Marco De Nadai

Contact Information

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About me

My research interests focus on Machine Learning and Computer Vision, particularly to the possibilities where Machine Learning can be applied to understand human behaviour. During my PhD, I studied how multi-modal data can be used to describe and predict people's activities in cities. To do so, I built predictive models that fuse structured data (e.g. tabular, geographic), images (e.g. satellite, Google Street View imagery) and GPS locations.

Actual Position

Research Scientist
Fondazione Bruno Kessler (FBK), Italy
Computer vision generative models (i.e. GANs) for urban aerial and street view imagery.

Education

PhD in Computer Science, cum laude — 2019
University of Trento, Italy
Thesis: Into the City: a Multi-Disciplinary Investigation into Urban Life
Advisors: Bruno Lepri and Nicu Sebe

Master of Science in Computer Science, 110/110 cum laude — 2015
University of Trento, Italy

Exchange student in Artificial Intelligence — 2014
Vrije Universiteit Amsterdam, The Netherlands

Bachelor of Science in Computer Science, 100/110 — 2012
University of Udine, Italy

Work Experience

Research scientist intern — 2018
Vodafone, London (UK)
Developed a data-driven model for understanding and predicting the use of Android mobile applications and the mobility of people. Mined terabytes of logs and GPS locations. Apache Spark ETL.
Advisors: Nuria Oliver and Angelo Cardoso

Visiting student - Research — 2016
Massachusetts Institute of Technology (MIT), Massachusetts, USA
Developed a model to predict and describe crime from geographical, mobile phone and census data.
Advisor: Marta C. Gonzalez

Data scientist — 2015
Fondazione Bruno Kessler, 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.

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

Machine Learning intern — 2014
University of Amsterdam, The Netherlands
Developed a Neural Network and ARIMA models to predict the energy consumption of buildings.

Publications

M. De Nadai and B. Lepri. The economic value of neighborhoods: Predicting real estate prices from the urban environment. In *IEEE Conference on Data Science and Advanced Analytics (DSAA)*, 2018

M. De Nadai, R. Vieriu, G. Zen, S. Dragicevic, N. Naik, M. Caraviello, C. A. Hidalgo, N. Sebe, and B. Lepri. Are safer looking neighborhoods more lively? a multimodal investigation into urban life. In *ACM International Conference on Multimedia (MM)*, 2016

M. De Nadai, J. Staiano, R. Larcher, N. Sebe, D. Quercia, and B. Lepri. The death and life of great italian cities: A mobile phone data perspective. In *The World Wide Web Conference (WWW)*, 2016

S. Centellegher, M. De Nadai, M. Caraviello, C. Leonardi, M. Vescovi, Y. Ramadian, N. Oliver, F. Pianesi, A. Pentland, F. Antonelli, and B. Lepri. The mobile territorial lab: A multilayered and dynamic view on parents' daily lives. *EPJ Data Science*, 2016

G. Barlacchi, M. De Nadai, R. Larcher, A. Casella, C. Chitic, G. Torrisi, F. Antonelli, A. Vespignani, A. Pentland, and B. Lepri. A multi-source dataset of urban life in the city of milan and the province of trentino. *Nature Scientific data*, 2015

M. De Nadai and M. van Someren. Short-term anomaly detection in gas consumption through arima and artificial neural network forecast. In *IEEE EESMS*, 2015

Scholarships and awards

Microsoft Azure Research Award. *€20,000.00 of Azure credits for my research.* 2017
1st Place. *Italian Football Federation Match Analysis competition; prize of €5,000.00.* 2017
Travel Grant. *Computational Social Science Summer school.* 2017
Travel Grant. *ACM grant for the Multimedia 2016 conference.* 2016
Travel Grant. *Google grant for the WWW 2016 conference.* 2016
Best Master's student. *University of Trento.* 2016

Other activities

PC member. ACM MM 2019 · ICDCS 2018 · DAPS 2017.
Reviewer. KDD 2018-2019 · Ubicomp · Plos one · EPJ Data Science · DAMI · JOSIS · GeoJournal.
Summer schools. Computational Social Science Summer school, *Sant'Antioco, Italy* · Complex networks: theory, methods, and applications, *Como, Italy.*

PhD and Industrial Projects

Generative Adversarial Networks (GANs) for urban spaces 2019
Ongoing work + Paper under review

Designed a GAN model to propose *what* and *where* the neighbourhood might be modified to make it successful. From an aerial image (e.g. satellite or map image) the model proposes the best locations to add the Point of Interests, conditionally to the existing layout of the district.

Modelling the application usage and mobility of hundreds thousands of people 2019
Paper under review

Created a model of the application usage and mobility of people through the analysis of the mobile application usage data and GPS locations of 400,000 individuals over six months.
Pre-print paper: https://bit.ly/2ICWEBE

Prediction of people's activity and real estate prices 2018
Cerved Group, Italy

Developed and implemented a predictive model to predict housing prices from structured data and Google Street View images. Deployed in production in multiple cities.

Data fusion of GIS, mobile phone, and census to predict crime 2017
Paper under review

Developed a MCMC Bayesian regression model to explore and predict geo-located crime from structured data and matrices of people's movements between urban areas. Deployed in five cities.

Skills

ML & AI. Machine Learning · Deep Learning · Computer Vision · Data Mining
Programming. Python · Java · C · SQL (especially PostgreSQL) · PHP · Javascript
Frameworks. NumPy · Scikit-learn · Pandas · PyTorch · Apache Spark · PostGIS · Stan · PyMC
Certifications. Scalable Machine Learning with Apache Spark · DeepLearning.ai course
OS & Tools. Linux · Bash · Git

Languages

English. C1 level
Italian. native