europass Curriculum vitae

PERSONAL INFORMATION

Daniele Cattaneo

+39 3932862511

cattaneo@cs.uni-freiburg.de

https://rl.uni-freiburg.de/people/people/cattaneo

Sex Male | Date of birth 20 Dec 1991 | Nationality Italian

EDUCATION AND TRAINING

Nov 2016–Present — **Ph.D. Student** — EQF level 8

University of Milano-Bicocca, Milan (Italy)

Topics: perception and localization for autonomous robots in urban scenarios, in particular on deep learning for vision-based and lidar-based localization.

In the Computer Science Doctorate Program at the University of Milano - Bicocca, Milan, Italy, The Italian Ph.D. program (Dottorato di Ricerca) lasts three years. Its specific degree areas are assigned a number of places each year and these are filled by national competition.

Tutor: Prof. Giuseppe Vizzari

Supervisor: Prof. Domenico G. Sorrenti

Jun 2019–Sep 2019 — **Ph.D. Visiting period**

University of Alcalá, Alcalá de Henares (Spain)

I will spend 3 months in the INVETT research group under the supervision of Prof. Miguel Ángel Sotelo

Sep 2018–Apr 2019 — **Ph.D. Visiting Period**

Albert-Ludwigs-Universität Freiburg, Freiburg (Germany)

Visiting period at the Autonomous Intelligent Systems (AIS) laboratory under the supervision of Prof. Wolfram Burgard which led to the publication **CMRNet: camera to LiDAR-map registration** (preprint)

Nov 2013–Mar 2016 — **MSc in Computer Science** — EQF level 7

Università degli Studi di Milano-Bicocca, Milan (Italy)

Full marks with honors

Thesis title: "**A Probabilistic Intersection Detector for the Road Layout Estimation Framework**"

Thesis description: a probabilistic method for detecting and classifying urban road intersections from a moving vehicle based on stereo images from an on-board stereo rig. The approach relies on the detection of the road ground plane on one side, and on a pixel-level classification of the road on the other. The two processing pipelines are then integrated and the parameters of the road components, i.e., the intersection geometry, are inferred.

Main topics involved: computer vision, robotics, data mining, parallel computing, image processing.

Courses:

- Perception and robotics
- Digital Imaging
- Data and text mining
- Machine Learning
- Parallel computing systems
- Probabilistic models for decision making
- Data and software architectures

- Models and computation
- Complex Systems: Models and Simulation
- Telecommunication systems and services
- Information theory and cryptography
- Software Design Laboratory

Oct 2010–Oct 2013

Bachelor Degree in Computer Science

EQF level 6

Università degli Studi di Milano-Bicocca, Milan (Italy)

Full marks with honor.

Thesis title: "**Component Software for structural learning in Continuous Time Bayesian Network (CTBN)**".

Thesis description: A parallel computing implementation of the Continuous Time Bayesian Network (CTBN) learning algorithm, using the MapReduce programming model.

Main courses:

- Probability and statistics for computer science
- Text algorithms
- Algorithms and operational research
- Operating systems and networks
- System Theory
- Information theory

WORK EXPERIENCE

1 Jan 2020–Present

Senior Researcher

University of Freiburg, Department of Computer Science, Freiburg im Breisgau (Germany)

Jun 2016–Nov 2016

Research assistant

Università degli studi di Milano-Bicocca, Milan (Italy)

Research assistant at the Informatics and Robotics for Automation Laboratory (IRALab) under the supervision of Prof. Domenico G. Sorrenti.

PERSONAL SKILLS

Mother tongue(s): Italian

Job-related skills: Skills acquired in different topics:

[Computer vision and robotics]

- Parametric and non-parametric Bayesian filters
- 3D reconstruction through stereo-vision and Structure From Motion
- Semantic image segmentation
- Object detection and tracking
- Point Clouds Registration
- Visual Odometry

Robotics software and libraries intensively used:

- ROS
- Point Cloud Library (PCL)
- OpenCV

- Eigen
- Boost
- scikit-learn

I've studied and practiced Deep Learning based technique for image classification, semantic segmentation, object recognition, depth estimation, point cloud processing and camera localization using the following frameworks:

- PyTorch
- Tensorflow
- Keras

[Parallel Computing]:

- CUDA
- Apache Hadoop (MapReduce programming model)
- OpenMP

[Data Mining]

Tools used for data mining:

- Weka
- Knime
- R

[Programming languages]

Excellent programming skills:

- Python
- C/C++
- CUDA

Good programming skill:

- Matlab
- Java
- SQL
- HTML
- CSS
- Javascript
- VBScript

[IDE]

- PyCharm
- CLion
- QtCreator
- Eclipse

ADDITIONAL INFORMATION

Publications

- D.Cattaneo, M. Vaghi, S. Fontana, A.L. Ballardini, D.G. Sorrenti (Università degli Studi di Milano-Bicocca) - **Global visual localization in LiDAR-maps through shared 2D-3D embedding space**, International Conference on Robotics and Automation (ICRA), 2020

- D.Cattaneo, M. Vaghi, A.L. Ballardini, S. Fontana, D.G. Sorrenti (Università degli Studi di Milano-Bicocca), W. Burgard (University of Freiburg) - **CMRNet: Camera to LiDAR-Map Registration**, International Conference on Intelligent Transportation Systems (ITSC), 2019
- A. L. Ballardini, D. Cattaneo, D. G. Sorrenti (Università degli Studi di Milano-Bicocca) - **Visual Localization at Intersections with Digital Maps,** International Conference on Robotics and Automation (ICRA), 2019
- A. L. Ballardini, D. Cattaneo, D. G. Sorrenti (Università degli Studi di Milano-Bicocca) and R.Izquierdo, I.Parra, M.A. Sotelo (Universidad de Alcalá) - **Ego-Lane Estimation by Modeling Lanes and Sensor Failures,** 20th International Conference on Intelligent Transportation Systems (ITSC), 2017
- The MOSCAB Collaboration: A. Antonicci, M. Ardid, R. Bertoni, G. Bruno, N. Burgio, G. Caruso, D. Cattaneo, F. Chignoli, M. Clemena, M. Corcione, L. Cretara, D. Cundy, I. Felis, M. Frullini, W. Fulgione, G. Lucchini, L. Manara, M. Maspero, R. Mazza, A. Pa pagni, M. Perego, R. Podviyanuk, A. Pullia, A. Quintino, N. Redaelli, E. Ricci, A. Santagata, D. S orrenti, L. Zanotti, "**MOSCAB: a geyser-concept bubble chamber to be used in a dark matter search**", The European Physical Journal C, 2017
- A. L. Ballardini, D. Cattaneo, S. Fontana, D. G. Sorrenti, "**An Online Probabilistic Road Intersection Detector**", International Conference on Robotics and Automation (ICRA), 2017
- A. L. Ballardini, D. Cattaneo, S. Fontana, D. G. Sorrenti, "**Leveraging the OSM Building Data to Enhance Localization of an Urban Vehicle**", 19th International Conference on Intelligent Transportation Systems (ITSC), 2016

Summer Schools

- 2017 - International Summer School on Deep Learning, Bilbao, Spain - "*DeepLearn 2017 will be a research training event with a global scope aiming at updating participants about the most recent advances in the critical and fast developing area of deep learning. This is a branch of artificial intelligence covering a spectrum of current exciting machine learning research and industrial innovation that provides more efficient algorithms to deal with large-scale data in neuroscience, computer vision, speech recognition, language processing, drug discovery, biomedical informatics, recommender systems, earning theory, robotics, etc. Renowned academics and industry pioneers will lecture and share their views with the audience.* "
- 2017 - International Summer School on Advances in Collective Intelligence: Big-Data and Community Resilience, Como, Italy - "*The past few years have seen a growing popularity and maturity of collective intelligence research, enabled by advances in information technology and complex systems sciences. Collective intelligence is defined as a shared or group intelligence emerging from the collaboration, collective efforts, and competition of many agents (human or artifacts). The discipline intrinsically grows in a cross-disciplinary research, involving computer science, cognitive science, political science, economics, organization theory, sociobiology, crowd and network sciences. Moreover, big-data research and applications create new opportunity to develop the design of new perspectives for the growth of collective intelligence towards many complex systems and organizations. The main purpose of the School is to enable participants to the most relevant issues and tools supporting new research and application scenarios involving collective intelligence, focusing on the main topics of crowds (from crowdsourcing to crowd management), big-data (large and complex data sets coming from distributed sources to be dealt with innovative data processing application software), and community resilience (sustained ability of a community to utilize available resources to respond to, withstand, and recover from adverse situations)*."
- 2016 - The Third Örebro Winter School on "Artificial Intelligence and Robotics", Örebro, Sweden - "*The fields of Artificial Intelligence (AI) and Robotics were strongly connected in the early days of AI, but have since diverged. Typical graduate student curricula concentrate on AI or on robotics, but rarely on both. Students in one area are seldomly aware of the concepts, methods, and achievements in the other one. This Winter School aims at filling this educational gap, by forming the next generation of researchers that will realize integrated intelligent robots. Students will be exposed to technologies at the forefront of research in AI and in Robotics, and will apply some of these through exercises on real robots*"
- 2016 - Sherpa Summer School, Passo Pordoi, Italy - "*The SHERPA Summer School 2016 is a five-day course to provide participants with a full overview of major aspects and research activities concerning robotics in search and rescue scenarios."*