# PAULO BRUNO SERAFIM

Deep Reinforcement Learning Researcher | Software Developer

I like to solve challenging problems using my creativity, developing new solutions to relevant and nontrivial assignments. Throughout my experience on different academic projects, I became a person who not only loves solving problems through innovation but also enjoys writing about them.

## SKILLS

C/C++ 9 years
*Object-Oriented and Data-Oriented C/C++*

Computer Graphics 6 years
*CG, 3D Printing, Computational Geometry, and Geometric Modelling in OpenGL and Qt*

Reinforcement Learning 3 years
*Deep Q-Networks projects in the environments ViZDoom, PySC2, OpenAI Gym, and GymRetro*

Python 4 years
*ML projects with OpenCV and Numpy*

Deep Learning 3 years
*TensorFlow and Keras in Python*

Digital Image Processing 3 years
*OpenCV (C/C++ and Python) and Octave*

## KEY PUBLICATIONS

- A Novel Approach for Automatic Enhancement of Fingerprint Images via Deep Transfer Learning. *IJCNN*, 2020.
- Patent applied for a novel method to automatically create parametrized support structures for 3D printing. 2019.
- A Method based on Convolutional Neural Networks for Fingerprint Segmentation. *IJCNN*, 2019.
- Evaluating competition in training of Deep Reinforcement Learning agents in First-Person Shooter games. *SBGames,* 2018.

## LANGUAGES

PT Native EN Proficient FR Intermediate

## FOLLOW

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## CONTACT

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## EXPERIENCE

### Deep RL Researcher — Apr 2018 - Present

*CRAb - Computer Graphics, Virtual Reality and Animation*

Deep Reinforcement Learning researcher, working with autonomous game agents using TensorFlow and the environments ViZDoom, OpenAI Gym, PySC2, and Gym Retro. Started a subgroup focused on DRL applications, especially in games and character animation. Co-advisor of two undergraduate and one PhD candidate students. Currently working on competition and cooperation with multiagent DRL and analysis of agent performance under different views of the same environment.

### Software Developer — Feb 2019 - Present

*Instituto Atlântico*

Working on R&D Computer Vision project for HP applying Deep Learning to problems of human segmentation and image matting (2020). Previously worked on R&D projects for HP Labs on 3D printing, applying computer graphics methods for surface and volumetric meshes using C/C++. Developed a new way to build voxelized support structures using algorithms of different areas, like Geometric Modelling and Image Processing, which generated a patent application (2019). Improvement of Genetic Algorithm heuristics applied to a Bin Packing Problem (2020).

### Software Developer — May 2018 - Feb 2019

*GREat - Group of Computer Networks, Software Engineering and Systems*

Developed solutions for fingerprint minutiae extraction and matching using OpenCV focused on high performance (2018). Implemented a data-oriented C++ version of SourceAFIS, reducing runtime in about 90% (2018-2019). Started a side project using Convolutional Neural Networks (CNN) for Region of Interest (ROI) segmentation using TensorFlow, presented at IJCNN 2019. Worked on a project to apply fingerprint image enhancements using TensorFlow and OpenCV (2019-2020).

## EDUCATION

### MSc – Computer Science — Mar 2016 - Apr 2018

*Federal University of Ceará (UFC)*

Research on multi-agent competitive applications of Deep Q-Networks using the environment ViZDoom. Evaluation of autonomous agents in shooter and foraging scenarios (2016-2017). Quantitative analysis of the behaviors of autonomous agents in a competitive First-Person Shooter scenario using Python and TensorFlow (2017-2018).

### BSc – Computer Science — Jan 2013 – Dec 2015

*Federal University of Ceará (UFC) – Magna Cum Laude degree*

Worked on hair animation projects using mass-spring systems and OpenGL (2013). Developed research on neuroevolution for autonomous game agents (2014-2015).