Túlio Fernandes de Almeida

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Education

Edmond and Lily Safra International Institute of Neurosciences — Macaíba, RN
Master in Neuroengineering — *Aug. 2019 – Jul. 2021*

Pontifical Catholic University of Minas Gerais — Belo Horizonte, MG
Bachelor of Physiotherapy — *Aug. 2014 – Jul. 2019*

CECON.TI — Belo Horizonte, MG
Digital Games Programming Technician — *Fev. 2012 – Nov. 2014*

Experience

Technical Support — Set. 2021 – Present
Edmond and Lily Safra International Institute of Neurosciences — *Macaíba, RN*

- I'm working analyzing electrophysiological data using signal processing techniques, brain connectivity and machine learning. Also, assisting in writing scientific articles

Master Student — Aug. 2019 – Jul. 2021
Edmond and Lily Safra International Institute of Neurosciences — *Macaíba, RN*

- During my master I work with data analysis using Python, performing multi-modal data fusion, application of machine learning algorithms, video and neural data analysis.
- Experience in animal behavior, electrophysiological data analysis and surgery for electrode implantation.
- I also had the opportunity to participate in the writing and submission of funding proposals with the approval of two grants.

Member of Machine Learning Research Group — Mar. 2020 – Present
Edmond and Lily Safra International Institute of Neurosciences — *Macaíba, RN*

Study group for weekly discussion of machine learning and deep learning articles and techniques. During these discussions we developed a series of projects.

- We developed projects and implemented machine learning techniques (pose estimation, autoencoder, SVM, t-SNE, GAN and others).
- Developed jupyter/colab notebooks tutorials.

Undergraduate Experience — Aug. 2015 – Jul. 2019
Pontifical Catholic University of Minas Gerais — *Belo Horizonte, MG*

- Experience in multidisciplinary work with data collection with humans, performing physical assessment and application of questionnaires.
- Class monitor in different subjects, helping other students in different contents.
- Practice with the application of electrotherapeutic resources.

Projects

PyRat — Aug. 2020 – Present
Edmond and Lily Safra International Institute of Neurosciences — *Macaíba, RN*

In this project, we use DeepLabCut to correlate brain oscillations and behavior, evaluate the object recognition task, quantifying the time spent on each object, detachment speed, head orientation and path taken during the task. For this, Python in Rodent Analysis and Tracking (PyRat) was developed, a python library to analyze tracking outputs.

JAMA/PyJama Aug. 2019 – Present

Edmond and Lily Safra International Institute of Neurosciences *Macaíba, RN*

JAMA is an open access device designed to perform motion analysis using inertial measurement units and microcontrollers. PyJama is a python library for analyzing human kinematics data. Aimed at analyzing data from IMU's, MIMU's, data from optical devices.

Brain connectivity in rats with epilepsy Sept. 2021 – Present

Edmond and Lily Safra International Institute of Neurosciences *Macaíba, RN*

This project aims to characterize the effects of pentylenetetrazole on brain connectivity (electrophysiology).

Technical Skills

Programming Languages: Python, MATLAB, C/C++, Pascal, Med State Notation
Developer Tools: Github, Google Colab, VS Code, Platform IO, Arduino, Jupyter, Anaconda
Libraries: pandas, NumPy, Matplotlib, Bokeh, FastAI, PyTorch, FastAI, TensorFlow, scikit-learn, flask
Equipaments: Plexon, Blackrock, Stereotaxic, Med associates behavioral setup

Publications

Almeida, T.F; Spinelli, B.G; Gonzalez, M.C; Lima, R.H; Rodrigues, A.C (2022). **PyRat: An open-source python library for quantifying animal behavior.** Frontiers in Neuroscience, 16. https://doi.org/10.3389/fnins.2022.779106 .

Almeida, T.F; Borges, L. H. B; Dantas, A.F.O.A (2022). **Development of an IoT Closed Loop FES Device for Human Machine Interface**. Sensors, v. 22, n. 9, p. 3551, 2022. doi.org/10.3390/s22093551.

de Almeida, T.F.; Morya, E.; Rodrigues, A.C.; de Azevedo Dantas, A.F.O. (2021) **Development of a Low-Cost Open-Source Measurement System for Joint Angle Estimation**. Sensors, 21, 6477. https://doi.org/10.3390/s21196477

Dantas, A. D., Dantas, A. F., Almeida, T. F., Dórea, C. E. (2020). **Design of reduced complexity controllers for linear systems under constraints using data cluster analysis**. International Journal of Systems Science, 1-16. doi.org/10.1080/00207721.2020.1795948

Almeida TF, de Araújo AR (2020) **Factors that Influence Injuries Occurrence in Jiu-Jitsu Competitors**. Int J Sports Exerc Med 6:164. doi.org/10.23937/2469-5718/1510164

Almeida, T. F., de Oliveira, L., de Leucas, C. B. (2018). **University extension: experience report about aquatic physical therapy during graduation**. Revista Família, Ciclos de Vida e Saúde no Contexto Social, 6(3), 494-499. doi:10.18554/refacs.v6i3.364

Almeida, T. F., Ferreira, A. L. C., Moreira, J. D. P., de Oliveira, H. L., dos Santos, D. H. S., de Leucas, C. B (2018). **Experience report: management of a project**. Conecte-se! Revista Interdisciplinar de Extensão, 2(3), 149-154.

Conference Publications

Neto, D.L.A; Dantas, A.F.O.A; Almeida, T.F.; Lima, J.A; Morya, E. **Comparison of Controller's Performance for a Knee Joint model based on Functional Electrical Stimulation Input**. In 2021 10th International IEEE/EMBS Conference on Neural Engineering (NER), 2021, pp. 836-839, doi: 10.1109/NER49283.2021.9441233.

In Preparation

Almeida, T.F; Rodrigues, A.C (2022). **Characterization of connectivity before and after pentylenetetrazole induced seizures**. In proceeding in Neurosciene Letter journal.

Reviwer

The Journal of Open Source Software (JOSS)