Andrei Liviu Nicolicioiu

Personal Data

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Education

2023 - current	**PhD in Artificial Intelligence, Mila - Quebec artificial intelligence institute and University of Montreal, Canada**. Research robust methods for out-of-distribution generalization that can scale to real-world settings. *Supervisor*: Aaron Courville.
2016–2018	**MSc in Artificial Intelligence, Faculty of Automatic Control and Computer Science, University Politehnica of Bucharest**. Research aligning vision-language representations, and how to compose pre-trained models for zero-shot video captioning. Propose caption ranking based on learned video-sentence similarity. *Supervisor*: Marius Leordeanu.
2012–2016	**BSc in Computer Science and Engineering, Faculty of Automatic Control and Computer Science, University Politehnica of Bucharest**.

Work Experience

Apr.2022–Dec. 2022	**Machine Learning Research Intern, Max Planck Institute for Intelligent Systems - Germany** Part of Empirical Inference department led by Bernhard Schölkopf. Research causality-inspired methods for out-of-distribution generalization.
Oct.2018–Apr. 2022	**Machine Learning Researcher, Bitdefender, Romania** My work focussed on deep learning methods with factorized and relational representations. I researched topics in vision-language models, few-shot learning, GNNs and Transformers for visual data, and object-centric methods.
Jul.2015–Sep. 2015	**Image Processing Intern, Fotonation, Romania** Research real-time segmentation using depth information for videos. Designed and prototyped different algorithms then implemented them in C.

Publications

NeurIPS 2023	**Spuriosity Didn't Kill the Classifier: Using Invariant Predictions to Harness Spurious Features** Cian Eastwood, Shashank Singh, Andrei Nicolicioiu, Marin Vlastelica, Julius von Kügelgen, Bernhard Schölkopf. *Conference on Neural Information Processing Systems (NeurIPS 2023)* Paper.
ICLR 2023	**DCI-ES: An Extended Disentanglement Framework with Connections to Identifiability** Cian Eastwood*, Andrei Liviu Nicolicioiu*, Julius Von Kügelgen*, Armin Kekic, Frederik Träuble, Andrea Dittadi, Bernhard Schölkopf. *International Conference on Learning Representations (ICLR 2023)* Paper.
NeurIPS 2021	**Discovering Dynamic Salient Regions with Spatio-Temporal Graph Neural Networks** Iulia Duta*, Andrei Nicolicioiu*, and Marius Leordeanu. *Conference on Neural Information Processing Systems (NeurIPS 2021)* Paper. Code
NeurIPS 2019	**Recurrent Space Time Graph Neural Networks** Andrei Nicolicioiu*, Iulia Duta*, and Marius Leordeanu. *Conference on Neural Information Processing Systems (NeurIPS 2019).* Paper. Code
BMVC 2018	**Mining for meaning: from vision to language through multiple networks consensus** Iulia Duta*, Andrei Nicolicioiu*, Simion-Vlad Bogolin and Marius Leordeanu. *British Machine Vision Conference (BMVC 2018).* Paper
SCIS @ICML 2023	**Do as your neighbors: Invariant learning through non-parametric neighbourhood matching** Andrei Liviu Nicolicioiu, Jerry Huang, Dhanya Sridhar, Aaron Courville. *ICML Workshop: Spurious Correlations, Invariance and Stability (SCIS @ICML)* Paper.
SCIS @ICML 2023	**Learning Diverse Features in Vision Transformers for Improved Generalization** Armand Nicolicioiu*, Andrei Nicolicioiu*, Bogdan Alexe, Damien Teney. *ICML Workshop: Spurious Correlations, Invariance and Stability (SCIS @ICML)* Paper.
OOD-CV @ ICCV 2023	**Environment-biased Feature Ranking for Novelty Detection Robustness** Stefan Smeu*, Elena Burceanu*, Emanuela Haller*, Andrei Liviu Nicolicioiu. *ICCV workshop on Out Of Distribution Generalization in Computer Vision (OOD-CV @ ICCV 2023)* Paper.
DistShift @NeurIPs 2022	**Env-Aware Anomaly Detection: Ignore Style Changes, Stay True to Content!** Stefan Smeu, Elena Burceanu, Andrei Liviu Nicolicioiu, Emanuela Haller. *NeurIPS Workshop on Distribution Shifts (DistShift @ NeurIPS 2022)* Paper.

Research Projects

2021	**Demixing object-centric representations.** Propose a constraint based on unmixing mixup representations for improving object-centric representations.
2020	**Effective Receptive Field for Graph Neural Networks** With Iulia Duta Study the effective receptive field of Transformer self-attention layers and graph convolutional networks and its impact on learning stability. Report
2020	**GNN conditioning for few-shot learning** With Armand Nicolicioiu Propose a few-shot learning method that uses GNNs to adapt the intermediate features of a given sample to a context given by class prototypes. Report. Code
2018	**Vision-language alignment** *Master Thesis - UPB.* Advised by Prof. Marius Leordeanu Study language denoising autoencoders and combining pre-trained models for zero-shot video captioning. Propose a ranking system based on learned video-sentence similarity.
2018	**Analysing EEG signal** With Nicolae Cudlenco and Marius Leordeanu Investigate the interplay between standard and learned features for EEG classification.
2017	**Multi-label classification in video** With Iulia Duta and Marius Leordeanu Study recurrent models for multi-label prediction. Investigate clustering of the network predictions using learnt or predetermined class correlations.

Awards

2023	Mila Full scholarship
2023	UdeM Excellence scholarship
2016, 2018	UPB Student Research Competition - Artificial Intelligence - First Prize(2018), Second Prize(2016)
2014, 2015	South Eastern European Mathematical Olympiad - Silver Medal (2014), Bronze Medal(2013)
2013	Intel Perceptual Computing Projects Award - 1st Place
2009-2012	National Mathematics Olympiad of Romania - Bronze Medal (2009, 2010, 2012)
2006 - 2012	Finalist in National Olympiad in Informatics (2006) Physics (2009, 2011), Mathematics (2007, 2009-2012)

Teaching Experience

2019 - 2023	Industry Invited speaker at the University of Bucharest. *Deep Learning* course taught by my colleagues and me at Bitdefender. Presented three lectures on GNNs and Deep Learning methods for Computer Vision. Proposed laboratory and homework assignments and mentored students on their final course project.
2017 - 2022	Teaching Assistant at University Politehnica of Bucharest. *Signal Processing* course taught by Prof. Marios Choudary. Propose assignments and assist students with the laboratory work, propose homework assignments, and advise and grade the students final course projects.
2019, 2020	Teaching Assistant at Eastern European Machine Learning Summer School (EEML). Assisted students with laboratory assignments.
2020-2022	Mentor Master's and Bachelor's Theses. With Marius Leordeanu, co-supervised an undergrad student on their Bachelor's thesis: *Meta-Learning for Few-Shot Classification* and with Bogdan Alexe co-supervised a student on their thesis: *Diversifying and Pruning Visual Transformers.*

Talks

Feb. 2023	*Learning structure in visual domain.* MLS Colloquium, Stuttgart.
Aug. 2022	*On the DCI Framework for Evaluating Disentangled Representations: Extensions and Connections to Identifiability.* Poster at UAI CRL Workshop 2022, Eindhoven.
Dec. 2021	*Discovering Dynamic Salient Regions for Spatio-Temporal Graph Neural Networks.* Poster at NeurIPS 2021 (Virtual).
Jul. 2021	*Graph Neural Networks and Transformers in Vision.* Human Pose Recovery and Behavior Analysis Group - University of Barcelona
Jun. 2021	*Introduction to Graph Neural Networks.* Strasbourg Deep Learning Meetup.
Dec. 2019	*Recurrent Space Time Graph Neural Network.* Poster at Conference on Neural Information Processing Systems (NeurIPS 2019), Vancouver, Canada.
Sep. 2018	*Mining for meaning: from vision to language through multiple networks consensus.* Poster at *British Machine Vision Conference (BMVC 2018)*, Newcastle, UK.
Nov. 2017	*Describing images and videos in natural language*, Presented at Bucharest Computer Vision Group, "Simion Stoilow" Institute of Mathematics of the Romanian Academy.

Other

Reviewer	TPAMI (2022 -); NeurIPS (2020, 2021, 2023 - Top reviewer); ICLR (2021, 2023, 2024); AAAI (2020, 2021); ICML (2021, 2024); CoLLAs (2022); ECCV (2020 - Top reviewer); CVPR (2020); ICCV (2019)
Programming	Python, PyTorch, TensorFlow, Matlab, C++