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 researcher who not only loves resolving problems through innovation but also enjoys writing about them, whether in the form of papers or as patents.

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 Numpy, Scikit and Matplotlib

Deep Learning 3 years
TensorFlow and Keras in Python

Digital Image Processing 3 years
OpenCV in C/C++ and Octave

KEY PUBLICATIONS

- 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.

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EXPERIENCE

Senior 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 PySC2, ViZDoom, OpenAI Gym, 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 the evaluation of intrinsic motivation in DRL agents and analysis of agent performance under different views of the same environment.

Software Developer — Feb 2019 - Present

Instituto Atlântico

Working on R&D projects for HP Labs on 3D printing 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).