Marco De Nadai | Ph.D.

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My research interests focus on Machine Learning and Computer Vision, particularly on unsupervised generative modelling for image-to-image translation and image/video manipulation. I am also interested in human behaviour understanding. During my PhD, I studied how multi-modal data (e.g. Street View imagery, GPS traces, geographic data) can be jointly used to describe and predict people's activities.

Current position

2021 Sep-Now **Applied scientist**, *Zalando*, Berlin, Germany.
Research on the generation of fashion-compatible outfits that fit well with customers' preferences, extracted from sequences of actions on the website.

Education

2015–2019 **PhD in Computer Science**, *University of Trento*, Italy, *cum laude*.
Published more than 10 papers in multiple research fields. Advisors: Bruno Lepri and Nicu Sebe.

2012–2015 **Master of Science in Computer Science**, *University of Trento*, Italy, *110/110 cum laude*.

2013–2014 **Exchange student in Artificial Intelligence**, *Vrije Universiteit Amsterdam*, Netherlands.

2008–2012 **Bachelor of Science in Computer Science**, *University of Udine*, Italy, *100/110*.

Work Experience

2019-2021 **Research scientist**, *Fondazione Bruno Kessler (FBK)*, Trento, Italy.
Computer vision models for multi-domain and multi-modal image-to-image translation and image/video manipulation. I co-advise **three** computer vision **PhD students** on a day-to-day basis.

2019 Oct–Dec **Research consultant**, *Samsung Electronics*, Remote.
Designed a research plan to model and predict human behaviour from large-scale passively-collected data of mobile phone applications.

2018 Jun–Sep **Research scientist intern**, *Vodafone*, London, UK.
Created a data-driven model for understanding and predicting the use of Android mobile applications and mobility of 400,000 people. Mined terabytes of logs and GPS locations. Apache Spark ETL.
Advisors: Nuria Oliver and Angelo Cardoso

2016 Jun–Sep **Visiting student - Research**, *Massachusetts Institute of Technology (MIT)*, Cambridge, MA, USA.
Developed a model to predict and describe crime from geographical, mobile phone and census data in four multi-million cities. Advisor: Marta C. Gonzalez

2015 Mar–Nov **Data scientist**, *Fondazione Bruno Kessler (FBK)*, Trento, Italy.
Responsible for designing and developing models to predict human behaviour from multiple sources of data. Mining large scale data from mobile phone logs. Deep learning models for images processing.

2014–2015 **Data scientist intern - Research**, *Telecom Italia*, Trento, Italy.
Analyzed large-scale data from mobile phone call logs to describe the mobility of people in cities.

Selected Publications

I authored more than 13 papers published by top conferences and journals. My Google Scholar h-index is 9.

2021 *Efficient Training of Visual Transformers with Small-Size Datasets* — **NeurIPS '21**
Y. Liu, E. Sangineto, Wei Bi, N. Sebe, B. Lepri, **M. De Nadai**. arXiv:2106.03746

2021 *Click to Move: Controlling Video Generation with Sparse Motion* — **ICCV '21**
P. Ardino, **M. De Nadai**, B. Lepri, E. Ricci, S. Lathuilière arXiv:2108.08815

2021 *Smoothing the Latent Style Space for Unsupervised Image-to-Image Translation* **CVPR '21**
Y. Liu, E. Sangineto, …, B. Lepri, N. Sebe, W. Wang, **M. De Nadai**. arXiv:2106.09016

2020 *Semantic-Guided Inpainting Network for Complex Urban Scenes Manipulation* **ICPR '20**
P. Ardino, Y. Liu, B. Lepri, **M. De Nadai**. arXiv:2010.09334

2020 *Describe What to Change: A Text-guided Unsupervised Image-to-Image Translation Approach*. **ACM MM '20**
Y. Liu, **M. De Nadai**, …, X. Almeda, N. Sebe, B. Lepri arXiv:2008.04200

2020 *Retrieval Guided Unsupervised Multi-domain Image to Image Translation* **ACM MM '20**
Y. Liu, R. Gomez, **M. De Nadai**, D. Karatzas, N. Sebe, B. Lepri arXiv:2008.04991

2019 *Gesture-to-Gesture Translation in the Wild via Category-Independent Conditional Maps* **ACM MM '19**
Y. Liu, **M. De Nadai**, G. Zen, N. Sebe and B. Lepri arXiv:1907.05916

2018 *The economic value of neighborhoods: Predicting real estate prices from the urban environment* **DSAA '18**
M. De Nadai and B. Lepri doi:10/ddjf

2016 *Are safer looking neighborhoods more lively? a multimodal investigation into urban life* **ACM MM '16**
M. De Nadai, R. Vieriu, G. Zen, …, C. A. Hidalgo, N. Sebe, and B. Lepri. doi:10/ddjd

2016 *The death and life of great italian cities: A mobile phone data perspective* **WWW '16**
M. De Nadai, J. Staiano, R. Larcher, N. Sebe, D. Quercia, and B. Lepri doi:10/ddjg

Skills

AI Computer Vision · GANs · Data Mining · Machine Learning · Deep Learning

Programming Python · SQL (especially PostgreSQL) · Java · PHP · Javascript

Libraries PyTorch · NumPy · Scikit-learn · Pandas · Apache (Py)Spark · PostGIS · Stan · PyMC3

Languages English full professional proficiency (C1) · Italian (Native)

Projects

2020 **Generating videos from a single image and a user trajectory**, *Ongoing work*.
We allow users to select some objects from an image and draw a trajectory. From it, our deep network generates a realistic video where the selected object moves according to the specified trajectory.

2020 **GPS mobility for COVID-19 spreading models and predictions**, *Ongoing work*.
Designed and developed the pipeline to process 7.5 TB of raw GPS data, compute the stop locations, OSM stops, home and work locations of 20M users for less than $ 250 in Apache Spark and Azure machines.

2018 **Prediction of people's activity and real estate prices**, *Industrial project*.
Designed and implemented a predictive model that improved by 30% the predictions on housing prices in the four biggest Italian cities by fusing structured data and Google Street View images.

Leadership and awards

2021 **PhD student guidance.** I am guiding two PhD students in computer vision.

2021 **Outstanding reviewer.** CVPR 2021.

2020 **Best PhD student (top 1%).** For the excellent cross-disciplinary scientific contribution.

2017 **Microsoft Azure Research Award.** Azure cloud credits for my research. *€20,000.00*

2017 **1st Place.** Italian Football Federation Match Analysis competition. *€5,000.00*

2016 **Travel Awards.** ACM and Google grants based on the research proposal and achievement.

2016 **Best Master student (top 1%).** University of Trento.

Other activities

Reviewer IEEE Transactions on Multimedia · Ubicomp · PLOS ONE · EPJ Data Science · DAMI

PC CVPR '20–'22 · ICCV '21 · IJCAI '20–'21 · AAAI '19–'22 · KDD '18-'19 · ACM MM '19–'20