

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

2019 **Research scientist**, *Fondazione Bruno Kessler (FBK)*, Trento, Italy.
May–Now 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.

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 **Research consultant**, *Samsung Electronics*, Remote.
Oct–Dec Designed a research plan to model and predict human behaviour from large-scale passively-collected data of mobile phone applications.
2018 **Research scientist intern**, *Vodafone*, London, UK.
Jun–Sep 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 **Visiting student - Research**, *Massachusetts Institute of Technology (MIT)*, Cambridge, MA, USA.
Jun–Sep 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 **Data scientist**, *Fondazione Bruno Kessler (FBK)*, Trento, Italy.
Mar–Nov 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	<i>Efficient Training of Visual Transformers with Small-Size Datasets</i> Y. Liu, E. Sangineto, Wei Bi, N. Sebe, B. Lepri, M. De Nadai .	Under review arXiv:2106.03746
2021	<i>Click to Move: Controlling Video Generation with Sparse Motion</i> P. Ardino, M. De Nadai , B. Lepri, E. Ricci, S. Lathuilière	ICCV '21 arXiv:2108.08815
2021	<i>Smoothing the Latent Style Space for Unsupervised Image-to-Image Translation</i> Y. Liu, E. Sangineto, ..., B. Lepri, N. Sebe, W. Wang, M. De Nadai .	CVPR '21 arXiv:2106.09016
2020	<i>Semantic-Guided Inpainting Network for Complex Urban Scenes Manipulation</i> P. Ardino, Y. Liu, B. Lepri, M. De Nadai .	ICPR '20 arXiv:2010.09334

2020	<i>Describe What to Change: A Text-guided Unsupervised Image-to-Image Translation Approach.</i> Y. Liu, M. De Nadai , ..., X. Almeda, N. Sebe, B. Lepri	ACM MM '20 arXiv:2008.04200
2020	<i>Retrieval Guided Unsupervised Multi-domain Image to Image Translation</i> Y. Liu, R. Gomez, M. De Nadai , D. Karatzas, N. Sebe, B. Lepri	ACM MM '20 arXiv:2008.04991
2020	<i>Socio-economic, built environment, and mobility conditions associated with crime: a study of multiple cities</i> M. De Nadai , Y. Xu, E. Letouze, M. C. Gonzalez, B. Lepri	Nature Sci. Reports doi: 10.1038/s41598-020-70808-2
2019	<i>Gesture-to-Gesture Translation in the Wild via Category-Independent Conditional Maps</i> Y. Liu, M. De Nadai , G. Zen, N. Sebe and B. Lepri	ACM MM '19 arXiv:1907.05916
2018	<i>The economic value of neighborhoods: Predicting real estate prices from the urban environment</i> M. De Nadai and B. Lepri	DSAA '18 doi:10/ddjf
2016	<i>Are safer looking neighborhoods more lively? a multimodal investigation into urban life</i> M. De Nadai , R. Vieriu, G. Zen, ..., C. A. Hidalgo, N. Sebe, and B. Lepri.	ACM MM '16 doi:10/ddjd
2016	<i>The death and life of great italian cities: A mobile phone data perspective</i> M. De Nadai , J. Staiano, R. Larcher, N. Sebe, D. Quercia, and B. Lepri	WWW '16 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-'21 · ICCV '21 · IJCAI '20-'21 · AAAI '19-'21 · KDD '18-'19 · ACM MM '19-'20