Ermano A Arruda

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PROFESSIONAL EXPERIENCE

Associate Principal Robotics Research Engineer - Dyson, UK October 2019 - Present
Current focus: robot manipulation, robot learning, team management, technical leadership.

Research Internship - Honda Research Institute Europe GmbH, Offenbach, Germany Sep 2018 - Nov 2018
Focus: robot grasping and manipulation research.

School of Computer Science - University of Birmingham

Teaching Associate - Software Workshop I, Graphics, Intelligent Robotics Oct 2015 - Sep 2018

- Teaching introductory programming course with Java at the University of Birmingham. Assisting on Computer Graphics and Intelligent Robotics modules, supervising mini-projects and assisting on assignments.

Research Internship - VoxarLabs Recife, Pernambuco, Brazil
Sep 2012 - Oct 2015

- Visual tracking for virtual and augmented reality interaction in projects such as AnimAR and FishTankVR.
- Member of the Voxar Robotics team in partnership with the Recife Center for Advanced Studies and Systems (CESAR, in Portuguese), working on the VoxarBrain project.

Center for Informatics (CIn) - Federal University of Pernambuco Recife, Pernambuco, Brazil
Graphical Processing Jan 2013 - Sep 2013
Algorithm & Data Structures Aug 2011 - Sep 2013
Introduction to Programming Feb 2011 - Aug 2011

- Gave revision lectures, elaborated programming puzzles, supervised projects, and marked exercises.

EDUCATION

PhD - University of Birmingham (UoB), School of Computer Science, UK Sep 2015 - Oct 2019
Thesis: Generative and predictive models for robust manipulation.
Focus: robot manipulation, robot learning, active perception, computer vision.

Bachelor in Computer Science - Center for Informatics (CIn), Federal University of Pernambuco (UFPE), Brazil - GPA: 9.03/10.0 2010 - 2015
Algorithms and Data Structures (96%), Intelligent Systems (91%), Linear Algebra (80%), Communication Infrastructure (98%), Data and Information Management (91%), Graphical Processing (95%), Computer Language Paradigms (99%), etc.

Affiliate Computer Science and Software Engineering - University of Birmingham, UK - 78% 2013 - 2014
Intelligent Robotics (85%), Advanced Robotics (91%), Parallel Programming (87%), Computational Vision (75%), Operating Systems with C/C++ (80%), Machine Learning (74%), Neural Computation (70%), etc.

PUBLICATIONS

- Ermano Ardiles Arruda, *3D cleaning tool path generation.* GB Patent GB2615994 (A), 2023. More details at https://patents.google.com/patent/GB2615994A.
- Ermano Arruda, Claudio Zito, Mohan Sridharan, Marek Kopicki, Jeremy L. Wyatt, *Generative grasp synthesis from demonstration using parametric mixtures.* Task-Informed Grasping (TIG-II): From Perception to Physical Interaction, Robotics: Science and Systems (RSS), 2019.
- Ermano Arruda*, Michael J Mathew*, Marek Kopicki, Michael Mistry, Morteza Azad, Jeremy L Wyatt, *Uncertainty Averse Pushing with Model Predictive Path Integral Control.* In Proceedings of IEEE International Conference on Humanoid Robots (Humanoids), 2017.
- Ermano Arruda, Jeremy Wyatt, Marek Kopicki, *Active vision for dexterous grasping of novel objects.* In Proceedings of IEEE International Conference on Intelligent Robots and Systems (IROS), 2016.
- Lucas Figueiredo, Edvar Vilar Neto, Ermano Arruda, João Marcelo Teixeira, Veronica Teichrieb, *Fishtank Everywhere: Improving Viewing Experience Over 3D Content*, In Proceedings of the 16th International Conference on Human-Computer Interaction, Crete, Greece, June 22-27, 2014. Springer.

AWARDS

First place at ISMAR Off-site Tracking Competition 2015, Fukuoka, Japan. 2015
Implemented a monocular visual odometry system with additional sparse bundle adjustment for camera trajectory optimisation.

Member of the winning team CESAR-VoxarLabs at LARC/CBR – Latin American and Brazilian Robotics Competition, RoboCup@Home. 2014
Implemented an object-tracking and detection system based on state-of-the-art long-term tracking algorithm Tracking-Learning-Detection (TLD).

AnimAR application – Grand Prize Winner for Metaio's GotHeARt Competition (InsideAR 2013, Munich, Germany). 2013
Augmented Reality android application for storyboard design and animation.

TECHNICAL SKILLS

Robotics	ROS2, Orocos
Simulation tools	Bullet, MuJoCo, Gazebo
Programming Languages	C/C++, Python, Java, Lua, Matlab, C#
Version Control	Git, SVN

LANGUAGES

- English (Fluent), Portuguese (Native)

PROJECTS

Grip 2024

- Grip is an open-source prototyping toolbox for robot manipulation research written in python. Project page: `https://github.com/dyson-ai/grip`

PaCMan project - Active perception for robotic grasping 2016

- Focused on next-best-view planning for improving grasp performance. Responsible for the final integrated demo of the PaCMan project with active vision system for next-best-view planning. See http://www.pacman-project.eu/.

ToyDQN, implementation of the Deep Q Network (DQN) algorithm for a few toy examples - Lua, Torch7, Love2d 2016

- An open-source personal summer project on deep reinforcement learning available at `https://github.com/eaa3/DeepQLearning`.

Simple Tracking and Mapping (STAM), visual odometry algorithm - C/C++, OpenCV 2015

- A monocular visual odometry system with additional sparse bundle adjustment for trajectory optimisation. The system ranked first place at the International Symposium on Mixed and Augmented Reality (ISMAR) 2015 Off-site Tracking Competition.

SLAM_X, A Graph-based SLAM system for mobile robots - Robot Operating System (ROS), C/C++, PCL, OpenCV 2015

- Final year project on SLAM techniques with applications on robot perception. The system was quantitatively evaluated on the TUM RGB-D SLAM Benchmark dataset. Video demonstration available at `https://youtu.be/-ZV9gk_Hw84`.

VoxarBrain, I-Zak's brain, the robot who won LARC/CBR RoboCup@Home Competition - C/C++, OpenCV, PCL 2015

- Object tracking, recognition and pose estimation for the I-Zak robot.

EXTRA CURRICULAR EXPERIENCE

University of Birmingham Drone Forum - IT Innovation Centre 2016 - 2018

- Engage with researchers, students, and hobbyists by creating an environment for discussion, research, and development of drone-related technologies and applications. Some of our work involved in-campus research activities to improve WiFi coverage, see more at this **link.**