmetry-Based Learning from Limited Data"
[Thesis]

2015 – 2017 **MSc with Honors, Applied Mathematics and Physics**,
Moscow Institute of Physics and Technology, Moscow, Russia
Skolkovo Institute of Science and Technology, Moscow, Russia
"Neural Networks for Topology Optimization"

2011 – 2015 **BSc with Honors, Applied Mathematics and Physics**,
Moscow Institute of Physics and Technology, Moscow, Russia
"Two-dimensional system for the prior positioning of the STM"

Highlights

Scholarships	*"Foundation for the Development of Innovation Education"* (2012 – 2014)
Awards	BMVC 2021 Best Paper Award [link][interview] Kaggle *"Leaf Classification"* competition [interview] National Physics Olympiad for Students 2013 Moscow Physics Olympiad 2011 Phystech Mathematical Olympiad 2011 Phystech Physics Olympiad 2011 Moscow Mathematical Olympiad 2010 Moscow Physics Olympiad 2010

Academic Experience

Teaching	MSc course **Applied Machine Learning**, University of Amsterdam, 2017 – 2020
Reviewing	ICLR 21/23/24, JMIV, TPAMI 22, ICML INNF+ 21, ICCV 21, WACV 21, CVPR 18, CVIU, Engineering Optimization, Computer Methods in Applied Mechanics and Engineering, The Visual Computer
Supervision	Cees Kaandorp, Lucas Meijer, Dario E. Shehni Abbaszadeh, Dave Meijdam, Jonne Goedhart, Daan Ferdinandusse, Gongze Cao, Michał Szmaja, Jan Jetze Beitler

Skills

Services	All AWS Services for ML: SageMaker, Bedrock, Rekognition, Textract, etc.
Coding	Python, Objective-C, Swift, C

Publications

2023 I. Sosnovik, A. Moskalev, C. Kaandorp, A. Smeulders, *"Learning to Summarize Videos by Contrasting Clips"*, Preprint, 2023 [pdf]

2022 A. Moskalev, A. Sepliarskaia, I. Sosnovik, A. Smeulders , *"LieGG: Studying Learned Lie Group Generators"*, NeurIPS, 2022 [pdf][video]

A. Moskalev, I. Sosnovik, V. Fischer, A. Smeulders, *"Contrasting Quadratic Assignments for Set-based Representation Learning"*, ECCV, 2022 [pdf][code][poster]

2021 S. Gulshad*, I. Sosnovik*, A. Smeulders, *"Wiggling Weights to Improve the Robustness of Classifiers"*, Preprint, 2021 [pdf]

I. Sosnovik, A. Moskalev, A. Smeulders, *"DISCO: accurate Discrete Scale Convolutions"*, BMVC (**Oral**), 2021, ***Best Paper Award*** [pdf][code]

Publications

A. Moskalev, I. Sosnovik, A. Smeulders, *"Two is a Crowd: Tracking Relations in Videos"*, Preprint, 2021 [pdf]

I. Sosnovik, A. Moskalev, A. Smeulders, *"How to Transform Kernels for Scale-Convolutions"*, ICCV VIPriors Workshop, 2021 [pdf][code]

A. Moskalev, I. Sosnovik, A. Smeulders, *"Relational Prior for Multi-Object Tracking"*, ICCV VIPriors Workshop (**Oral**), 2021 [link]

S. Gulshad*, I. Sosnovik*, A. Smeulders, *"Built-in Elastic Transformations for Improved Robustness"*, Preprint, 2021 [pdf]

2020 I. Sosnovik*, A. Moskalev*, A. Smeulders, *"Scale Equivariance Improves Siamese Tracking"*, WACV, 2021 [pdf][code]

2019 I. Sosnovik, M. Szmaja, A. Smeulders, *"Scale-Equivariant Steerable Networks"*, ICLR, 2020 [pdf][code]

A. Atanov, A. Volokhova, A. Ashukha, I. Sosnovik, D. Vetrov, *"Semi-Conditional Normalizing Flows for Semi-Supervised Learning"*, ICML INNF, 2019 [pdf][code]

I. Sosnovik, I. Oseledets, *"Neural Networks for Topology Optimization"*, Russian Journal of Numerical Analysis and Mathematical Modelling, 34(4) [pdf][code]

2018 J.J. Beitler, I. Sosnovik, A. Smeulders, *"PIE: Pseudo-Invertible Encoder"* [pdf]

Patents

2024 A. Moskalev, I. Sosnovik, A. Smeulders, K. Groh *"Recognition of Objects in Images with Equivariance or Invariance in Relation to the Object Size"*, 2020 DE 2021 US CN [link]

2021 I. Sosnovik, A. Smeulders, K. Groh *"Training a machine learnable model to estimate relative object scale"*, 2021 DE, 2022 US CN JP KR [link]

2020 I. Sosnovik, A. Smeulders, K. Groh *"Device and Method for Training a Scale-Equivariant Convolutional Neural Network"*, 2020 EP, 2021 US CN [link]

2019 I. Sosnovik, A. Smeulders, K. Groh, M. Szmaja *"Method and Apparatus for Processing Sensor Data Using a Convolutional Neural Network"*, 2019 DE, 2020 US CN [link]