Nelson Aloysio Reis de Almeida Passos

🌐 Website | 🐱 GitHub | 💼 LinkedIn | 🆔 ORCID | 🎓 Scholar | ✉ nelson.reis@phd.unipi.it

I'm a Ph.D. candidate in Artificial Intelligence at the University of Pisa and the High Performance Computing laboratory, part of the Institute of Information Science and Technologies (ISTI) of Italy's National Research Council (CNR), with 10+ years of experience in R&D in academia and the industry.

As a researcher, my current project lies in the intersection between Network Science and AI: graph neural networks for node-level clustering of attributed temporal graphs. As a developer, I have experience in data engineering, data science, and machine learning, mostly using Python-based technology stacks.

EDUCATION

Ph.D. Artificial Intelligence   Est.: 2025 (3 years)
University of Pisa   *Pisa, Italy*

M.S. Social Science   2022 (2 years)
Federal University of Espirito Santo   *Vitoria, Brazil*

Pg.D. Data Science with Big Data   2021 (2 years)
Federal Institute of Science and Technology of Espirito Santo   *Serra, Brazil*

B.S. Communication   2018 (4 years)
Federal University of Espirito Santo   *Vitoria, Brazil*

DISSERTATION AND THESES

A Temporal Graph Neural Network for Dynamic Community Detection (Ongoing). Ph.D. dissertation. University of Pisa. Supervisors: Emanuele Carlini, Salvatore Trani. Funding: National Research Council.

Classifying communities in temporal networks by text: mapping the 2013-2018 Brazilian protests on Twitter (2022). Master thesis. Federal University of Espirito Santo. Supervisor: Cristiana Losekann. Funding: CAPES Foundation, Ministry of Education of Brazil.

Cluster analysis using Markov Cluster Algorithm and the Louvain method: a case study of Wikipedia entries (2021). Postgraduate thesis. Federal Institute of Science and Technology of Espirito Santo. Supervisor: Jefferson O. Andrade.

A tool for data journalism, social network analysis and cyberspace mapping (2018). Bachelor thesis. Federal University of Espirito Santo. Supervisor: Fábio L. Malini.

RESEARCH EXPERIENCE

Nelson A. R. A. Passos, Emanuele Carlini, Salvatore Trani (2024a). *Deep Community Detection in Attributed Temporal Graphs: Experimental Evaluation of Current Approaches.* Proceedings of the 3rd GNNet Workshop: Graph Neural Networking Workshop (GNNet '24), Los Angeles, USA.

Nelson A. R. A. Passos, Emanuele Carlini, Salvatore Trani (2024b). *Deep Community Detection on Attributed Dynamic Graphs with a Spatio-Temporal Graph Neural Network.* Poster presentation. International School and Conference on Network Science (NetSciX '24), Venice, Italy.

Nelson A. R. A. Passos, Emanuele Carlini, Salvatore Trani (2024c). *NetworkX-Temporal: Building, manipulating, and analyzing dynamic graph structures.* Software release. Zenodo.

Nelson A. R. A. Passos, Emanuele Carlini, Salvatore Trani (2024d). *PubMed-Temporal: A dynamic graph dataset with node-level features.* Dataset release. Zenodo.

Other/Past contributions

Nelson A. R. A. Passos (2019). *Impacts of new information and communication technologies in post-2013 Brazil.* IV Proceedings of the Social Sciences Seminar PGCS-UFES, Vitória (ES), Brazil.

Global education and social networks (2017). Scientific report (NDA). UNESCO's Education Commission.

Jean M. Medeiros, Patrick M. Ciarelli, Fábio L. Malini, Luisa Aboudib, **Nelson A. R. A. Passos** (2016). *Introduction to sentiment analysis in social networks: the lexicon built in two moments of the impeachment process.* IX ABCiber National Symposium, São Paulo (SP), Brazil.

Nelson A. R. A. Passos, Fábio L. Malini (2016). *The hashtag #ThereWillBeNoCoup in light of the perspectivist social network analysis method.* XXXIX Congress of Communication Sciences, São Paulo (SP), Brazil.

Zika Virus: analysis of digital data from Brazil and the world (2016). Scientific report (NDA). UNICEF.

Fábio L. Malini, Gabriel H. C. Moura, **Nelson A. R. A. Passos** (2014). *Black Block and the Role of Social Media in Brazilian Demonstrations of September 7, 2013.* XIX Congress of Communication Sciences - Southeast Region, Vila Velha (ES), Brazil.

Fábio L. Malini, Priscilla Calmon, Jean M. Medeiros, **Nelson A. R. A. Passos** (2014). *Mapping the 'Ninja Media': an analysis of the emerging territorial collectivities on Facebook.* VIII ABCiber National Symposium, São Paulo (SP), Brazil.

Lorena L. Regattieri, Fábio L. Malini, **Nelson A. R. A. Passos**, Jean M. Medeiros (2014). *Perspectives on Twitter: a quanti-qualitative technique for social network studies.* XXXVII Congress of Communication Sciences, Foz do Iguaçu (PN), Brazil.

Allan Cancian, Bianca Bortolon, Jean M. Medeiros, **Nelson A. R. A. Passos** (2013). *Gephi: An open-source software to handle and visualize graphs.* Lecture handout.

Work Experience

Doctoral researcher **Ongoing**
National Research Council (ISTI-CNR), Italy *Nov 2022 - Now*

Project: "A Temporal Graph Neural Network for Dynamic Community Detection" (tentative title).

Data engineer **1 year**
Sou Ciencia Institute – Federal University of Sao Paulo, Brazil *Nov 2021 - Oct 2022*

Developed NLP and ETL pipelines for knowledge discovery and quantitative research studies.

Machine Learning engineer **∼2 years**
Culture Hack Labs, Canada *Jan 2020 - Oct 2022*

Implemented natural language processing pipelines for topic modeling and entity recognition;

Implemented network analysis and unsupervised clustering algorithms for data mining tasks;

Prototyped fully working dashboards to process and visualize output data from NLP models.

Back-end developer **∼2 years**
The Rules, USA *Mar 2018 - Dec 2019*

Developed automated data collection and scraping tools from news websites and online social networks;

Maintained the back-end of a web analytics dashboard and implemented data processing pipelines for unsupervised clustering, network analysis, and visualization tasks.

Data analyst **8 months**
NDA, Ecuador *Aug 2016 - Mar 2017*

Developed software to automate the process of collecting and analyzing data from online sources, supporting the delivery of daily intelligence reports for a general election campaign team.

Research assistant **3 years**
Labic – Federal University of Espirito Santo, Brazil *Jan 2014 - Dec 2016*

Analyzed tabular, image, and graph data sets for descriptive and exploratory studies;

Collaborated on research experiments focused on collecting online data and analyzing social networks;

Developed analytical dashboards and tools focused on online social network monitoring/analysis.

TEACHING EXPERIENCE

Lecture: Introduction to Computational Social Science **Jun 2022**
Federal University of Espirito Santo *Vitoria, Brazil*

Crash course: Introduction to Programming with Python **Dec 2017**
Federal University of Espirito Santo *Vitoria, Brazil*

Workshop: Analyzing social life with Gephi **Dec 2013**
Getulio Vargas Foundation / Federal University of Espirito Santo *Vitoria, Brazil*

PROGRAMMING EXPERIENCE

*nix	Docker & Podman, Git, k8s, OpenStack, OSTree, Shell, GNU tools (awk, cron, sed …)
Cloud	AWS (EC2, RDS, S3), Google Cloud (BigQuery, GCE)
Databases	ArangoDB, CassandraDB, MongoDB, MySQL, Neo4j, PostgreSQL
Graphs	cdlib, graph-tool, HypergraphX, igraph, NetworKit, NetworkX, NetworkX-Temporal
ML	Gensim, Keras, PyTorch & PyTorch Geometric, scikit-learn, spaCy, Stanza, TensorFlow
Other lib.	Airflow, Altair, BeautifulSoup, Matplotlib, NLTK, NumPy, Pandas, Plotly, Polars, SciPy, Seaborn, Selenium, statsmodels, Streamlit

LANGUAGES

Portuguese (Native), **English** (C1), **Italian** (B2).