Fabricio Olivetti de França

Professor, Universidade Federal do ABC (UFABC) |Google Scholar (h-index: 21) |Lattes CV
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Objective

To contribute to the creation of Symbolic Regression algorithms and supporting tools enabling the discovery of general scientific laws and interpretable nonlinear regression model. To advance in the field of explainable and interpretable models, in scenarios where transparency is required. To push the limits of the interpretability, simplicity, and accuracy trade-off in fields that require accurate and transparent decision process.

Education

– **Visiting Professor**, University of Applied Sciences Upper Austria, FH, Austria, 2022.

– **Ph.D./M.Sc. in Electrical Engineering**, Universidade Estadual de Campinas, 2010/2005.

– **M.Sc. in Electrical Engineering**, Universidade Estadual de Campinas, 2005

– **B.Sc. in Electrical Engineering**, Universidade Católica de Santos, 2002

Work experience

– 2018-current: Head of the Heuristics, Analysis and Learning Laboratory (HAL)

  – Objectives: advance in the research of heuristics and machine learning algorithms, support the educational background of the university students, create opportunities for collaboration with other academic institutes and the industry.

– 2023-2026: Coordinator of the graduate program of Computer Science at the Universidade Federal do ABC (UFABC)

  – Objectives: creating and executing plans to increase the research impact of the members of the prgram

– 2012-current: Professor of Computer Science at the Universidade Federal do ABC (UFABC)

  – Roles: supervising bachelor, Master's, and Ph.d.'s students, teaching undergrad and graduation level courses, researching and coordinating research teams.

– 2010-2012: Research Consultant at Tuilux

  – Roles: Combinatorial Optimization applied to Logistics, Recommender Systems, Sentiment Mining, Consumer Behavior and Big Data

Summary of Research Expertise

- **Symbolic Regression:**

  - Developed the *Transformation-Interaction-Rational* (TIR) framework for interpretable regression, achieving state-of-the-art accuracy with enhanced model transparency.

  - Contributed to the *SRBench* for symbolic regression.

  - Developed a symbolic regression library (srtree) with support to automatic differentiation and equality saturation.

  - Developed the *eggp* framework that exploits the database and pattern matching properties of equality graphs to improve the efficiency of genetic programming search.

  - Developed the *rEGGression* tool to explore the building blocks of the history of a symbolic regression search, helping practitioners to find interesting regression models.

- **Optimization and Genetic Programming:**

  - Focus on multimodal, robust, and time-varying optimization scenarios.

  - Improved algorithm efficiency in model search, addressing overfitting with multi-objective techniques.

Research interests

- Machine Learning, Data Mining, Data Science and Big Data

  - Symbolic Regression

  - Genetic Programming

  - Interpretability and Explainability

  - Program Synthesis

  - Equality Saturation and e-graphs

  - Efficient Data Structures

  - Domain Knowledge integration

- Optimization Problems

  - Multimodal Optimization

  - Uncertainties

  - Meta-heuristics

Achievements

- Lectures on 14 different courses including Machine Learning and Evolutionary Computing at graduate levels.

- Supervised over 20 undergraduate, Master's and Ph.D. students in Computational Intelligence.

- Creator and maintainer of SRTree library for tree-based symbolic regression.

- Developer and co-creator of eggp algorithm for symbolic regression.

– Developer and co-creator of rEGGression a nonlinear regression models exploration and query system withe-graphs

– Active contributor and current co-organizer of SRBench

– Organizer of the Genetic Programming Theory & Practice XXII

– Organizer of two Symbolic Regression competitions in 2022 and 2023

– Organizer of EvoMan competition in 2019

– Part of the editorial board of Genetic Programming and Evolvable Machines.

– Active referee for journals such as Neurocomputing, IEEE TEVC, information Sciences, Scientific Reports, GPEM, GECCO, CEC, NeurIPS.

Technical Skills

– Main programming languages: Python, R, MATLAB, C++, Haskell

– Frameworks: Scikit-Learn, TensorFlow

– Algorithms: Symbolic Regression, Genetic Programming, Equality Saturation, Optimization, Data Structures

Selected Publications

More at Google Scholar profile and Lattes CV.

– La Cava, W., Burlacu, B., Virgolin, M., Kommenda, M., Orzechowski, P., de França, F. O., ... & Moore, J. H. (2021). Contemporary symbolic regression methods and their relative performance. Advances in neural information processing systems, 2021(DB1), 1. arxiv

– Kronberger, G., de França, F. O., Burlacu, B., Haider, C., & Kommenda, M. (2022). Shape-constrained symbolic regression—improving extrapolation with prior knowledge. Evolutionary Computation, 30(1), 75-98. arxiv

– de Franca, F. O., Virgolin, M., Kommenda, M., Majumder, M. S., Cranmer, M., Espada, G., ... & La Cavaz, W. G. (2024). SRBench++: Principled benchmarking of symbolic regression with domain-expert interpretation. IEEE transactions on evolutionary computation. pub

– Aldeia, G. S. I., & de Franca, F. O. (2022). Interpretability in symbolic regression: a benchmark of explanatory methods using the Feynman data set. Genetic Programming and Evolvable Machines, 23(3), 309-349. arxiv

– Russeil, E., de França, F. O., Malanchev, K., Burlacu, B., Ishida, E., Leroux, M., ... & Gangler, E. (2024, July). Multiview Symbolic Regression. In Proceedings of the Genetic and Evolutionary Computation Conference (pp. 961-970). arxiv

– Fernandes, M.C., França, F.O.d., Francesquini, E. (2025). Going Bananas! - Unfolding Program Synthesis with Origami. In: Paes, A., Verri, F.A.N. (eds) Intelligent Systems. BRACIS 2024. Lecture Notes in Computer Science(), vol 15413. Springer, Cham. https://doi.org/10.1007/978-3-031-79032-4_1 arxiv

– de França, F. O., & Kronberger, G. (2025). Improving Genetic Programming for Symbolic Regression with Equality Graphs. arXiv preprint arXiv:2501.17848. arxiv

– de Franca, F. O., & de Lima, M. Z. (2021). Interaction-transformation symbolic regression with extreme learning machine. Neurocomputing, 423, 609-619. pub

– de França, F. O. (2022, July). Transformation-interaction-rational representation for symbolic regression. In Proceedings of the Genetic and Evolutionary Computation Conference (pp. 920-928). arxiv

– de Franca, F. O., & Kronberger, G. (2023, July). Reducing Overparameterization of Symbolic Regression Models with Equality Saturation. In Proceedings of the Genetic and Evolutionary Computation Conference (pp. 1064-1072). pub

Past and Current Projects

– Shape-constrained Symbolic Regression (2023): Integrated multi-objective optimization for robust extrapolation in machine learning models. FAPESP 21/12706-1.

– Interaction-Transformation Symbolic Regression (2020): Applied innovative algebraic data types for enhanced symbolic regression tasks. FAPESP 18/14173-8.

– Improving the Search of Symbolic Regression (2024-2026). CNPq 301596/2022-0.

– Internet Conflicts Observatory (2020). FAPESP 18/23022-3.

– Data Science. CAPES Print (2018-2025)

– The role of social media in comparative elections: Turkey and Brazil (2016). FAPESP 15/50250-9.

– Electoral Disputes in Cyberspace: study of social networks in Brazilian presidential elections (2014). FAPESP 14/06331-1.

Teaching Experience

– Symbolic Regression

– Introduction to Programming

– Type Driven Development

– Functional Programming

– Artificial Intelligence videos

– Network Science

– Bio-Inspired Computing

– Category Theory for Programmers

– Machine Learning with Big Data

– Data Structures

– Machine Learning

– Structured Programming

– Formal Languages and Automata

- Information Theory

- Explainable AI

- Playlists for some of these lectures (in Portuguese).

Programming languages that I have written at least one line of code :-) (main languages in bold):

- Assembly
- ActionScript
- AWK
- Bash
- BASIC
- Brainf*ck
- **C**
- **C++**
- C#
- D
- Delphi
- Fortran
- Go
- **Haskell**

- Java
- Javascript
- Julia
- Kotlin
- Lisp
- Logo
- Matlab
- NetLogo
- OCaml
- Octave
- Pascal
- PureScript
- PHP
- Prolog

- **Python**
- R
- Scala
- Scilab
- Sed
- SQL
- TASM
- TeX
- TypeScript
- Unity
- Visual Basic
- Wolfram language
- Z shell