

# Henrique Soares Assumpção e Silva

Belo Horizonte, Brasil

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## Education

<b>MSc in Computer Science</b> <i>Universidade Federal de Minas Gerais, Brasil</i>	Mar 2025 - Present
• Focus: Graph Theory and Optimization.	GPA: 98%
• Advisors: Prof. Gabriel Coutinho and Prof. Csaba Schneider.	
<b>BSc in Computer Science</b> <i>Universidade Federal de Minas Gerais, Brasil</i>	Jan 2020 - Feb 2025
• Undergraduate Thesis: <i>Álgebras, grupos e grafos.</i>	GPA: 94%
• Advisor: Prof. Gabriel Coutinho.	
• Minor: Pure Mathematics.	

## Professional Experience

<b>Machine Learning Researcher</b> <i>Inter Science, Brasil</i>	Jun 2025 - Ongoing
• Lead developer of <a href="#">CodeEvolve</a> , an open source implementation of Google Deepmind's AlphaEvolve. CodeEvolve is an evolutionary coding agent capable of automating algorithmic discovery and optimization.	Full Time
• Optimized training pipelines for Large Language Models (LLMs) on distributed systems, focusing on reducing inference latency and memory overhead for financial applications.	
<b>Undergraduate Researcher</b> <i>Inter/DCC-UFMG, Brasil</i>	Aug 2021 - Feb 2022
• Architected DELATOR, a Graph Neural Network framework using <b>DGL</b> and <b>PyTorch</b> to detect money laundering patterns across a massive financial network.	Internship
• Scaled the solution to process a production graph with over <b>20 million accounts</b> and <b>100 million transactions</b> , identifying suspicious activity previously undetected by rule-based systems.	
• Results published at <i>IEEE Big Data 2022</i> ; presented findings on scalable GNNs to the scientific community in Osaka, Japan.	
<b>Data Science Instructor</b> <i>Usiminas/DCC-UFMG, Brasil</i>	Jun - Dec 2022
• Designed and delivered a comprehensive curriculum on Python, Pandas, and PyTorch, upskilling engineering teams at a major steel manufacturer to adopt data-driven workflows.	Part time
• Mentored multidisciplinary teams in building and deploying internal ML tools, resulting in the automation of manual data analysis tasks.	
<b>A.I. Research &amp; Development</b> <i>Plus Three, USA</i>	Mar - Aug 2021
• Engineered end-to-end NLP pipelines for automated question-answering and text generation, integrating transformer-based models into client-facing web applications to enhance chatbot capabilities.	Part Time
• Authored a series of technical articles on AI ethics and bias for the nonprofit <i>AlandYou</i> , translating complex algorithmic concepts for a broad non-technical audience.	

## Research Projects

<b>Quantum Computing for finance</b> <i>Inter/DCC-UFMG, Brasil</i>	Jan 2025 - Jun 2025
• Developed a Quantum Support Vector Machine (QSVM) using <b>Qiskit</b> to benchmark quantum kernel methods against classical ML baselines for fraud classification.	
• Simulated quantum circuits on high-dimensional banking data to evaluate the feasibility of quantum advantage in financial risk modeling.	

## Graph theory and optimization

DCC-UFMG, Brasil

Mar 2023 - Jan 2025

- 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, submitted in 2025.
- Utilized spectral graph theory to develop novel algorithms for analyzing connectivity patterns in biological neural networks (clinical brain data).

## Predictive maintenance for industrial machinery

MINASLIGAS/DCC-UFMG, Brasil

May - Jul 2021

- Built and deployed a Variational Autoencoder (VAE) in PyTorch to detect anomalies in time-series telemetry from steel machinery, increasing failure prediction accuracy by **10%**.
- Collaborated on a full-stack dashboard to visualize real-time machinery health, reducing operational downtime through data-driven alerts.

## Sentiment analysis on online mental health communities

DCC-UFMG, Brasil

Dec 2020 - May 2021

- 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.

## Papers

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- Henrique Assumpção**, Diego Ferreira, Leandro Campos, Fabricio Murai. [CodeEvolve: An open-source evolutionary coding agent for algorithmic optimization](#). Submitted, 2025.
- Henrique Assumpção**, Gabriel Coutinho. [Semidefinite programming bounds on fractional cut-cover and maximum 2-SAT for highly regular graphs](#). Submitted, 2025.
- 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 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.

## Technical Skills

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**Languages:** Python, C++, C, CUDA, Rust, SQL, Java, JavaScript

**Machine Learning:** PyTorch, TensorFlow, JAX, Scikit-Learn, DGL, HuggingFace

**Infrastructure & DevOps:** Docker, Kubernetes, AWS, Apache Spark, Git/GitLab, Linux

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

## Awards

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- Best Paper Award at the *XI Brazilian Workshop on Social Network Analysis and Mining* (BraSNAM), 2022.