

Umberto Michieli

Research and development experience in AI, ranging from scene understanding across unseen domains and concepts during my Ph.D. to research on foundation problems for distributed and on-device efficient model training at Samsung. My research achievements include: 20+ research publications, 10+ master's thesis supervision.

Last Update: July 31, 2022.

Work Experience

- Mar. 2022 – **Senior Researcher, Samsung Research UK.**
present
 - Leader of research projects (group of 3 Ph.D. and 2 M.Sc.), defining its agenda and reporting results.
- Oct. 2021 – **Adjunct Professor, University of Padova.**
Mar. 2022 *Neural Networks and Deep Learning*, M.Sc. course (3 credits)
- Oct. 2021 – **Postdoctoral Research Grant, University of Padova.**
Mar. 2022 Research topic: "Semantic Scene Understanding in the Wild".
 - Developing algorithms addressing foundation AI problems such as: continual learning, domain adaptation, federated learning, coarse-to-fine learning.
 - Led various projects with a group of 7 Ph.D. candidates.
 - Attracting new project collaborations, funding, and Ph.D. students to the Lab.
- Sep. 2020 – **Intern AI Researcher, Samsung Research UK.**
May 2021 Federated Learning of Computer Vision Models. Supervisor: Dr Mete Ozay.
As part of the personalized AI/ML team, I have been working on developing and testing new federated optimization frameworks.
 - Improved federated learning optimizers in Tensorflow/Pytorch by $\sim 10\%$ of accuracy via self-attention and latent-level regularization with a $\sim 0.5\%$ computation increase.
 - Won the bronze prize at *Samsung Research UK Innovation Challenge*.
- Feb. – Jul. **Visiting Researcher, Technische Universität Dresden (TUD).**
2018 Experimental research on link prediction (LP) on real and synthetic complex networks. Supervisor: Prof. Carlo Vittorio Cannistraci.
 - Implemented new LP algorithms based on local geometry: improved accuracy by 10% and reduce complexity by $\times 10$.
 - Gathered the largest up-to-date collection database of ~ 1000 complex networks.
- 2018-22 **Teaching Assistant, University of Padova.**
Machine Learning (junior TA: 18/19; TA: 19/20 and 21/22), M.Sc. course.
Computer Vision (junior TA: 18/19), M.Sc. course.

Education

- Oct. 2018 – **Ph.D. in Information Engineering, University of Padova.**
Oct. 2021 Research topic: "Visual Understanding across Semantic Groups, Domains and Devices". Supervisor: Prof. Pietro Zanuttigh. Thesis defended on 10/3/22.
 - Published first-authored papers at prestigious venues (CVPR, ECCV, ICCV).
 - Collaborated with 10+ other Ph.D. students.
 - Mentored more than 20 M.Sc. final projects.

Seasonal Schools, INDABA2022, DeepLearn2021, M2L2020, AI-DLDA2020, REGML2020, GTTI2020, ICVSS2019, GTTI2019, CMMRS2018.

Sep. 2016– **M.Sc. in Telecommunication Engineering**, *University of Padova*.

Sep. 2018 Grade: 110/110 Summa cum Laude.

Thesis: "Link Prediction on Real and Synthetic Complex Networks".

Oct. 2013 – **B.Sc. in Information Engineering**, *University of Padova*.

Jul. 2016 Grade: 110/110 Summa cum Laude.

Thesis: "Correlation and Coherence Analysis between EEG and EMG Signals".

Academic Experience

Program Chair and Reviewer Activity.

- *Journals*: **IEEE** TPAMI, TIP, TMM, TNNLS, TETC, TIV; **Elsevier** INFFUS, PR; **ACM** TOMM; **MDPI** Remote Sensing, Applied Sciences, Applied Intelligence; **ISPRS** Journal of Photogrammetry and Remote Sensing.
- *Main conferences*: ECCV, ICPR, ICASSP, CPHS, BGM.
- *Workshops*: CVPRW on Continual Learning, ECCVW on Transferring and Adapting Source Knowledge, ICMLW on Continual Learning, IJCAIW on Continual Semi-Supervised Learning.

General Chair Activity.

- 2021 GTTI workshop – Deep signal processing for a safer world.

Invited Talks.

- 08/22 *Learning to Segment Images with Limited Data across Devices, Domains and Tasks* - Weakly Supervised Computer Vision Workshop, INDABA2022 (travel supported).
- 01/22 *Visual Understanding across Semantic Groups, Domains and Devices* - Computer Vision seminar, Carnegie Mellon Univ.
- 11/21 *Remembering the Past while Learning the Future: Continual Learning in Deep Neural Networks* - DEITalks series, Univ. of Padova.
- 10/21 *Visual Understanding across Semantic Groups, Domains and Devices in Healthcare Applications* - Microsoft Research Cambridge.
- 10/21 *Visual Understanding across Semantic Groups, Domains and Devices* - Polytechnic Univ. of Turin.
- 07/21 *Federated Learning in Computer Vision* - Computer Vision Talks Series.
- 06/21 *Internal Feature Representations in Federated Learning* - Univ. of Padova.

Fellowships and Awards

- 2022 Awarded a fellowship from the organizers of "*Synapse AI Symposium*".
- 2021 Selected for participation at the Doctoral Consortium at ICCV 2021.
- 2021 Winner of IEEE Young Professional pitch contest *My Research in 5 Minutes*.
- 2021 Winner of a travel award from MDPI Computers.
- 2021 Bronze Prize at Samsung Research UK Innovation Challenge.
- 2021 Winner of Photo Competition at Samsung Research UK (available at [my website](#)).
- 2020 ICPR2020 Free Attendance Pass from the General Chairs.
- 2020 Collaborator of SEED project "Semantic Segmentation in the Wild" (EUR 33K).
- 2018 Selected and awarded a fellowship from the organizers of "*The Cornell, Maryland, Max Planck Pre-doctoral Research School*" (CMMRS).
- 2018 Ph.D. fellowship (3 years). Selection based on project proposal and oral exam.
- 2018 Fellowship by Technische Universität Dresden to attend NetSci 2018.
- 2018 Erasmus fellowship at Technische Universität Dresden.
- 2018 Scholarship grant "Mille e una lode" for merit by University of Padova.
- 2018 Finalist with travel award at "Accenture Innovation Game", business game of project management.

Skills

- **Programming:** Python, MATLAB (previous experience in java, javascript, C++, ns-3).
- **Python libraries:** Pytorch, Tensorflow, Keras, Scikit-learn, Jupyter Notebooks, Pandas.
- **Software development:** Bash, Batch, Git, Pycharm, Scrum, Jira, GitHub Projects.
- **Typesetting:** L^AT_EX.
- **Infrastructure:** HPC clusters, Docker.
- **Soft skills:** project management, teamwork, mentoring and coaching, public speaking.
- **Languages:** Italian (native), English (fluent), Spanish (basic).

Publications

Journals

- [1] D. Shenaj, F. Barbato, U. Michieli, and P. Zanuttigh, "Continual coarse-to-fine domain adaptation in semantic segmentation," *Image and Vision Computing (IMAVIS)*, 2022.
- [2] U. Michieli and P. Zanuttigh, "Knowledge Distillation for Incremental Learning in Semantic Segmentation," *Elsevier Journal on Computer Vision and Image Understanding (CVIU)*, 2021.
- [3] M. Toldo, U. Michieli, G. Agresti, and P. Zanuttigh, "Unsupervised Domain Adaptation for Mobile Semantic Segmentation based on Cycle Consistency and Feature Alignment," *Image and Vision Computing (IMAVIS)*, 2020.
- [4] M. Toldo, A. Maracani, U. Michieli, and P. Zanuttigh, "Unsupervised Domain Adaptation in Semantic Segmentation: a Review ," *Technologies*, vol. 8, no. 35, 2020.
- [5] M. Mel, U. Michieli, and P. Zanuttigh, "Incremental and Multi-Task Learning Strategies for Coarse-to-Fine Semantic Segmentation," *Technologies, special issue on Computer Vision and Image Processing Technologies*, vol. 8, no. 1, 2020.
- [6] U. Michieli, M. Basetton, G. Agresti, and P. Zanuttigh, "Adversarial Learning and Self-Teaching Techniques for Domain Adaptation in Semantic Segmentation," *IEEE Transactions on Intelligent Vehicles (T-IV)*, vol. 5, no. 3, pp. 508–518, 2020.

Conferences

- [7] A. Maracani*, U. Michieli*, M. Toldo*, and P. Zanuttigh, "RECALL: Replay-based Continual Learning in Semantic Segmentation," *International Conference on Computer Vision (ICCV) [acceptance rate=25.9%]*, 2021.
- [8] U. Michieli and M. Ozay, "Are All Users Treated Fairly in Federated Learning Systems?," *Conference on Computer Vision and Pattern Recognition (CVPR), Workshop on Responsible Computer Vision (RCV)*, 2021.
- [9] F. Barbato, M. Toldo, U. Michieli, and P. Zanuttigh, "Latent Space Regularization for Unsupervised Domain Adaptation in Semantic Segmentation," *Conference on Computer Vision and Pattern Recognition (CVPR), Workshop on Autonomous Driving (WAD)*, 2021.
- [10] U. Michieli and P. Zanuttigh, "Continual Semantic Segmentation via Repulsion-Attraction of Sparse and Disentangled Latent Representations," *Computer Vision and Pattern Recognition (CVPR) [acceptance rate=23.6%]*, 2021.
- [11] M. Toldo, U. Michieli, and P. Zanuttigh, "Unsupervised Domain Adaptation in Semantic Segmentation via Orthogonal and Clustered Embeddings," *Winter Conference on Applications of Computer Vision (WACV) [acceptance rate=28%]*, 2021.

- [12] U. Michieli, E. Borsato, L. Rossi, and P. Zanuttigh, "GMNet: Graph Matching Network for Large Scale Part Semantic Segmentation in the Wild," *European Conference on Computer Vision (ECCV)* [acceptance rate=26%], 2020.
- [13] T. Spadotto, M. Toldo, U. Michieli, and P. Zanuttigh, "Unsupervised Domain Adaptation with Multiple Domain Discriminators and Adaptive Self-Training," *International Conference on Pattern Recognition (ICPR)* [first round acceptance rate=35.6%], 2020.
- [14] U. Michieli and P. Zanuttigh, "Incremental Learning Techniques for Semantic Segmentation," *International Conference on Computer Vision (ICCV), Workshop on Transferring and Adapting Source Knowledge in Computer Vision (TASK-CV)*, 2019.
- [15] U. Michieli, M. Camporese, A. Agiollo, G. Pagnutti, and P. Zanuttigh, "Region Merging Driven by Deep Learning for RGB-D Segmentation and Labeling," *International Conference on Distributed Smart Cameras (ICDSC)*, 2019.
- [16] M. Biasetton, U. Michieli, G. Agresti, and P. Zanuttigh, "Unsupervised Domain Adaptation for Semantic Segmentation of Urban Scenes," *Conference on Computer Vision and Pattern Recognition (CVPR), Workshop on Autonomous Driving (WAD)*, 2019.
- [17] U. Michieli and L. Badia, "Game Theoretic Analysis of Road User Safety Scenarios Involving Autonomous Vehicles," *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)*, pp. 1377–1381, 2018.
- [18] G. Cisotto, U. Michieli, and L. Badia, "A coherence study on EEG and EMG signals," *IEEE Global Wireless Summit (GWS)*, pp. 372–376, 2016.

Book Chapters

- [19] U. Michieli, M. Toldo, and P. Zanuttigh, "Unsupervised Domain Adaptation and Continual Learning in Semantic Segmentation," *Advanced Methods and Deep Learning in Computer Vision*, Elsevier, 2021.

Posters

- [20] P. Testolina, F. Barbato, U. Michieli, M. Giordani, P. Zanuttigh, and M. Zorzi, "SELMA: SEmantic Large-scale Multimodal Acquisitions in Variable Weather, Day-time and Viewpoints for Autonomous Driving Research," *IEEE Communication Theory Workshop (CTW)*, 2019.
- [21] U. Michieli, P. Testolina, M. Lecci, and M. Zorzi, "Wireless User Positioning via Synthetic Data Augmentation and Smart Ensembling," *IEEE Communication Theory Workshop (CTW)*, 2019.
- [22] U. Michieli, A. Muscoloni, L. Badia, and C. V. Cannistraci, "A dramatic truth in link prediction: SBM inference fails to effectively predict even the structure of synthetic networks generated with the SBM model," *Complex Networks: the International Conference on Complex Networks and Their Applications*, 2018.

* indicates equal contribution.

I hereby authorize the processing of the personal data contained in this CV in compliance with the Italian Personal Data Protection Code (Legislative Decree no. 196 of 30 June 2003).