Riccardo Renzulli

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🏠 Turin, Italy

About Me

I'm a postdoc researcher at the University of Turin, Computer Science Department, EIDOS group.
My research focuses on artificial intelligence and deep learning, and I am particularly interested in

- representation learning
- interpretability
- robustness
- medical applications

Education

2020 – 2023   ● **Doctoral Degree**
University of Turin, Computer Science Department, Italy
Final grade: Passed with Honour
Thesis title: Hierarchical Object-Centric Learning with Capsule Networks

2015 – 2018   ● **Master Degree**
University of Turin, Computer Science Department, Italy
Final grade: 110/110 cum laude
Thesis title: An exploratory study into Capsule Networks and how to make them deeper

2012 – 2015   ● **Bachelor Degree**
University of Turin, Computer Science Department, Italy
Final grade: 105/110
Thesis title: Non-monotonic extensions of Description Logics and a Protégé Plugin for reasoning about typicality

Work Experience

11/2023 – Now   ● **PostDoc Researcher**
University of Turin, Computer Science Department, Italy
Research focused on representation learning, including concept learning, compositionality, and interpretability

03/2022 – 09/2022   ● **Visiting Researcher**
Aalto University, School of Electrical Engineering, Helsinki, Finland
Development of a system for non-GNSS visual localization of UAVs, supervised by Prof. Ville Kyrki

03/2019 – 09/2019   ● **Machine Learning Engineer**
Machine Learning Reply, Turin, Italy
Designing and developing machine learning systems for cloud platforms

12/2018 – 02/2019   ● **Deep Learning Scientist**
Addfor S.p.A., Turin, Italy
Development of deep learning algorithms for image recognition tasks and writing scientific articles for digital marketing

02/2018 – 06/2018   ● **Intern**
Addfor S.p.A., Turin, Italy
This internship aimed to discover the advantages and disadvantages of Capsule Networks compared to the traditional Convolutional Networks

Work Experience (continued)

01/2016 – 10/2017 • **Scholarship Researcher**
University of Turin, Computer Science Department, Italy
Development of a Protégé plugin to non-monotonically reason about defeasible inheritance with exceptions in ontologies

Academic Activities

Teaching

- **Lecturer**
DeepHealth Winter School 2022 (medical imaging master class)

- **Invited Seminar Speaker**
Talks on capsule networks for the Deep Learning course (2019-2020, 2020-2021, 2021-2022), University of Turin, Computer Science Department

- **Laboratory Assistant**
Support to the students of the Operating Systems course (40 hours, 2020-2021), University of Turin, Computer Science Department

Research Projects

- **Co.R.S.A.**
Development of a state-of-the-art AI-based system for diagnosing Covid-19 pneumonia from Chest X-ray (CXR) images for the Covid Radiographic imaging System based on AI (Co.R.S.A.) project
https://corsa.di.unito.it

- **DeepHealth**
Segmentation of lung nodules and generation of brain perfusion maps in CT scans for the European project DeepHealth (Deep-Learning and HPC to Boost Biomedical Applications for Health)
https://deephealth-project.eu

Events Organization

- **COMETE PhD Workshop**
Member of the organizing committee of the COMETE (COMputer SciEnce DeparTmEnt) PhD Workshop 2022, a full-day event dedicated to PhD students of the Computer Science department at the University of Turin.

Reviewing Service

- **Reviewer**
Conferences: ICPR (2020), ICANN (2021-2023), ICIAP (2023), ECML PKDD (2023), IROS (2023), ICRA (2024)
Journals: IEEE Multimedia, IEEE Open Journal of Signal Processing

Thesis supervision

- **Master's Degree in Computer Science**
Candidate: Miriam Fasciana
Thesis: Towards non-invasive stroke diagnosis: a neural network approach to CT perfusion imaging with subsampling (2023)

- **Master's Degree in Computer Science**
Candidate: Paolo Peretti
Thesis: Capsule Networks for lung nodules segmentation (2022)

- **Bachelor's Degree in Computer Science**
  Candidate: Alessandro Grassi
  Thesis: Encoding rotation representations of synthetic datasets in quaternions-based deep learning models (2021)
- **Master's Degree in Computer Science**
  Candidate: Stefano Berti
  Thesis: Lung nodules segmentation from CT scans using deep learning (2021)

Research Publications

Preprints

1. R. Renzulli, E. Tartaglione, and M. Grangetto, "Capsule networks do not need to model everything," In review, 2024.

Journal Articles

1. U. A. Gava, F. D'Agata, E. Tartaglione, *et al.*, "Neural network-derived perfusion maps: A model-free approach to computed tomography perfusion in patients with acute ischemic stroke," *Frontiers in Neuroinformatics*, vol. 17, 2023, ISSN: 1662-5196. DOI: 10.3389/fninf.2023.852105.

2. J. Kinnari, R. Renzulli, F. Verdoja, and V. Kyrki, "Lsvl: Large-scale season-invariant visual localization for uavs," *Robotics and Autonomous Systems*, vol. 168, p. 104 497, 2023, ISSN: 0921-8890. DOI: https://doi.org/10.1016/j.robot.2023.104497.

Conference Proceedings

1. F. Di Sario, R. Renzulli, E. Tartaglione, and M. Grangetto, "Two is better than one: Achieving high-quality 3d scene modeling with a nerf ensemble," in *Image Analysis and Processing – ICIAP 2023*, G. L. Foresti, A. Fusiello, and E. Hancock, Eds., Cham: Springer Nature Switzerland, 2023, pp. 320–331, ISBN: 978-3-031-43153-1.

2. G. Spadaro, R. Renzulli, A. Bragagnolo, *et al.*, "Shannon strikes again! entropy-based pruning in deep neural networks for transfer learning under extreme memory and computation budgets," in *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV) Workshops*, Oct. 2023, pp. 1518–1522.

3. H. A. H. Chaudhry, R. Renzulli, D. Perlo, *et al.*, "Lung nodules segmentation with deephealth toolkit," in *Image Analysis and Processing. ICIAP 2022 Workshops*, P. L. Mazzeo, E. Frontoni, S. Sclaroff, and C. Distante, Eds., Cham: Springer International Publishing, 2022, pp. 487–497, ISBN: 978-3-031-13321-3.

4. H. A. H. Chaudhry, R. Renzulli, D. Perlo, *et al.*, "Unitochest: A lung image dataset for segmentation of cancerous nodules on ct scans," in *Image Analysis and Processing – ICIAP 2022*, S. Sclaroff, C. Distante, M. Leo, G. M. Farinella, and F. Tombari, Eds., Cham: Springer International Publishing, 2022, pp. 185–196, ISBN: 978-3-031-06427-2.

5. R. Renzulli and M. Grangetto, "Towards efficient capsule networks," in *2022 IEEE International Conference on Image Processing (ICIP)*, Oct. 2022, pp. 2801–2805. DOI: 10.1109/ICIP46576.2022.9897751.

6. R. Renzulli, E. Tartaglione, A. Fiandrotti, and M. Grangetto, "Capsule networks with routing annealing," in *Artificial Neural Networks and Machine Learning – ICANN 2021*, I. Farkaš, P. Masulli, S. Otte, and S. Wermter, Eds., Cham: Springer International Publishing, 2021, pp. 529–540, ISBN: 978-3-030-86362-3.

7. L. Giordano, V. Gliozzi, G. L. Pozzato, and R. Renzulli, "An efficient reasoner for description logics of typicality and rational closure," in *Proceedings of the 30th International Workshop on Description Logics*, A. Artale, B. Glimm, and R. Kontchakov, Eds., ser. CEUR Workshop Proceedings, vol. 1879, CEUR-WS.org, 2017.

8   L. Giordano, V. Gliozzi, G. L. Pozzato, and R. Renzulli, "RAT-OWL: reasoning with rational closure in description logics of typicality," in *Joint Proceedings of the 18th Italian Conference on Theoretical Computer Science and the 32nd Italian Conference on Computational Logic*, D. D. Monica, A. Murano, S. Rubin, and L. Sauro, Eds., ser. CEUR Workshop Proceedings, vol. 1949, CEUR-WS.org, 2017, pp. 306–320.

Skills

Languages	● Italian (Mother tongue) and English (C1)
Coding	● Java, php, Python, R, sql, xml/xsl, LaTeX, …
Frameworks	● GitHub, Docker, Kubernetes, Pandas, Numpy, Scikit-learn, Scipy, Pytorch, Tensorflow …
Databases	● Mysql, Postgresql, hsql, sqlite
Web Dev	● Html, css, JavaScript, Apache Web Server, Tomcat Web Server, Streamlit

Miscellaneous

Hobbies and Interests

● Gardening, Photography, Cinema, Music, Books, Hiking, Saunas and many more!

Driving Licence

● B (Cars)