



JOÃO RIBEIRO PINTO

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About me:

Hi, I'm João! I have been working on computer vision and biometrics, contributing to creating innovative solutions to real-life problems. I am looking to use my knowledge and experience to build practical and realistic AI solutions in exciting new projects. I am passionate about innovation, taking AI from research to reality, leading teams, and mentoring students. Beyond work, I love design, history, geography, heraldry, languages, and everything related to world cultures.

TECH STACK

MOST USED:

Python PyTorch Lightning

Keras/Tensorflow OpenCV

Pillow Scikit-Learn Scikit-Image

Pandas Scipy/Numpy HTML

CSS Javascript

OCASIONALLY USED:

Adobe Illustrator MATLAB PHP

SQL TensorRT

BASIC KNOWLEDGE:

C/C++ Java jQuery

STATS

42 publications

11 journal papers

18 int. conference papers

550+ citations

16 supervised master theses

20+ supervised interns

15 scientific events

more info at

jtrpinto.github.io



EDUCATION

Ph.D. in Electrical and Computers Engineering

2022

University of Porto, Portugal

- Research on biometrics, wellbeing monitoring, & other ML/CV topics;
- Authored 38 scientific articles within my doctoral studies;
- Received the Max Snijder 2022 Award - European Association for Biometrics.

M.Sc. in Bioengineering - Biomedical Engineering

2017

University of Porto, Portugal

- Strong foundations on machine learning, programming, and computer vision;
- Authored 2 journal articles, on medical image analysis and biometrics.

EXPERIENCE

AI for Autonomous Driving

Senior Deep Learning Engineer - Bosch Portugal

since 04/2022, 1yr. 2m.

- Implemented and improved AI solutions for road lane estimation, semantic segmentation, and near-range sensor blockage for autonomous driving scenarios (PyTorch, Lightning, Scikit-Learn, Scikit-Image, OpenCV, Pillow);
- Managed a sub-project on cybersecurity, privacy, and biometric solutions for autonomous vehicles.

Biometrics and Computer Vision R&D

Research Assistant - INESC TEC

10/2017 - 04/2022, 4yr. 6m.

- Conceptualized and implemented a novel method for biometric security in deep learning (PyTorch, Microsoft SEAL) - simpler, faster, lighter, and with improved performance - received 2 best paper/presentation awards;
- Explored algorithm architectures for diverse tasks such as classification, semantic segmentation, content retrieval, object detection (PyTorch, Keras, Tensorflow, Scikit-Learn, Scikit-Image, OpenCV).

Research Scholar - FEUP

08/2017-09/2018, 1yr. 2m.

- Designed the first end-to-end deep learning model for ECG biometrics (CNN in Keras, Tensorflow), complete with data augmentation and transfer learning strategies, achieving error rates 56% inferior to the existing alternatives.

In-Vehicle Driver and Passenger Monitoring

Collaborator - Easy Ride Project

02/2020-12/2021, 1yr. 11m.

- Developed temporal neural networks (CNN & LSTM in PyTorch, Keras, Tensorflow) for emotion and activity monitoring in autonomous shared vehicles (including audio and RGB sensor fusion).
- Led the entire process from conceptualization to in-vehicle deployment;
- Demonstrated the developed violence detection algorithm, in-vehicle and in real-time, live at a public event.

Collaborator - AUTOMOTIVE Project

07/2019-11/2021, 2yr. 4m.

- Developed novel, robust, and optimized algorithms for ECG and face biometrics to enable the next generation of personalized driver drowsiness monitoring.

Digital Signal Processing and Machine Learning Development

Intern - CardioID Technologies

07/2016-07/2017, 1yr. 1m.

- Compiled the most complete survey on ECG biometrics to date (+100 citations);
- Developed a complete machine learning solution for seamless and accurate vehicle driver biometrics in challenging settings (Scipy, Scikit-Learn);
- Comprehensively benchmarked ECG biometric algorithms in realistic edge scenarios, step-by-step, from digital signal processing to decision.

SELECTED PUBLICATIONS

Electrocardiogram Lead Conversion from Single-Lead Blindly-Segmented Signals

- in *BMC Medical Informatics and Decision Making*, 2021
- The first study on ECG signal lead conversion from single-lead blindly-segmented inputs, using multi-head encoder-decoder deep learning models.

Secure Triplet Loss: Achieving Cancelability and Non-Linkability in End-to-End Deep Biometrics

- in *IEEE Transactions on Biometrics, Behavior and Identity Science*, 2021
- The first loss function designed to teach end-to-end deep learning models to learn biometric security.

Self-Learning with Stochastic Triplet Loss

- at *IJCNN 2020*
- An adaptation of triplet loss for self-supervised learning, especially fit for learning without labels on multiclass datasets and continuous/sequential data.

Explaining ECG Biometrics: Is It All In The QRS?

- at *BIOSIG 2020*
- The first study of explainability/interpretability for ECG biometrics.

(selected among a current total of 42 publications, cited over 470 times)

An End-to-End Convolutional Neural Network for ECG-Based Biometric Authentication

- at *BTAS 2019*
- The first end-to-end convolutional neural network for ECG biometric identity verification, with significant performance improvements on realistic scenarios.

Evolution, Current Challenges, and Future Possibilities in ECG Biometrics

- in *IEEE Access*, 2018
- The largest and most comprehensive survey of ECG biometric literature to date.

(selected among a current total of 42 publications, cited over 550 times)

VOLUNTEERING

Event Organization

VISUM Summer School 2019-2022, 4 eds.

- Helped guide teams of students on lectures and challenges; developed and maintained the website (HTML/CSS/JavaScript); created marketing materials (Adobe Illustrator); managed social media.

xAI4Biometrics Workshop @ WACV 2021-2022, 2 eds.

- Created and maintained the website (JavaScript/PHP); designed promotional materials.

IWBF (Int. Workshop on Biometrics and Forensics) 2020, 1 ed.

- Led the organization of live demonstrations during the conference; developed a software tool for virtual poster presentations (JavaScript/PHP).

CIBB (Int. Conference on Bioinformatics and Biostatistics) 2019-2023, 3 eds.

- Co-organised a special session on machine learning (2019, 2021, 2023); member of the conference technical programme committee (2021).

Symposium on Bioengineering 2017-2022, 3 eds.

- Organized as part of the communication and image team (2017); led workshops on deep learning (2021, 2022); delivered invited speech and participated in a panel (2022).

AWARDS

EAB Max Snijder Award 2022
Best PhD student NIS 2021
Best paper IWBF 2020
Best session paper IPAS 2020
Health Essay Award UCP 2012

TOP SKILLS

Creative, self-driven, and resilient;
Teamwork and autonomy;
Always searching for realistic results;
Multidisciplinary background;
Communication (oral and written);
Leading and mentoring people.

LANGUAGES

Portuguese (Native)
English (Fluent)