Tiago Travassos Vieira Vinhoza

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Personal statement

I am a data scientist and researcher with a PhD in Electrical Engineering and over 10 years of experience in applying machine learning, signal processing, statistics, and data analysis/visualization techniques to various domains, such as healthcare and wireless communications. I have a track record of delivering solutions and results in challenging and complex projects, both individually and as a team member.

Skills

- **Machine Learning applied to Healthcare**
  - Defined and developed machine learning models based on electronic health record data to predict patient outcomes - Centro Hospitalar de São João
  - Developed an algorithm to change the topology of a Bayesian Network to improve its performance for breast cancer prediction - INESC Technology and Science
  - Built predictive models for breast cancer using various classification algorithms such as SVMs, Naïve Bayes, and Decision Trees - INESC Technology and Science
  - Use of tools to explain black-box machine learning models predictions (Shapley values, LIME, Rule Fit, Surrogate Models).
  - Experiments with Deep Neural Networks (LSTM) for time-series data, clustering to identify and compare patient phenotypes and topic modeling for clinical texts.
- **Signal Processing applied to Healthcare**
  - Used signal processing techniques to create segmentation algorithm to extract heart sound components (S1 and S2) based on its time and frequency characteristics. Created a set of features (from time, frequency, perceptual and non-linear/chaos domains) from heart sounds to detect heart murmurs - Instituto de Telecomunicações.
- **Data Visualization**
  - Used tools such as Tableau Public, Microsoft PowerBI, and Streamlit to create and share interactive dashboards and visualizations both in professional settings and side projects such as the Portuguese Legislative Election Simulator (2019,2022), the COVID pandemic dashboard for Portugal (2021-22), and the Brazilian Presidential election (2022). Participation in Data Visualization Challenges: Makeover Monday, Storytelling with Data (2018-19).
  - Portfolio: https://github.com/tiagotvv/data_analysis_and_visualization
- **Statistical Analysis and Modeling**
  - Proposed and validated a vehicle-to-vehicle communications channel model that accounts for vehicles as 3D obstacles - Instituto de Telecomunicações.
  - Applied a Markov chain model and Galois field algebra to analyze the decoding delay distribution and information-theoretic security aspects of network coding - Instituto de Telecomunicações.
  - Used probabilistic modeling, constrained optimization and linear algebra techniques for receiver design and channel estimation in wireless communications system - PUC-Rio.
- **Programming and Tools**
  - Proficient in Python and R, with experience in using libraries such as Numpy, Scipy, Pandas, Scikit-learn, Tensorflow, Keras, Streamlit and Tidyverse.
  - Familiarity with databases: Microsoft SQL Server and MySQL, version control: Git/Github, Dataviz: Tableau, PowerBI, other programming languages (Julia).

Education

- PhD in Electrical Engineering, PUC-Rio, 2007 (full scholarship)
- MSc in Electrical Engineering, PUC-Rio, 2003 (full scholarship)
- BSc in Electrical Engineering, PUC-Rio, 1999 (academic excellence certificate)

Employment history

Following the end of my previous contract, I took the opportunity to have an extended break in 2019. However, the pandemic hit in 2020-21, which then led into more of a career break. Despite the challenges, I did not lose sight of my career aspirations and goals. I used this time to enhance my skills and qualifications by engaging in some side projects, as mentioned in the previous section. Furthermore, I maintained my connection and involvement with the data science community by attending webinars and meetups, listeing to podcasts as well as reading books and blogs on the latest tdevelopments in the field.

- Data Scientist, Centro Hospitalar de São João, Porto, Portugal, May'17 – Nov'18
- Machine Learning Researcher, INESC Technology and Science, Portugal, Sep'14 – Nov'15
- Data Mining and Signal Processing Researcher, Instituto de Telecomunicações, Porto, Portugal, Jun'12 – May'14
- Wireless Communications and Networking Researcher, Instituto de Telecomunicações, Porto, Portugal, Dec'08 – Jun'12
- Post-Doc Researcher, Pontificia Universidade Católica do Rio de Janeiro, Jan'08 – Aug'08

Main Research Outcomes

- E. Almeida, P. Ferreira, T. T. V. Vinhoza, I. Dutra, Y. Wu, E. Burnside, "ExpertBayes: Automatically Refining Manually Built Bayesian Networks", International Conference on Machine Learning and Applications,Detroit, MI, USA, 2014.
- J. Pedrosa, A. Castro, T. T. V. Vinhoza, "Heart Sound Segmentation and Murmur Detection in Pediatric Phonocardiograms", Proc. of the IEEE EMBC 2014, Chicago, IL, USA, 2014.
- P. F. Oliveira, L. Lima, T. T. V. Vinhoza, M. Medard, J. Barros "Coding for Trusted Storage in Untrusted Networks", IEEE Transactions on Information Forensics and Security, December 2012.
- M. Boban, T. T. V. Vinhoza, M. Ferreira, J. Barros, O. K. Tonguz, "Impact of Vehicles as Obstacles in Vehicular Adhoc Networks", IEEE JSAC (Special issue on Vehicular Communications and Networks), January 2011

Other Information

- Teaching: Taught full-credit graduate level Information Theory course at University of Porto. Served as a teaching assistant for several courses at PUC-Rio (Random Processes, Probabilistic Models, Digital Communications, Statistical Theory of Communications) both at undergraduate and graduate level.
- Awarded a Ciência 2008 contract by Fundação para a Ciência e a Tecnologia, Portugal - Jun'09
- Community involvement: Participation in meetups: Data Science Portugal, Data Visualization Lisboa; Attended local conferences (Data Science Portugal Day (2018-19), Data Makers Fest (2023).
- Reading: Interested in books on data science, machine learning, artificial intelligence and literature as whole.