Henrique S. Assumpção

Belo Horizonte, Brazil

 https://henriqueassumpcao.github.io/   henriquesoares@dcc.ufmg.br
 github.com/HenriqueAssumpcao   linkedin.com/henriqueassumpcao

Education

Universidade Federal de Minas Gerais
Bachelor Degree in Computer Science (GPA: 93/100)

Jan 2020 - Dec 2024
Belo Horizonte, Brazil

- **Relevant Coursework in CS:** Data Structures (C,C++), Algorithms (C++, Python), Data Science (Python), Machine Learning (Python), Parallel and Distributed Systems (C,Python), Operating Systems (C), Software Engineering (JS,Python).
- **Relevant Coursework in Mathematics:** Real Analysis, Linear Algebra, Rings and Modules, Group Theory, Topology, Graph Theory, Semidefinite Optimization, Calculus, Differential Equations, Probability, Discrete Mathematics.

Research Experience

Applications of Abstract Algebra to Graph Theory and Optimization
Advisor: Prof. Gabriel Coutinho, Scholarship: FAPEMIG

Mar 2023 - Ongoing
DCC-UFMG, Brazil

- Researches novel problems on semisimple algebras and self-adjoint matrix algebras, and how to apply their structural properties for more efficient solutions of tasks in semidefinite optimization and graph theory.
- Studies advanced subjects in Pure and Applied Mathematics, such as Functional Analysis, Commutative and Non-Commutative Algebra, and Combinatorial 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

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 Almeira, 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, and researched novel methods for effectively integrating chatbots into the company's website.
- Wrote for the non-profit organization AIandYou, 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)