


Henrique Assumpção

Belo Horizonte, Brazil

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Education

M.S. in Computer Science

Universidade Federal de Minas Gerais

Mar 2025 - Expected June 2026

Belo Horizonte, Brazil

- **Thesis subject:** Combinatorial parameters of Johnson graphs;
- **Advisors:** [Prof. Gabriel Coutinho](#) and [Prof. Csaba Schneider](#).

B.S. in Computer Science

Universidade Federal de Minas Gerais (GPA: 94%)

Jan 2020 - Feb 2025

Belo Horizonte, Brazil

- **Minor:** Pure Mathematics;
- **Undergraduate Thesis:** [Algebras, groups and graphs](#);
- **Advisor:** Prof. Gabriel Coutinho.

Research Experience

Quantum algorithms for finance

Advisor: Prof. Gabriel Coutinho, Scholarship: [Fundep](#)

Jan 2025 - Dec 2025

[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 algorithms to be deployed for usage in the banking industry.

Graph Theory and Optimization

Advisor: Prof. Gabriel Coutinho, Scholarship: [FAPEMIG](#)

Mar 2023 - Jan 2025

[DCC-UFMG](#), Brazil

- Conducted research in graph theory and semidefinite optimization, obtaining novel results in applications for combinatorial problems;
- Developed algorithms for the analysis of clinical data of human brains, employing techniques from graph theory, linear algebra and optimization.

Money Laundering detection on banking networks

Advisor: Prof. Fabricio Murai, Scholarship: [Fundep](#)

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 scientific 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.

Predictive Maintenance for industrial machinery

Advisor: Prof. Fabricio Murai, Scholarship: [Fundep](#)

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;
- Contributed to the development of a production-ready full stack application for predictive maintenance for the machinery from MINASLIGAS.

Sentiment Analysis on Online Mental Health communities

Advisors: Prof. Fabricio Murai, [Prof. Ana Paula Couto da Silva](#)

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

Conference Papers

- **Henrique S. Assumpção**, Fabrício Souza, Leandro Lacerda Campos, Vinícius T. de Castro Pires, Paulo M. Laurentys de Almeida, Fabricio Murai. [DELATOR: Money Laundering Detection via Multi-Task Learning on Large Transaction Graphs](#). In *IEEE International Conference on Big Data (IEEE BigData)*, 2022. Earlier version published in *Brazilian Workshop on Social Network Analysis and Mining (BraSNAM)*, 2022.

Journal Papers

- 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.

Professional Experience

Data Science Instructor

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.

A.I. Research & Development

Mar - Aug 2021

[Plus Three, USA](#)

- Implemented NLP models for question answering and language generation on web applications;
- Researched novel methods for effectively integrating chatbots into the company's website;
- Wrote for the non-profit organization AlandYou, creating educational articles on many AI-related topics with the purpose of reaching minority groups in the US.

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
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: Portuguese (Native), English (C2), Spanish (B2), French (B1)