Henrique Sousa
https://hbvsa.github.io/
Email : henriquebvsousa@gmail.com

Skills

- **Technical Skills**: Deep Learning, Machine Learning, Data Science
- **Programming Languages**: Python, SQL, Java, C++
- **Programming Frameworks**: Pytorch, Tensorflow, Keras, HuggingFace, Pandas, OpenCV, Matplotlib
- **Technologies**: Git, Docker, GCP/AWS/Azure Compute and Storage (Databricks(Spark Jobs), model training and serverless app deployment with Docker)

Experience/Projects

- **Master Thesis: Deep Learning for SNP-Disease Correlation Analysis** Instituto Superior Técnico
  Deep Learning Research *September 2020 - October 2022*
  - **Problem and Motivation**: Developed an innovative deep learning model to detect complex, nonlinear correlations between Single Nucleotide Polymorphisms (SNPs) and diseases. A short but more thorough description is available at Master Thesis.
  - **Deep Learning Expertise**: Gained in depth intuitive understanding of state-of-the-art deep learning architectures (Transformers, MLPs, CNNs, RNNs) through extensive literature review. Analyzed their applicability to various data types, particularly high-dimensional genetic data.
  - **Custom and Creative Model Development**: Designed and implemented a deep learning model with custom layers optimized for genetic data analysis enhancing model interpretability and performance combined with embedding layers for feature encoding to retain model complexity.
  - **Innovative Methodology for Model Evaluation in problematic datasets**: Adapted the model evaluation approach using multi-initialization strategy to ensure consistent feature selection in datasets with very subtle and nonlinear correlations.
  - **Significant Results**: Achieved 99% recall on 3rd order non-linear interaction datasets where the top performing state of the art methods achieved 0% recall. Successfully identified significant SNP combinations in datasets where SNP impact contributed only 1% to disease probability variation.
- **Quantitative Research and Algorithmic Trading** Lisbon
  Software Engineering, Data Science, Deep Learning *Nov 2022 - Present*
  - **Strategy Backtester**: Designed and implemented a comprehensive Python-based algorithmic trading system, incorporating multi-timeframe data analysis and minute-precision trade execution. Developed a rigorous backtesting framework using years of historical price data.
  - **Optimization**: Developed strategy optimizations evaluated using statistical testing. Integrated deep learning models (CNNs, Vision and Regular Transformers) to optimize signal selection based on prediction confidence.
  - **Real-Time Trading Infrastructure with APIs**: Engineered a low-latency, automated execution system interfacing with multiple exchange APIs. Implemented robust error handling and continuous data feed processing for uninterrupted trading operations.
  - **Visualization Tools**: Developed and integrated visualization tools using Finplot and PyQt libraries for real-time and historical data analysis. These tools proved essential for strategy evaluation, adjustment, and execution debugging.
- **Deep Learning Projects** Lisbon
  Deep Learning, Software Engineering
  - **Deep Learning end to end projects**: Implemented multiple deep learning models to different projects of which some selected ones are showcased at Portfolio. Model deployment with Docker to different cloud providers such as GCP, AWS, Azure and HuggingFace.

Education

- **Instituto Superior Técnico** Lisboa, Portugal
  Master of Science in Computer Science and Engineering *2018 – 2022*
  - **Relevant Courses**: Data Science, Machine Learning, Reinforcement Learning, Artificial Intelligence in Games, Autonomous Agents and Multi-Agent Systems, Natural Language
- **ISCTE-IUL** Lisboa, Portugal
  Bachelor of Engineering in Computer Science and Engineering *2015 – 2018*