Emanuele Sansone

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Education

2013-2018 — Ph.D.

ICT doctoral school, University of Trento, Italy

Thesis: "Towards Uncovering the True Use of Unlabeled Data in Machine Learning"

Advisor: Prof. Francesco G.B. De Natale.

Dissertation on the usage of unlabeled data in different areas of machine learning, including positive unlabeled and semi-supervised learning.

2011-2012 — M.Sc. in Telecommunications Engineering (cum laude)

University of Trento, Italy

110/110 *summa cum laude* | Gpa: 28.82/30

Thesis: "Multimodal Photo Galleries Synchronization"

Advisor: Prof. Nicola Conci, Giulia Boato.

Computer vision application for automatic synchronization of photo galleries from multiple users attending the same event (C++ language).

2008-2010 — B.Sc. in Telecommunications Engineering

University of Trento, Italy

Thesis: "Master P-NET protocol implementation on PIC 32 architecture"

Advisor: Prof. Dario Petri, Eng. Michele Corrà.

Programming a master device in a network composed by different sensors and actuators. Implementation of P-NET protocol over a PIC 32 microcontroller (C language).

Research Experience

2020-to date — PostDoc Researcher

KU Leuven, Leuven, Belgium

Conducting research on topics related to representation and statistical relational learning.

Coordinating the research activities for a work package of the TAILOR (Trustworthy AI: Integrating Learning Optimization and Reasoning) European research network together with Prof. Luc de Raedt. The goal of the work package is to unify the different paradigms of learning (based on deep learning) and reasoning (based on logic, knowledge graphs and constraints). See the website of the work package for further details.

Supervision of Master Students:

2020-2021 - Eleonora Misino: "Deep Generative Models with Probabilistic Logic Priors". University of Bologna

2021-2022 - Ioannis Lamprou: "Assessing the Use of Deep Learning in Combinatorial Optimization". KU Leuven

2021-2022 - Rijo John Zachariah: "Gradient-Based Approximate Inference in Large Weighted Propositional Logic Programs ". KU Leuven

2021-2022 - Rik Bossuyt: "Neural Compilation in ProbLog". KU Leuven

Supervision of Honor Students:

2021-2022 - Xander Haijen: "Comparison of Reinforcement Learning Methods Applied to Tetris". KU Leuven

2018-2020 — Research Scientist

Huawei Technologies R&D, London, UK

Working in the area of deep generative models and self-supervised learning. Supervising students on using machine learning for applications related to the company: Yinbai Li (Bachelor student in Mathematics at University of Cambridge), Xingyu Jin (Master student in Computer Science at University of Edinburgh).

2018-to date — Professional Service

Serving as a reviewer for international journals in the area of machine learning and signal processing, such as IEEE Transactions on Neural Networks and Learning Systems, Machine Learning (Springer) and IEEE Transactions on Image Processing.

Serving as a reviewer at the major machine learning conferences, like ICLR (2021,2022,2023), NeurIPS (2021,2022), ICML (2022), AISTATS (2022,2023) and ECML-PKDD - Research Track (2021)

2015-2016 — Research Internship

LAMDA group, Nanjing University, China

Advisor: Prof. Zhi-Hua Zhou.

Working on positive unlabeled learning.

Teaching Experience

2020 & 2021

Teaching Assistant, Machine Learning and Inductive Inference (B-KUL-H00G6a)

M.Sc. in Artificial Intelligence, KU Leuven, Belgium

2016

Teaching Assistant, Computer Vision (Code 140266)

M.Sc. in Telecommunications Engineering, University of Trento, Italy

Goal: provide an introductory view of machine learning and neural networks. [Sample Material]

Tasks (frontal lessons): Basic notions of statistical learning theory. Introduction to neural networks and derivation of the backpropagation algorithm. Building a binary classifier with neural networks (with demo in Matlab). Extending the classifier to multiclass classification (with demo in Matlab).

Tasks (lab sessions for the main course): Introduction to OpenCV and explanation/ implementation of SIFT descriptors.

Case study/Project description: design and implementation of a neural network classifier for positive unlabeled learning.

Students' supervision and Assessment: Federico Morelli, Davide Piscini, Subhankar Roy, Alessandro Antonucci, Pietro Postal, Andrea Simonelli, Stefano Leornardelli, Giulio Carlo Gialanella, Davide Zanetti, Adriano Tomasi.

2015

Teaching Assistant, Multimedia Networking (Code 140151)

M.Sc. in Telecommunications Engineering, University of Trento, Italy

Goal: provide an introductory view of video compression/coding. [Sample Material]

Tasks (frontal lessons): Introduction to motion estimation and problem formulation. Implementation of motion estimation algorithms (e.g. exhaustive search, 3-step search) and testing on synthetic datasets using Matlab. Analysis of computational complexity of the proposed motion estimation algorithms. Implementation and testing on real world data using Matlab. Review of fundamentals of video coding (which was covered in the main course). Summary of the comparison among different standards (i.e. H.261, MPEG-1, MPEG-2). Introduction and use of ffmpeg libraries with different configuration settings. Review of H.264 standard. Introduction and use of the H.264/AVC JM reference software manual.

Project description: design and implementation of an algorithm for summarization of consumer videos.

Student Supervision and Assessment: Michele Vascotto

Pre-prints

2021

Leveraging Hidden Structure in Self-Supervised Learning

E. Sansone

arXiv pre-print

2017

Training Feedforward Neural Networks with Standard Logistic Activations is Feasible

E. Sansone, F.G.B. De Natale

arXiv pre-print

Publications

2022 — **VAEL: Bridging Variational Autoencoders and Probabilistic Logic Programming**
E. Misino, G. Marra, E. Sansone
Neural Information Processing Systems (NeurIPS), [Code]

2022 — **LSB: Local Self-Balancing MCMC in Discrete Spaces**
E. Sansone
International Conference on Machine Learning (ICML), [Code]

2020 — **Coulomb Autoencoders**
E. Sansone, H. T. Ali, J. Sun
European Conference on Artificial Intelligence (ECAI)

2018 — **Towards Uncovering the True Use of Unlabeled Data in Machine Learning**
E. Sansone
PhD Thesis

2018 — **Efficient Training for Positive Unlabeled Learning**
E. Sansone, F.G.B De Natale, Z.H. Zhou
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), [Code]

2017 — **Automatic Synchronization of Multi-User Photo Galleries**
E. Sansone, K. Apostolidis, N. Conci, G. Boato, V. Mezaris, F.G.B. De Natale
IEEE Transactions on Multimedia (TMM), [Code]

2016 — **Classtering: Joint Classification and Clustering with Mixture of Factor Analysers**
E. Sansone, A. Passerini, F.G.B. De Natale
European Conference on Artificial Intelligence (ECAI), [Code]

2014 — **Synchronizing Multi-User Photo Galleries with MRF**
E. Sansone, G. Boato, MS. Dao
MediaEval Workshop

2013 — **Event Clustering and Classification from Social Media: Watershed-based and Kernel Methods**
TV. Nguyen, MS. Dao, R. Mattivi, E. Sansone, F.G.B. De Natale, G. Boato
MediaEval Workshop

Invited Talks

2019 — **Coulomb Autoencoders**
Symposium on Deep Generative Models, British Computer Society (London, UK)

2017 — **Generative Adversarial Networks**
Fondazione Bruno Kessler (Trento, Italy)

Awards

2022 — **Outstanding Reviewer Award**
ICML 2022

2021 | Outstanding Reviewer Award
ICLR 2021

2016 | Academic Hardware Grant Award, NVIDIA
Award consisting of a NVIDIA Titan X GPU
Description: Independently writing a proposal for research grant

2012 | Merit Award, University of Trento
Trento, Italy
Award assigned to distinguished master students

Learning Certificates

2022 | European Summer School in Logic, Computation and Information (ESSLLI 2022)
Galway, Ireland
Certificate of completion
Organization: National University of Ireland Galway

2020 | Algorithms Specialization
Certificate of completion
Organization: Coursera (Stanford University)

2018 | Full Stack Deep Learning Bootcamp
Berkeley, USA
Certificate of completion
Organization: University of California, Berkeley

2017 | Neural Networks for Machine Learning
Certificate of completion
Organization: Coursera (University of Toronto)

2015 | Machine Learning Summer School
Austin, USA
Certificate of completion
Organization: University of Texas at Austin

Sport Professional Experience (Coaching Skills)

2011-to date | Ski master instructor
Italy
This is the highest professional degree in alpine skiing (the total number of ski master instructors in Italy is around 200), which can be achieved by demonstrating excellent skiing capabilities as well as strong organizational, didactical and methodological skills used when coaching.

I hold several professional education and training courses for ski instructors and candidate ski instructors. The following is a list of people I prepared to become ski instructors (all of them are now either coaches and/or ski instructors): Alessandro Berlanda, Camilla Berlanda, Martina Kerschbaumer, Davide Raineri, Valentina Zampedri, Erman Baldessari, Federico Tonezzer, Martina Longobardi, Chiara Villotti, Stefano Gonzo, Francesca Cella, Samuel Piffer, Teo Valle, Martino Santoni, Emma Santoni, Thomas Corradino, Silvia Zeni, Marco Faccenda.

2007-2017 | Ski coach
Italy

Coach of young athletes (6-20 years old) in several racing ski teams: Ski Team Sopramonte (2007/2008), Sci Club Padova (2008/2009), Sci Club Panarotta (2009-2011), Ski Team Paganella (2013/2014), Campiglio Ski Team (2016/2017).

2002-2007

Ski athlete

Italy

Participating in many international competitions. See a sample list of records.

Sport Certificates

2011 — Ski Master Instructor
Milan, Italy
Certificate
Organization: FISI, CoScuMa

2011 — Ski Coach (3° level)
Milan, Italy
Certificate
Organization: FISI, STF

2007 — Ski Instructor
Trento, Italy
Certificate
Organization: PAT

Languages

Italian:	Mothertongue
English:	Fluent (C2)
German:	Fluent (B2)

Other Interests

Blogging — I maintain a blog, where I'm sharing notes about topics of interest, including reinforcement learning and automated reasoning.

Volunteering — From 2012 to 2014, I've been member of a no-profit association, GiPro, composed by young representatives of different sectors (e.g. ski instructors, engineers, lawyers, psychologists). The goal of the association is to promote the professional categories on the territory and stimulate the inter-professional collaboration of young people.