

Sylvio Barbon Junior

Professor in Computer Engineering

about

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languages

Portuguese
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Research

Machine Learning
Computer Vision
Pattern Recognition
Text Mining
Process Mining

Summary

Sylvio Barbon Junior, a Brazilian and Italian citizen, is 39 years old. He obtained his B.S. degree in Computer Science from Centro Universitário do Norte Paulista in Brazil in 2005. He then pursued a Master's degree in Computational Physics from the University of São Paulo in Brazil, completing it in 2007. He also holds a degree in Computational Engineering from Centro Universitário de Votuporanga in Brazil, which he obtained in 2008. Furthermore, he earned his Ph.D. degree in 2011 from IFSC/USP (**University of São Paulo**), building upon his previous Master's degree.

From 2012 to 2021, he worked as an assistant and associate professor at the **State University of Londrina** (UEL) in Brazil. There, he actively contributed to postgraduate and graduate programs. In 2017, he embarked on a research visit to Università di Modena e Reggio Emilia and Università degli Studi di Milano, where he focused on Machine Learning and Process Mining. In 2021, he served as a visiting professor at Università degli Studi di Milano, teaching a course on Machine Learning.

In 2021, he began his role as an Associate Professor in the Engineering and Architecture Department at the **University of Trieste**. During 2023, he worked as a visiting professor at the State University of Campinas, concentrating on Computer Vision Systems.

His research interests span various areas, including Pattern Recognition, Process Mining, Machine Learning, and their applications in multidisciplinary fields.

Research Interests

I am a researcher in the field of Artificial Intelligence and its most varied applications. I have an academic background in Computing, more specifically in Pattern Recognition based on Machine Learning and Digital Signal Processing. My career goal is to work in international research groups, improving my research capacities, experience and keeping engaged with high-level projects.

Now, I have 1,636 citations (Scopus), H-index 23, and a perspective of enhancement in my academic contribution. During my master's degree, I had worked with voice conversion and Digital Signal Processing (PDS); Since that time, my research field changed, focusing on developing Machine Learning approaches to deal with digital signals. In this way, my Ph.D. culminate in the Discriminative Paraconsistent Machine (DPM), an Artificial Neural Network with some Support Vector Machines as first layer neurons and a paraconsistent logic as output. This approach is optimized to deal with low-confident datasets used in the training step.

Afterwards, I was approved as an assistant professor at Universidade Estadual de Londrina (UEL). This position allowed me to work in the Computer Science Master Program of UEL. Working with my colleagues from UEL, in the Computer Network Research Group, I applied and developed some machine learning approaches in anomaly behaviour detection for computer networks.

During 2014, I established a Text Mining research, and from 2015 I have had more than seven accepted papers in journals and conferences in the referenced area. The most important were focused on security over Online Social Networks. On the other hand, UEL is a very traditional university in Food and Agriculture research fields. This fact culminates in

some partnership in different areas such as Food Quality Research. In this cooperation, I played a role in applying and improving some Computer Vision (CV) and ML techniques to evaluate meat in a fast and accurate way.

Since January 2017, I have started to cooperate with Professor Dr Alessandro Ulrici from Università Degli Studi Di Modena e Reggio Emilia (UNIMORE), Italy. Professor Ulrici works on Spectroscopy; he tackles problems of dimensional reduction and prediction. In this way, I have begun to study and develop multi-target machine learning solutions to improve the prediction of regression problems. I have already supervised some students in this research field; some results have been published in Brazilian and International event. In May 2017 I arrived in Italy to cooperate in this project. In June 2017, a cooperation with Professor Ernesto Damiani and Paolo Ceravolo from Università Degli Studi di Milano, Italy, had started. In this last cooperation, as a visiting researcher, I have worked with machine learning applications on process mining, more specifically, addressing online process discovery and conformance checking.

In 2018, I was awarded the scholarship with high productivity in research by Fundação Araucária (the research council of UEL State) and have approved several national research financial support from the National Council for Scientific and Technological Development (CNPq).

In January 2021, I was a visiting professor at Università Degli Studi di Milano lecturing a Machine Learning course and a seminar on Automatic Machine Learning and Meta-learning.

More recently, I was awarded the scholarship with high productivity in research by the National Council for Scientific and Technological Development (CNPq).

In 2021 I keep part of the Computer Science Master Program and integrate the advisor board of Doctorate Program of Electrical Engineering UEL/UTFPR-CP until December.

In December 2021, I was appointed as an Associate Professor in the Engineering and Architecture Department of the University of Trieste. Currently, I serve as the co-head of the Machine Learning Laboratory and actively contribute to the PhD program in Applied Data Science & Artificial Intelligence (ADSAI). My primary goal is to attract a greater number of students to participate in my ongoing research on Automated Machine Learning.

In 2023, I had the opportunity to visit the Food Engineering Faculty at the University of Campinas, where I led a course on Computer Vision Systems.

Summarizing, my research interest is:

- Machine Learning:
 - Meta-Learning and AutoML;
 - Process Mining;
 - Stream Mining and Real-time Classification;
 - Applications of Machine Learning Classification and Regression;

Education

2017–2018	Visiting Researcher Process Mining; Machine Learning	Università degli Studi di Milano, Italy
2017-2017	Visiting Researcher Machine Learning; Pattern Recognition	Università di Modena e Reggio Emilia, Italy
2007–2011	Ph.D. Computational Physics Support Vector Machine; Voice Disorder; Artificial Neural Networks	University of Sao Paulo, Brazil
2006–2007	M.Sc. Computational Physics Dynamic Time Warping; Pattern Matching; Discrete Wavelet Transform	University of Sao Paulo, Brazil
2006-2007	B.Sc. in Computer Engineering	Centro Universitario de Votuporanga, Brazil
2002-2005	B.Sc. in Computer Science	Centro Universitario do Norte Paulista, Brazil

Experience

2023-2023	Guest Editor <i>IEEE Computers in Biology and Medicine (Special Issue - Artificial Intelligence in Biomedical Speech and Voice Analysis: explainable x non-explainable features, 2023)</i>	
2023-2023	Visiting Professor <i>Computer Vision Systems; Machine Learning</i>	University of Campinas, Brazil
2023-2023	Guest Editor <i>MDPI - Sensors (Special Issue - Artificial Intelligence in Sensor Data, 2023)</i>	
since-2021	Associate Professor <i>ING-INF/05 - Sistemi di elaborazione delle informazioni</i>	University of Trieste, Italy
since-2020	Program Chair <i>ML4PM, International Workshop on Leveraging Machine Learning in Process Mining</i>	
2019-2020	Visiting Professor <i>Applied Multi-output Machine Learning</i>	Università degli Studi di Milano, Italy
since-2019	Guest Editor <i>Journal on Data Semantics (Special Issue - Big Data Semantics, 2019)</i>	
2018-2021	Dean Advisor <i>Communication and Information Technology advisor of State University of Londrina</i>	Universidade Estadual de Londrina, Brazil
2017-2018	Post-doctorate <i>Multi-target characterization of large datasets with Near Infrared Spectroscopy</i>	Universita Degli Studi Di Modena e Reggio Emilia, Italy
2017-2018	Visiting Researcher <i>Data Stream Mining with Process Mining</i>	Universita Degli Studi Di Milano, Italy
2017-2018	Research Consultant <i>Image Satellite Intelligent processing</i>	Agropixel Soluções Inteligentes, Agronegócio Sustentável
since 2016	Research Consultant <i>Data Mining and Machine Learning</i>	Private Institutions

- 2016-2016 **Research Consultant** Bayer S/A - Digital Farming Solutions
Data Mining and Fuzzy Modelling for agricultural product prediction
- since 2013 **Editorial Board**
International Journal of Knowledge and Learning (2013), MDPI Future Internet (2020)
- 2012-2021 **Assistant/Associate Professor** Universidade Estadual de Londrina, Brazil
Artificial Intelligence, Computer Graphics
- 2010-2012 **Assistant Professor** Faculdade de Tecnologia de São José do Rio Preto, Brazil
Programming Language
- 2008-2012 **Associate Professor** Universidade Estadual de Minas Gerais, Brazil
Artificial Intelligence, Programming Language
- since-2009 **Invited Reviewer**
Elsevier Information Processing in Agriculture, Elsevier Engineering Applications of Artificial Intelligence, Elsevier Vibrational Spectroscopy, Springer Human-centric Computing and Information Sciences, MDPI Future Internet, MDPI Data, Springer EURASIP Journal on Audio, Speech, and Music Processing, Elsevier Infrared Physics and Technology, PLOS ONE, IOP Publishing and IEEE Access

Membership

- since 2014 **Member of Brazilian Computer Society (SBC)**
Engaged in SBSI (Information Systems) and BRACIS (Artificial Intelligence)
- since 2018 **Member of IFIP Working Group**
IFIP Working Group 2.6 on Databases
- since 2019 **IEEE Member**

Numbers

Supervision of master project:	24
Supervision of Ph.D. projects:	03 Matheus Camilo da Silva Iuliana Malina Grigore
Co-supervision of Ph.D. projects:	04 Ana Paula Ayub da Costa Barbon Louise Manha Peres Leonardo Arrighi Luca Pennella
Patents and Software Registration:	02
H-Index (Scopus):	23
Documents (Scopus):	122
Citations (Scopus):	1636
H-Index (Scholar):	31
i10-index (Scholar):	78
Citations (Scholar):	2790

Top 10 Publications

- 1 **Authorship verification applied to detection of compromised accounts on online social networks** Barbon, Sylvio, Rodrigo Augusto Igawa, and Bruno Bogaz Zarpelão.
Multimedia Tools and Applications (2016): 1-21
- 2 **Evaluation Goals for Online Process Mining** P Ceravolo, GM Tavares, S Barbon Junior, E Damiani
IEEE Transactions on Services Computing (2020)
- 3 **Evaluating the Four-way Performance Trade-off for Data Stream Classification in Edge Computing** JF Lopes, EJ Santana, VGT da Costa, BB Zarpelão, S Barbon
IEEE Transactions on Network and Service Management (2020)
- 4 **Account classification in online social networks with LBCA and wavelets** RA Igawa, S Barbon Jr, KCS Paulo, GS Kido, RC Guido
Information Sciences (2016) 332, 72-83
- 5 **Detection of Human, Legitimate Bot, and Malicious Bot in Online Social Networks Based on Wavelets** Sylvio Barbon, CAMPOS, GABRIEL F. C., TAVARES, GABRIEL M., IGAWA, RODRIGO A., MARIO PROENÇA, GUIDO, RODRIGO CAPOBIANCO
ACM Transactions on Multimedia Computing Communications and Applications (2018)
- 6 **DSTARS: A multi-target deep structure for tracking asynchronous regressor stacking** SM Mastelini, EJ Santana, R Cerri, S Barbon Jr
Applied Soft Computing (2020), 106215
- 7 **Unsupervised learning clustering and self-organized agents applied to help network management** LF Carvalho, S Barbon Jr, L de Souza Mendes, ML Proença
Expert Systems with Applications (2016): 54, 29-47
- 8 **Strict Very Fast Decision Tree: a memory conservative algorithm for data stream mining** VGT da Costa, ACP de Leon Ferreira, SB Junior
Pattern Recognition Letters (2018): 116, 22-28
- 9 **Machine learning hyperparameter selection for contrast limited adaptive histogram equalization** GFC Campos, SM Mastelini, GJ Aguiar, RG Mantovani, S. Barbon Junior
EURASIP Journal on Image and Video Processing (2019)
- 10 **Introducing the Discriminative Paraconsistent Machine (DPM)** RC Guido, S Barbon Jr, RD Solgon, KCS Paulo, LC Rodrigues
Information Sciences (2013) 221, 389-402