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Israel Oliveira

Data Scientist

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Data scientist with 4 years of experience in NLP and time series forecasting. Has experience with python libraries, such as Numpy, Pandas, Sklearn, Matplotlib, and PyTorch. Has experience in working with network analysis using Gephi and Python libraries such as Networkx, and Py3plex. Has experience in working with LLM, integrating them in backend applications using FastAPI. Has strong mathematical background in deep learning and high interest in developing new technologies in this field.

Skills

Tools and Languages	Python, JavaScript, NuxtJS, Git, LaTeX, MarkDown, SQL, HTML
Quantitative Research	Deep Learning, Information Theory, Dynamical Systems, Reservoir Computing, Statistical Mechanics
Communication	English (C1), Portuguese (Native), French (B1), German (A2)

Technical Experience

Data Scientist **Oct 2021 — Present**
Centro de Gestão e Estudos Estratégicos *Brasília, Distrito Federal*

- Develop state of the art methodologies to identify technology emergence using patent data.
- Perform extensive exploratory analysis to identify patterns and extract important features from patent data.
- Create SQL databases with useful features extracted from patent data to be used in future projects.
- Create and maintain data analytic applications to be used inside the company. The technologies used are JavaScript and HTML for front-end, and Flask (Python) for back-end.
- Develop state of the art visualizations in the field of networks and multi-layer networks.
- Analyze the performance of machine learning and deep learning models applied on small sized data sets. Sometimes in this case I use techniques such as data augmentation in the context of Natural Language Processing.
- Create reports and insightful presentations about the developed methodologies.
- To develop the methodologies I use a large number of tools and technologies, such as: Glove embedding, tf-idf, recurrent neural networks, reservoir computing, and information theory.
- Create documentation for important Python packages used by the data science group.

Data Science Intern **Feb 2021 — Sept 2021**
Centro de Gestão e Estudos Estratégicos *Brasília, Distrito Federal*

- Analyze the performance of machine learning and deep learning models applied on small sized data sets. Sometimes in this case I use techniques such as data augmentation in the context of Natural Language Processing.
- Research state of the art methods in the fields of technology emergence, machine learning, deep learning, and natural language processing.
- Create and maintain data analytic applications to be used inside the company. The technologies used are JavaScript and HTML for front-end, and Flask (Python) for back-end.
- Convert some web applications to desktop applications.

Education

Doctor of Philosophy - PhD, *University of Brasília* Aug 2023 - Present

- My research revolves around crafting novel machine learning techniques aimed at tackling intricate statistical mechanics systems marked by far-reaching interactions. The initial phase of my research centers on comprehending these elaborate systems and mastering the key integration techniques for partial differential equations. Subsequently, the latter part entails innovating and refining machine learning algorithms, including Echo State Networks, Next Generation Reservoir Computing, and Physics Informed Neural Networks. The primary objective of this endeavor is to leverage these algorithms in solving these complex systems. There will be several technologies present in this work, such as Python, Tensorflow, Numpy, Pandas, Sklearn, Seaborn, Matplotlib, and Fastapi.

Master of Physics, *University of Brasília* Aug 2019 - Dec 2021

- Forecast of COVID-19 time series from Distrito Federal using Reservoir Computing.
- Create recurrent neural networks from scratch to perform forecasting in time series.
- Deep mathematical understanding of the theory of recurrent neural networks and Fourier transforms.
- Technologies used: Python, Numpy, Matplotlib, Jupyter Lab, Sklearn, Pandas, Networkx.

Bachelor of Physics, *University of Brasília* Jul 2014 - Aug 2019

- Analysis of a physical dynamical system.
- Create algorithms to create Poincaré sections, bifurcation diagrams, and recurrence plots.
- Deep understanding of the theory of dynamical systems.
- Technologies used: Matlab.