Updated 1st September 2022

André Brasil Vieira Wyzykowski

http://lattes.cnpq.br/9280827841526837 (portuguese)
+1 (517) 980-1839| wyzykow2@msu.edu | abvwmc@gmail.com
Sex: Male | Nationality: Brazilian | Birthplace: Salvador, Bahia | Birth date: August 03, 1989

EDUCATION

COLEGIO SALESIANO DO SALVADOR
Secondary School
Feb 2005 - Dec 2007 | Salvador, Brazil

UNIVERSITY OF VALE DO ITAJAÍ
Bachelor of Computer Science
Feb 2011 - Jul 2015 | Florianópolis, Brazil

FEDERAL UNIVERSITY OF SANTA CATARINA (UFSC)
Master degree in Computer Science
Aug 2015 - Aug 2017 | Florianópolis, Brazil

FEDERAL UNIVERSITY OF BAHIA (UFBA)
Degree of Doctor of Computer Science
Oct 2017 - Feb 2022 | Salvador, Brazil

MICHIGAN STATE UNIVERSITY (MSU)
Postdoctoral researcher,
Jun 2022 - today | East Lansing, MI, US

SKILLS

COMPUTER SCIENCE
Biometrics
Fingerprint synthesis
Computer Vision
Imaging Processing
Computer Graphics
Image recognition

PROGRAMMING
C++
Python
TensorFlow
PyTorch

LANGUAGES
English: |★★★★|
Spanish: |★★★★|
Portuguese: |★★★★★| (native speaker)
French: |★★|

AWARD

IV Sinapse da Inovação Santa Catarina (Innovation and Entrepreneurship), FAPESC, Government of Santa Catarina

RESEARCH

INSTITUTIONAL PROGRAM FOR TECHNOLOGICAL DEVELOPMENT AND INNOVATION (PROINOVA) | UNIVALI
Aug. 2014 – Jul. 2015 | São José, Brazil
Worked in the developing of the project - Software Solutions for Counting and Classifying Male Reproductive Cells in Lensless Microscopy Images.

ARTIFICIAL INTELLIGENCE AND EDUCATIONAL TECHNOLOGY LABORATORY (IATE - UFSC) | Master Degree
Aug. 2015 – Aug. 2017 | Florianópolis, Brazil
Worked with Dr. Jerusa Marchi in the development of an algorithm to extract features in images, with the intention to use this algorithm in a navigation system to aid visually impaired people.

UNIVERSIDAD DE CHILE - UCHILE - SOCIALCONNECTOR | Fondecyt - Number 1150252
Sep. 2016 - Sep. 2016 | Santiago, Chile
Worked with Dr. Sergio Ochoa on the development of face detection algorithms. The research sought to help elderly people in their homes.

FEDERAL UNIVERSITY OF BAHIA | UNIVERSITY OF SOUTH FLORIDA | CNPq | Doctorate
Oct 2017 - Feb 2022 | Salvador, Brazil and Tampa, US
We presented a new method capable of generating high-resolution fingerprints. Our approach is analogous to an authentic dataset. In 2021, I made a six-month academic visit to the University of South Florida with Dr. Sudeep Sarkar.

MICHIGAN STATE UNIVERSITY | Postdoc
Jun 2022 - Today | East Lansing, MI, US
Doing research with Dr. Anil K. Jain on latent fingerprint synthesis, and the development of new Automated Fingerprint Identification System (AFIS) using deep learning.

EXPERIENCE

KHOMP
Senior Software Engineer
Feb. 2010 – May. 2013 | Florianópolis, Brazil
Software developer - embedded devices.

OBYRAMA
Managing partner
Feb. 2014 – May. 2015 | Florianópolis, Brazil
Business developer.

CATHOLIC UNIVERSITY OF SALVADOR (UCSAL)
Assistant Professor
Mar. 2018 – today | Salvador, Brazil
Artificial intelligence, Experimental software engineering, software evolution, and advanced programming.

MICHIGAN STATE UNIVERSITY
Postdoctoral researcher
Jun. 2022 – today | East Lansing, MI, US
Latent fingerprints. Fingerprint synthesis. Automated Fingerprint Identification System (AFIS).

COMPUTER SCIENCE COURSES (DOCTORATE AND MASTER'S DEGREE)

Aug 2015 - Dec 2021 | Florianopolis, Salvador, Brazil

1. **TOPICS IN VISUAL COMPUTING:** Image databases organization, linear regression, logistic regression, multilayer perceptron, optimization, logistic regression + MLP using TensorFlow, CNN using TensorFlow, dropout, weight decay and batch normalization, Ensembles and Augmentation, Autoencoders, GANs.
2. **ARTIFICIAL INTELLIGENCE:** Knowledge representation. Automated reasoning. Search methods. Machine learning. Agents and Multi-Agents. Probabilistic methods (Bayes and Markov).
3. **TOPICS IN COMPUTATIONAL INTELLIGENCE:** Machine Learning, fuzzy Systems, fuzzy Time Series, expert system, genetic algorithms, neural networks, introduction to artificial neural networks, descending gradient, activation functions, multilayer perceptron, data augmentation.
4. **ALGORITHMS AND GRAPHS:** Algorithm concepts, algorithm analysis and efficiency, algorithm design (induction, division and conquest, dynamic programming, greedy method), NP-completeness (theory and demonstration technique), complexity classes (P, NP, NP-complete, NP-hard), polynomial reductions, algorithms for NP-complete problems. Basic concepts of graphs and algorithms to solve problems modeled in graphs; Connectivity; Distances, Stability and Chromatic Number, Trees; Planar Graphs. Ways; Topological Sorting; Coloring.
5. **ALGORITHM DESIGN AND ANALYSIS:** Introduction to algorithm analysis and design; Complexity; Asymptotic notation; recurrences; Divide and conquer algorithms; Algorithms in Graphs; Algorithms, sweet tooth; Dynamic Programming; NP-Complete Problems; reductions; techniques to handle complex problems.
6. **STATISTICAL METHODS:** Types of research and statistics, Survey, experimental and simulation research, research planning, Data analysis, Exploratory data analysis, Presentation of statistical software, Frequency distribution and histogram, Location and dispersion measures, diagrams in boxes, Probabilistic modeling, concept of random variable and probability distribution, Binomial and Poisson models, Uniform, exponential and normal models, General comments on random number generation and simulation, Statistical inference, Basic concepts: parameters, statistics and sample distributions, Parameter estimation, confidence intervals, hypothesis tests, t test for comparing two computer systems.
7. **THEORY OF COMPUTATION:** Programs, Machines and Computations. Turing machines. Recursive Functions. Computability. Decidability. Analysis and Complexity of Algorithms. Classes and complexity of computational problems.
8. **REAL-TIME SYSTEMS:** Definition of basic concepts and the importance of computational systems for real-time applications. Software Engineering of Real-Time Systems; Presentation Main Methodologies, Operating Systems Programming for Real-Time Applications; Escalation Methods; Comparative Analysis of some existing operating systems. Distributed Real-Time Systems; Timing and timing issues.
9. **FUNDAMENTALS OF RESEARCH IN COMPUTER SCIENCE:** Science and the scientific method. Science and computer science. Reading scientific articles. Empirical data analysis technique. The technique of graphical presentation of empirical data. How to conduct empirical research. Planning of surveys and questionnaires. Experiment design. Validation of empirical investigations. Measurement. Analysis of data from experiment designs. Case study planning. Systematic reviews and mappings. Writing and presentation of a scientific article.
10. **TEACHING INTERNSHIP 2017, 2019, 2020** : Teaching internship in the courses of Computer Theory and C++ programming.

MANAGEMENT

Worked as a managing partner of the company Obyrama, participating in the Technological Innovation Center of Univali (Uniinova) from Aug. 2013 to May. 2015.

DOCTORATE AWARDS (FEDERAL UNIVERSITY OF BAHIA)

1. **BEST PRESENTATION RATED BY THE AUDIENCE OF THE VI PGCOMP STUDENT WORKSHOP (WEPGCOMP 2021).**
2. **BEST PRESENTATION OF THE IV PGCOMP STUDENT WORKSHOP (WEPGCOMP 2019).**

PAST STUDENTS (UNDERGRADUATE)

Jul. 2019 - Dec. 2021 | Salvador, Brazil | Manuscripts titles (PT-BR), translated by google translator.

1. Gabryela Santana Barros and Lielson R. Pereira Junior. Experimental analysis between TDD and Test-Last techniques in the corrective software maintenance process. 2019.
2. Murilo Guerreiro Arouca. Risk Signaling: A Gamified Application for Participatory Risk Mapping. 2019.
3. Felipe Deveza de Almeida and Hudson Luís da Silva Costa. Iridescent: A serious game that aims to identify the possibility of adopting a psychological test based on the DASS-21. 2019.
4. Carlos Daniel Santana Cruz. Development of an IoT System Focused on Accessibility in Urban Mobility. 2019.

Lecture: Prof. Rangachar Kasturi (USF): Biometric Modalities: Face, Fingerprint, Iris, Ear - An Overview.

5. Danilo Silva Gonçalves. e-Coach: A League of Legends team and character recommendation system using multilayer neural networks. 2019.
6. Luiz Henrique Brito Rios and Adriano Ricardo Andrade Araújo. ROBOT COBRA: System for the Identification of Living Organisms in Collapsed Structures. 2020.
7. Ícaro Santana and Sérgio Matheus. Synthesis of X-ray images of respiratory problems using adversarial generative neural networks. 2020.
8. Rafael Rembrandt Aquino. WGAN adaptation to the stochastic process. 2020.
9. Rodrigo Soares. SED99 - Evolution Dataset Software - 99 repositories. 2020
10. Saulo de Andrade. Covid-19 detection in thoracic medical imaging using convolutional neural network (CNN). 2020.
11. Hugo Vinicius and Lucas Pereira. Cataract detection through images using Convolutional Neural Networks. 2020.
12. Guilherme Gurgel and Jorge Luiz. Identification and reading of plates in the Mercosur pattern using convolutional neural networks. 2020.
13. Rodrigo Figueiredo Barbosa. Recognition of facial expressions using a convolutional neural network. 2021.
14. Maurício Sena da Cruz and Wilton Oliveira Júnior. The use of data augmentation as a technique for improving neural networks to detect fake news about COVID-19. 2021.
15. Gabriel Barreto da Silva Costa and Victor Dias dos Santos. Electrical energy management system in computer labs. 2021.

PUBLICATIONS

In my doctorate, I published the papers [1, 2]. Other research conducted: [3], [4], [5], [6].

References

[1] A. B. V. Wyzykowski, M. P. Segundo, and R. de Paula Lemes, "Level three synthetic fingerprint generation," in 2020 25th International Conference on Pattern Recognition (ICPR). IEEE, 2021, pp. 9250–9257.

[2] ——, "Multiresolution synthetic fingerprint generation," in IET Biometrics (under revision), 2021.

[3] A. Wyzykowski, J. Marchi, and P. Mafra, "Rho-affine-orb : An improved orb algorithm for fully affine invariant matching," in The 32nd International Conference on Computers and Their Applications, 2017.

[4] A. Gaete, F. J. Gutierrez, S. F. Ochoa, P. Guerrero, and A. Wyzykowski, "Visitrack: A pervasive service for monitoring the social activity of older adults living at home," in International Conference on Ubiquitous Computing and Ambient Intelligence. Springer, 2017, pp. 520–530.

[5] A. B. V. Wyzykowski, E. Comunello, and A. C. Sobieranski, "Reconhecimento de células reprodutoras masculinas em imagens de microscopia sem lentes," 2017.

[6] A. B. V. Wyzykowski and A. K. Jain, "Synthetic latent fingerprint generator," 2022. [Online]. Available: https://arxiv.org/abs/2208.13811