

Nikita Dvornik

PhD in Computer Vision and Machine Learning

Education

- 2016–2019 **PhD in Computer Vision and Machine Learning**, *Thoth team*, Inria Grenoble.
Studying object-level scene understanding and learning with limited annotated data.
Supervised by Julien Mairal and Cordelia Schmid.
- 2015–2016 **Masters in Data Science**, *University of Grenoble & Ensimag*, Grenoble, France.
- 2010–2014 **Bachelor in Applied Math**, *Moscow Institute of Physics and Technology*, Moscow, Russia.

Experience

- Nov 2021 **Senior Research Scientist**, *Samsung AI Center*, Toronto, Canada.
present Building AI systems for procedure understanding from video and language.
- Jan 2021 **Joint Postdoctoral Fellow**, *University of Toronto, PAIR Lab*, Toronto, Canada.
- Nov 2021 Working on Video Understanding and ML for robotics. Joint postdoc with Samsung AI Centre Toronto.
- Sep 2020 **Research Scientist Intern**, *Uber ATG*, Toronto, Canada.
- Dec 2020 Improving perception and prediction simulation for autonomus driving.
- Jan 2020 **Research Engineer**, *Inria*, Grenoble, France.
- Oct 2020 Developing new methods for training deep neural networks with little annotated data.
- May 2017 **Computer Vision Engineer**, *Teleport inc*, Moscow, Russia.
- July 2017 Designing and implementing methods for real-time semantic video segmentation.
- Feb 2016 **Research Internship in Computer Vision**, *Inria*, Grenoble, France.
- June 2016 Applying deep learning method to image retrieval.
- Jun 2014 **Summer Intern**, *Deloitte*, Moscow, Russia.
- Dec 2014 Working in Legal & IT department. Optimizing database uploading system.

Publications

- preprint **SlotFormer: Unsupervised Visual Dynamics Simulation with Object-Centric Models.**
by Ziyi Wu, Nikita Dvornik, Klaus Greff, Thomas Kipf, Animesh Garg
- BMVC 2022 **SAGE: Saliency-Guided Mixup with Optimal Rearrangements.**
by Avery Ma, Nikita Dvornik, Ran Zhang, Leila Pishdad, Konstantinos G. Derpanis, Afsaneh Fazly

- ECCV 2022 **Graph2Vid: Flow graph to Video Grounding for Weakly-supervised Multi-Step Localization.**
(Oral)
by Nikita Dvornik, Isma Hadji, Hai Pham, Dhaivat Bhatt, Brais Martinez, Afsaneh Fazly, Allan D. Jepson
- CVPR 2022 **P3IV: Probabilistic Procedure Planning from Instructional Videos with Weak Supervision.**
(Oral)
by He Zhao, Isma Hadji, Nikita Dvornik, Konstantinos G. Derpanis, Richard Wildes, Allan D. Jepson
- NeurIPS 2021 **Drop-DTW: Aligning Common Signal Between Sequences While Dropping Outliers.**
by Nikita Dvornik, Isma Hadji, Konstantinos G. Derpanis, Animesh Garg, Allan D. Jepson
- ECCV 2020 **Selecting Relevant Features from a Universal Representation for Few-shot Classification.**
by Nikita Dvornik, Cordelia Schmid and Julien Mairal
- ICCV 2019 **Diversity with Cooperation: Ensemble Methods for Few-Shot Classification.**
by Nikita Dvornik, Cordelia Schmid and Julien Mairal
- TPAMI 2019 **On the Importance of Visual Context for Data Augmentation in Scene Understanding.**
by Nikita Dvornik, Julien Mairal and Cordelia Schmid
- ECCV 2018 **Modeling Visual Context is Key to Augmenting Object Detection Datasets.**
by Nikita Dvornik, Julien Mairal and Cordelia Schmid
- ICCV 2017 **BlitzNet: A Real-Time Deep Network for Scene Understanding.**
by Nikita Dvornik, Konstantin Shmelkov, Julien Mairal and Cordelia Schmid

Software

For each research project I have open sourced the code. It allows to reproduce published results and easily use our methods for further research.

- **BlitzNet: Real-time Object Detection and Semantic Segmentation.**
— github.com/dvornikita/blitznet
A real-time scene understanding pipeline with state-of-the-art performance. The repo includes the code for training, inference and a demo with interface.
- **Drop-DTW: Sequence Alignment with Outlier Rejection.**
— <https://github.com/SamsungLabs/Drop-DTW>
Using this repo, one can run Drop-DTW to align sequences that contain common signal interspersed with outliers or train video representation end-to-end via alignment.
- **Copy-paste Data Augmentation with Context Modeling.**
— github.com/dvornikita/context_da
The repo implements copy-paste data augmentation with context guidance and provides plug-and-play data augmentation module for training a scene understanding model.
- **Diversity with Cooperation: Ensemble Methods for Few-Shot Classification.**
— github.com/dvornikita/fewshot_ensemble
The full pipeline to train and distill ensembles for few-shot learning. The repo contains the diversity- and cooperation-based training and robust prototype classifiers implementation.

- **Selecting Relevant Features from a Universal Representation for Few-shot Classification.**

— github.com/dvornikita/SUR

The repo contains the code to train a universal representation and implements feature selection mechanism.

Skills

Languages Russian (Native), English (Fluent), French (Basic)
Programming Python, Matlab, C++, Bash, Unix
Fremeworks PyTorch, Tensorflow