PAULO BRUNO SERAFIM

Deep Reinforcement Learning Researcher | Software Developer

I love to solve challenging problems using my creativity, developing new solutions to relevant and nontrivial assignments. Throughout my experience on different projects, I became a person who not only loves solving problems through innovation but also enjoys writing about them. I like to work close to other people who love what they do, so that we can share our experiences and knowledge.

SKILLS

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

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

Reinforcement Learning — 5 years
Deep Q-Networks projects in the environments ViZDoom, PySC2, OpenAI Gym, and GymRetro

Python — 5 years
ML projects with Numpy, Scikit and Matplotlib

Deep Learning — 5 years
TensorFlow and Keras in Python

Image Processing and Computer Vision — 3 years
OpenCV in C/C++ and Python, Image Segmentation, and OCR

LANGUAGES

PT Native Speaker
EN Full Professional Proficiency
FR Limited Professional Proficiency

SOCIAL

- paulobruno.github.io
- linkedin.com/in/pbserafim
- github.com/paulobruno
- researchgate.net/profile/Paulo-Serafim
- lattes.cnpq.br/7877766764101416

CONTACT

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PROFESSIONAL EXPERIENCE

Computer Vision Engineer — Sept. 2020 – Present
Instituto Atlântico

Working on an R&D Computer Vision project for HP applying Deep Learning to the problems of human segmentation and image matting using TensorFlow. Worked on OCR methods applied to printed text documents. Developed a synthetic document generator using OpenCV in Python, capable of generating hundreds of simulated text documents per minute. Co-leader of the Cognitive Computing study group, focused on Computer Vision, Image Processing, and Reinforcement Learning.

Deep RL Researcher — Apr. 2018 - Present
CRAb - Computer Graphics, Virtual Reality and Animation

Deep Reinforcement Learning (DRL) researcher, working with autonomous game agents using TensorFlow and the environments ViZDoom, OpenAI Gym, and Unity ML-Agents. Started a subgroup focused on DRL applications, especially in games and character animation. Co-advisor of one undergraduate, two MSc 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.

Computer Graphics Engineer — Feb. 2019 – Aug. 2020
Instituto Atlântico

Worked on R&D projects for HP Labs on 3D printing, applying computer graphics methods for surface and volumetric meshes using C/C++ standard libraries. 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 - ASTEF

Developed solutions for fingerprint minutiae extraction and matching focused on high performance, using OpenCV in C++. Implemented a data-oriented C++ version of SourceAFIS, reducing runtime in about 90%. Created a side project using Convolutional Neural Networks for fingerprint ROI segmentation (paper presented at IJCNN 2019). Worked on a Transfer Learning solution to enhance fingerprint images, leading to a higher matching percentage (paper presented at IJCNN 2020). Helped the team with singular point detection using YOLOv4 (paper presented at IWSSIP 2021).

EDUCATION

MSc – Computer Science   Mar. 2016 – Apr. 2018
Federal University of Ceará (UFC)

   Advisor: Dr. Joaquim Bento Cavalcante Neto

   Thesis: *Avaliação da competição no treino de agentes autônomos com Aprendizado Profundo por Reforço em jogos de Tiro em Primeira Pessoa (in Portuguese)*

   Research on multi-agent competitive applications of Deep Q-Networks using the environment ViZDoom and TensorFlow. Quantitative analysis comparing the behaviors of autonomous agents.

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).

STUDENTS (CO-ADVISOR)

Halisson Rodrigo	*PhD*	2020 – Present
Alexandre Magno	*BSc/MSc*	2019 – Present
Rômulo Férrer Filho	*BSc/MSc*	2019 – Present
Hyuan Farrapo	*BSc*	2020 – Present
Anderson Oliveira	*BSc/MSc*	2017 – 2020
Matheus Cordeiro	*BSc*	2017 – 2019
Eduardo Melo	*BSc*	2015 – 2017
Gabriel Costa	*BSc*	2015 – 2017

PUBLICATIONS

Robust Fingerprint Singular Point Detection using a Single-Stage CNN for Object Detection   June 2021
28th International Conference on Systems, Signals and Image Processing (IWSSIP)

Investigating Deep Q-Network Agent Sensibility to Texture Changes on FPS Games   Nov. 2020
XIX Brazilian Symposium on Computer Games and Digital Entertainment (SBGames)

Deep Reinforcement Learning em Ambientes Virtuais (in Portuguese)   Nov. 2020
XXII Symposium on Virtual and Augmented Reality (SVR) - Pre-Symposium Book

Autonomous Foraging with SARSA-based Deep Reinforcement Learning   Nov. 2020
XXII Symposium on Virtual and Augmented Reality (SVR)

Simplificando o Balanceamento de Atributos em RPGs Eletrônicos (in Portuguese)   Nov. 2020
XIX Brazilian Symposium on Computer Games and Digital Entertainment (SBGames)

A Novel Approach for Automatic Enhancement of Fingerprint Images via Deep Transfer Learning   July 2020
2020 International Joint Conference on Neural Networks (IJCNN)

A Minimal Training Strategy to Play Flappy Bird Indefinitely with NEAT   Oct. 2019
18th Brazilian Symposium on Computer Games and Digital Entertainment (SBGames)

A Method based on Convolutional Neural Networks for Fingerprint Segmentation   July 2019
2019 International Joint Conference on Neural Networks (IJCNN)

Evaluating Competition in Training of Deep Reinforcement Learning Agents in First-Person Shooter Games   Oct. 2018
17th Brazilian Symposium on Computer Games and Digital Entertainment (SBGames)

On the Development of an Autonomous Agent for a 3D First-Person Shooter Game Using Deep Reinforcement Learning   Nov. 2017
16th Brazilian Symposium on Computer Games and Digital Entertainment (SBGames)

Towards Playing a 3D First-Person Shooter Game Using a Classification Deep Neural Network Architecture   Nov. 2017
19th Symposium on Virtual and Augmented Reality (SVR 2017)