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Umberto Michieli
Date of birth: 28/11/1994

Umberto Michieli

I am a Computer Vision and Deep Learning research scientist. My goal is to contribute to the adoption of AI in everyday life and to its adaptation to meet human needs.

Last Update: March 20, 2022.

Work Experience

Mar. 2022 – present **Senior Research Engineer/Scientist**, *Samsung Research UK*.
- Leader of research project, defining research agenda
- Team leader of two Ph.D. interns (8 months each)

Oct. 2021 – Mar. 2022 **Adjunct Professor**, *University of Padova*.
Neural Networks and Deep Learning, M.Sc. course (partial)

Oct. 2021– Mar. 2022 **Postdoctoral Research Grant**, *University of Padova*.
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.
- Co-leading a group of five Ph.D. students on related topics.
- Attracting new project collaborations, funding, and Ph.D. students to the Lab.

Sep. 2020 – May 2021 **Internship as AI Research Engineer**, *Samsung Research UK*.
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*.
- Contributed to hiring a new Ph.D. intern.

Feb. – Jul. 2018 **Visiting Researcher**, *Technische Universität Dresden (TUD)*.
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 – Oct. 2021 **Ph.D. in Information Engineering**, *University of Padova*.
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).
- Mentored more than 20 M.Sc. final projects.

Seasonal Schools, 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** 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*: 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.

- 01/2022 *Visual Understanding across Semantic Groups, Domains and Devices* - Computer Vision seminar, Carnegie Mellon Univ.
- 11/2021 *Remembering the Past while Learning the Future: Continual Learning in Deep Neural Networks* - DEITalks series, Univ. of Padova.
- 10/2021 *Visual Understanding across Semantic Groups, Domains and Devices in Healthcare Applications* - Microsoft Research Cambridge.
- 10/2021 *Visual Understanding across Semantic Groups, Domains and Devices* - Polytechnic Univ. of Turin.
- 07/2021 *Federated Learning in Computer Vision* - Computer Vision Talks Series.
- 06/2021 *Internal Feature Representations in Federated Learning* - Univ. of Padova.

Fellowships and Awards

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 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:** LaTeX.

- **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. Biasetton, 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.

* 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).