André Pacheco | Curriculum Vitae

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Education

Federal University of Espírito Santo — **Vitória, Brazil**
Ph.D., Computer Science, Supervisor: Prof. Dr. Renato A. Krohling — *Aug 2016 – Nov 2020*
Thesis: Combining heterogeneous data and deep learning models for skin cancer detection

Dalhousie University — **Halifax, Canada**
Visiting Graduate Research Student, Supervisor: Prof. Dr. Thomas Trappenberg — *May 2019 – Feb 2020*
Research project: Out-of-distribution detection methods applied to skin cancer classification

Federal University of Espírito Santo — **Vitória, Brazil**
Ms.C., Computer Science, Supervisor: Prof. Dr. Renato A. Krohling — *Sep 2014 - Jul 2016*
Ms.C. thesis: Aggregation of neural classifiers via Choquet integral with respect to a fuzzy measure

Federal University of Espírito Santo — **Vitória, Brazil**
B.S., Computer Engineering — *Mar 2009 – Aug 2014*
Undergraduate Program in Computer Science and Electrical Engineering
B.S. Thesis: Designing a fuzzy controller using differential evolution applied to a line follower robot

Professional Experience

Samsung Electronics — **Campinas, Brazil**
AI Research Engineer | AI R&D Lab — *Aug 2020 - Now*
- My main responsibility is to work on the development of AI algorithms to improve Samsung devices
- Currently, I'm working on a project that demands sensor data analysis, prediction, and data classification for health applications, in particular, for environments with very limited resources such as smartwatches

Sharespot Inc — **Vitória, Brazil**
Software developer — *Jan 2016 - Dez 2016*
- I worked with a team that designed and developed web-based systems using mainly Java and Angular for interactive marketing solutions

Padtec S/A — **Vitória, Brazil**
Software Developer - Intern — *Feb 2013 - Jan 2014*
- I worked with a team that designed a software simulator to optical transport network (OTN) in C++.

Núcleo de Cidadania Digital - NCD — **Vitória, Brazil**
IT help desk - Intern — *Feb 2011 - Mar 2012*
- I worked with a team that provided IT help desk to computers based on Linux distributions.

Research Experience

- **AI R&D Lab - Samsung Research Institute Brazil (SRBR)** **Campinas, Brazil**
  AI Research Engineer *Aug 2020 – Now*
  Working with AI/ML models to allow new health/well-being solutions for wearable devices.

- **Hierarchical Anticipatory Learning Lab. (HALLab), Dalhousie University** **Halifax, Canada**
  Visiting Graduate Research Student with Prof. Dr. Thomas Trappenberg *May 2019 – Feb 2020*
  Worked with Prof. Dr. Thomas Trappenberg and Prof. Dr. Sageev Oore on dynamic weights for an ensemble of deep models and out-of-distribution detection applied to medical data.

- **Bio-inspired Laboratory (LABCIN), Federal University of Espírito Santo** **Vitória, Brasil**
  Ph.D. student with Prof. Dr. Renato A. Krohling *Aug 2016 – Nov 2020*
  Worked with Prof. Dr. Renato A. Krohling and Profa. Dra. Patricia Lyra Frasson on deep learning applied to skin cancer detection and interpretability/explainability.

- **Optimization laboratory (LabOtim), Federal University of Espírito Santo** **Vitória, Brasil**
  Ms.C. student with Prof. Dr. Renato A. Krohling *Sep 2014 – Jul 2016*
  Worked with Prof. Dr. Renato A. Krohling on aggregation algorithms applied to an ensemble of classifiers

- **Robotic Laboratory, Federal University of Espírito Santo** **Vitória, Brasil**
  Undergraduate research student with Profa. Dra. Roberta L. Gomes *Jun 2012 – Feb 2014*
  Worked with a team of students led by Profa. Dra. Roberta L. Gomes to develop algorithms and hardware to educational robots.

Awards, Honors and scholarships

- **2010**: 1st place (out of 31 teams) in the Latin America Robotics Competition (LARC), category IEEE-SEK, São Paulo, Brazil.
- **2011**: 1st place (out of 22 teams) in the Latin America Robotics Competition (LARC), category IEEE-SEK, Bogotá, Colombia.
- **2012**: The State of Espírito Santo Research Agency (FAPES) scholarship for undergraduate research (R$ 4,800/year).
- **2013**: 2nd place (out of 19 teams) in the Latin America Robotics Competition (LARC), category IEEE-OPEN, Arequipa, Peru.
- **2013**: The best undergraduate research work in engineering and exact sciences at the Federal University of Espírito Santo (out of 151 projects).
- **2014**: Full scholarship from Brazil's research agency CAPES (R$ 18,000/year) for a two-years master's degree program at the Federal University of Espírito Santo.
- **2016**: Full scholarship from Brazil's research agency CAPES (R$ 26,400/year) for a four-years PhD program at the Federal University of Espírito Santo.
- **2018**: The State of Espírito Santo Research Agency (FAPES) grant (R$ 132.100,00) for the Ph.D. project "Skin cancer detection based on images collected from smartphones and patient demographics".
- **2019**: 4th place (out of 64 teams) in the International Skin Imaging Collaboration challenge -

ISIC 2019 task 1.

- **2019**: 3rd place (out of 16 teams) in the International Skin Imaging Collaboration challenge - ISIC 2019 task 2.
- **2019**: Travel awards NeurIPS 2019
- **2020**: FAPES travel awards to CVPR 2020
- **2020**: Best paper award at ISIC @ CVPR 2020

Main publications

- Krohling, R.A., **Pacheco, A.G.C.** and Siviero, A.L., 2013. IF-TODIM: An intuitionistic fuzzy TODIM to multi-criteria decision making. Knowledge-Based Systems.
- **Pacheco, A.G.C.**, Krohling, R.A. and da Silva, C.A., 2018. Restricted Boltzmann machine to determine the input weights for extreme learning machines. Expert Systems with Applications.
- **Pacheco, A.G.C.**, Ali, A.R., Trappenberg, T., 2019. Krohling, R.A., 2019. Skin cancer detection based on deep learning and entropy to detect outlier samples. International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) @ ISIC challenging workshop.
- **Pacheco, A.G.C.** and Krohling, R.A., 2019. The impact of patient clinical information on automated skin cancer detection. Computers in biology and medicine.
- **Pacheco, A.G.C.**, Sastry C.S., Trappenberg, T., Oore, S., and Krohling, R.A, 2020. On Out-of-Distribution Detection Algorithms With Deep Neural Skin Cancer Classifiers. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) @ ISIC 2020.
- **Pacheco, A.G.C.** and Krohling, R.A., 2021. An attention-based mechanism to combine images and metadata in deep learning models applied to skin cancer classification. IEEE Journal of Biomedical and Health Informatics.

Complete list available on Google Scholar

Academic activity and service

- **Teaching assistant:**

  2020: INF-00714 - Software Development in C. Instructor: Vinicius Mota
  2020: INF-00714 - Software Development in C. Instructor: Maria C. S. Boeres
  2018: INF-00714 - Software Development in C. Instructor: Jordana Salamon
  2017: EPR-12992 - Computational Simulation. Instructor: Renato A. Krohling
  2015: INF-00714 - Software Development in C. Instructor: Maria C. S. Boeres

- **Conference and Journal Reviewing**:

  2021: IEEE Journal of Biomedical and Health Informatics, Medical Image Analysis, ISIC @ CVPR (program committee)
  2020: IEEE Journal of Biomedical and Health Informatics
  2019: Computers & Industrial Engineering, IEEE International Joint Conference on Neural Networks, and Neurocomputing
  2018: IEEE International Joint Conference on Neural Networks

- **University Activities:**

  2020: **Orienta Covid ES HUCAM UFES** - It is a project created by professors/doctors from the university hospital of UFES (HUCAM) that provides orientation about COVID-19 to people in general. I act as a volunteer by providing IT support and I developed a web server (Java/SpringBoot, Angular, MySQL, and AWS) to help doctors to store data from the appointments.

  2017 - 2020: **Dermatological and Surgical Assistance Program (PAD-UFES)** - In addition to being part of my doctoral research project, I also work as a volunteer software engineer for this program. I lead a team that has developed and maintain a web server (Java/SpringBoot, Angular, and MySQL) and a smartphone application (React-Native) to collect and store patient data.

  2018: **Kangaroo Project (UFES)** - This is a project that provides assistant to pregnant teenagers in the Espírito Santo state. This is a major health issue in Brazil and I worked as a volunteer data analyst to help researchers from this project understand the data that they collect from their patients.

  2012 - 2014: **UFES' robotic team (ERUS):** I am a co-founder of the UFES' robotic team (ERUS). This team has participated in and won several types of robotic competitions. In 2013, I was chosen as the team leader, which was a unique experience that I had during my undergraduate.

  2012: **Solidarity Teaching Project (PAS-UFES)** - This was a free preparatory course to help low-income people to get a spot in a public university in Brazil. I worked as a volunteer physics teacher (high school level) on this project.

- **B.S. Thesis co-advisor**:

  2016: Designing algorithms using Restricted Boltzmann Machine applied to time series forecasting. Author: José M. N. Cardoso Neto.
  2017: Discriminative Restricted Boltzmann Machine and PSO applied to data classification. Author: Guilherme Artém dos Santos.
  2017: Skin cancer classification using CNNs embedded in smartphones. Author: Gabriel S. C. Ucelli.
  2018: Skin cancer segmentation using images collected from standard camera. Author: Gabriel Giorisatto De Angelo.
  2019: Development of a tool for data analysis and visualization of the UFES Dermatological Assistance Program. Author: Felipe Branquinho Rodrigues.

Invited talks

- **Institutional talks:**

  2019: What is machine learning? Faculdade Multivix, Vitória, Brazil.
  2018: Introduction to Python for scientific computer. Production Engineer, UFES, Vitória, Brazil.
  2016: Introduction to data classification. Jornada de Atualização em Computação, Elétrica e Eletrônica - JAACE, UFES Vitória, Brazil.

- **Conference Orals:**

  2020: Learning dynamic weights for an ensemble of deep models applied to medical imaging classification. IJCNN 2020 - Online.

2020: An App to Detect Melanoma Using Deep Learning: An Approach to Handle Imbalanced Data Based on Evolutionary Algorithms. IJCNN 2020 - Online.
2019: Recent advances in deep learning applied to skin cancer detection. NeurIPS 2019 @ Retrospectives workshop - Vancouver, Canada.
2018: An approach to improve online sequential extreme learning machines using restricted Boltzmann machines. IJCNN 2018 - Rio de Janeiro, Brazil.
2016: Discriminative Restricted Boltzmann Machine applied to data classification. SBPO 2016 - Vitória, Brazil.

Technical and Personal skills

- **Natural Languages:** native Portuguese and high level of proficiency in English.
- **Programming Languages, Libraries, and Frameworks I've worked with:**
  - Python, PyTorch, TensorFlow/Keras, Scikit-learn, OpenCV, NumPy, Pandas, and Matplotlib
  - C, MATLAB, and Java
  - Jekyll, Spring Boot, Angular, React-native, SQL, HTML, and CSS
  - Git, Docker, and Latex
- **Hardwares:** Arduino and Raspberry-Pi

Check some projects on my Github

Additional activities

- I have a blog named Computação inteligente in which I teach Artificial Intelligence/Machine Learning to Portuguese speakers. In Brazil, most people do not or have low proficiency in English, which limits them to learn concepts in this field. My goal is to fill this gap and help them to have access to this knowledge.
- I like to watch e-sport games, in particular, League of Legends. In order to get more insights about the game, I like to crawl data and perform some analysis of them. You can find these analyses on my blog.
- As you can see in my activities, I am very engaged in social projects. I always focus on using my knowledge for social good. Currently, my main goal is to help clinicians to improve skin cancer assessment for low-income people in Brazil.

References

- Available upon request.