Henrique Soares Assumpção e Silva

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Education

M.S. in Computer Science Mar 2025 - Expected June 2026
Universidade Federal de Minas Gerais *Belo Horizonte, Brazil*

- **Thesis subject**: Combinatorial parameters of Johnson graphs;
- **Advisor**: Prof. Gabriel Coutinho;
- **Co-Advisor**: Prof. Csaba Schneider.

B.S. in Computer Science Jan 2020 - Feb 2025
Universidade Federal de Minas Gerais (GPA: 94%) *Belo Horizonte, Brazil*

- **Undergraduate Thesis**: Algebras, groups and graphs;
- **Advisor**: Prof. Gabriel Coutinho;
- **Minor**: Pure Mathematics.

Experience

Researcher: Quantum algorithms for finance Jan 2025 - Ongoing
Inter S.A./DCC-UFMG, Brazil

- Develops algorithms that leverage the power of quantum computers to solve complex financial tasks, such as portfolio optimization and fraud detection;
- Collaborates with a team of researchers from UFMG and industry experts from Inter in order to build efficient and robust quantum algorithms to be deployed for usage in the banking industry.

Researcher: Graph theory and optimization Mar 2023 - Jan 2025
DCC-UFMG, Brazil

- Conducted research in graph theory and semidefinite optimization, obtaining novel results for graph parameters related to NP-hard problems such as MAXCUT and MAX 2-SAT, and co-authored a paper exhibiting the results, to be published in 2025;
- Developed algorithms for the analysis of clinical data of human brains, employing techniques from graph theory, linear algebra and optimization, and co-authored a paper discussing the results, to be published in 2025.

Instructor: Data science Jun - Dec 2022
Usiminas/DCC-UFMG, Brazil

- Instructed multidisciplinary teams of professionals in developing useful software programs for applications at Usiminas, by employing data analysis and machine learning algorithms;
- Taught Python programming concepts and technologies in the context of data science, such as Numpy and Pandas, and technologies related to machine learning, such as Pytorch and Tensorflow.

Intern: Money laundering detection on banking networks Aug 2021 - Feb 2022
Inter S.A./DCC-UFMG, Brazil

- Created *DELATOR*, a Graph Neural Network framework in Pytorch and DGL for detecting money laundering on large banking transaction networks. The framework efficiently operated on a large-scale banking database with over 20 million accounts and 100 million transactions, and was successfully employed by Inter's Anti-Money Laundering team to detect new cases of suspicious activity;
- Co-authored a paper published at *IEEE Big Data 2022*, and attended the conference in Osaka, Japan, in order to present the paper's findings to the scientific community.

Researcher: Predictive maintenance for industrial machinery May - Jul 2021
MINASLIGAS/DCC-UFMG, Brazil

- Constructed a Variational Autoencoder model in Pytorch for predictive maintenance on siderurgy machinery, leveraging structural information from time-series data in order to prototype an efficient model that yielded a 10% increase in overall accuracy;

- Developed and deployed, together with a team of programmers, a production-ready full-stack application for predictive maintenance of machinery at MINASLIGAS, enhancing operational efficiency and reducing downtime through data-driven insights.

Intern: A.I. Research & Development Mar - Aug 2021

Plus Three, *USA*

- Implemented NLP models for question answering and language generation in web applications, enhancing user interaction with chatbots;
- Researched innovative approaches to integrate chatbots into the company's website and authored dozens of educational AI articles for the nonprofit AIandYou, focusing on minority groups in the US.

Researcher: Sentiment analysis on online mental health communities Dec 2020 - May 2021

DCC-UFMG, *Brazil*

- Developed a novel Recurrent Neural Network model in Pytorch for sentiment analysis on mental health online communities. The model efficiently and accurately predicted shifts in the emotional tone of online users, and outperformed all considered baselines by an average of 20%;
- Co-authored a scientific paper published at *Future Generation Computer Systems*, an international journal that allowed for greater disclosure of our work.

Publications

- **Henrique S. Assumpção**, Fabrício Souza, Leandro Lacerda Campos, Vinícius T. de Castro Pires, Paulo M. Laurentys de Almeira, Fabricio Murai. DELATOR: Money Laundering Detection via Multi-Task Learning on Large Transaction Graphs. *IEEE International Conference on Big Data* (IEEE BigData), 2022. Earlier version published in *Brazilian Workshop on Social Network Analysis and Mining* (BraSNAM), 2022.
- Bárbara Silveira, **Henrique S. Silva**, Fabricio Murai, Ana Paula C. da Silva. Predicting user emotional tone in mental disorder online communities. *Future Generation Computer Systems*, 2021.

Awards & Achievements

- Best Paper Award at the *XI Brazilian Workshop on Social Network Analysis and Mining* (BraSNAM), 2022.
- Achieved 2nd place in the admission test for Computer Science at *Universidade de São Paulo* (USP), 2020.
- Receive Honorable Mentions for public speaking and argumentation for four consecutive years at SINUM (United Nations model simulation at Marista Dom Silvério High School), 2015 - 2018.

Skills

Programming Languages: Python, C++, C, Rust, JavaScript, SQL, Java, R, C#, Verilog, MATLAB, GNU Octave
Technologies: Pytorch, Tensorflow, Numpy, Scipy, Pandas, scikit-learn, Pytorch Geometric, DGL, StellarGraph, SageMath
MLOps: AWS Sagemaker, AWS Elastic Inference
DevOps: GitLab CI/CD
Backend Tools: MySQL, SQLite, Docker
Tools: Linux, Git, LaTeX, Microsoft Excel, Microsoft Power BI
Languages: Brazilian Portuguese (Native), English (C2), Spanish (B2), French (B1)