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Giulio Campagna

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Email: gica@create.aau.dk **Phone:** (+39) 3337396558

Phone: (+45) 22543373 **Website:** https://www.campagna-robotics.com/

Website: https://vbn.aau.dk/en/persons/153215

Website: https://scholar.google.com/citations?user=2YTOXC4AAAAJ&hl=en&oi=ao

Skype: xaldinwow4e

LinkedIn: https://www.linkedin.com/in/giulio-campagna-7505881a4

Gender: Male **Date of birth:** 03/05/1995 **Nationality:** Italian

ABOUT ME

Born the 3rd of May 1995 in Siena, Italy.

Received B.S. degree in Computer and Information Engineering in 2018 from the University of Siena with a thesis entitled "*Experimentation on Real Video of Systems for Object Detection*".

Received M.S. degree in Computer and Automation Engineering - Robotics and Automation in 2021 from the University of Siena with a thesis entitled "*Commanding Grasping Robot through Virtual Reality and Simulated Wrenches*".

PhD Fellow at Aalborg University, Human-Robot Interaction Laboratory. The research aimed to develop machine learning algorithms that leverage multi-modal sensor data to enhance safety, foster trust and ergonomic behavior, and create more user-friendly robot control systems for human operators in industrial human-robot collaboration.

According to the prestigious *Best Global Universities* ranking, Aalborg University is ranked among the top 20 universities worldwide for engineering.

WORK EXPERIENCE

[15/01/2022 – 14/01/2025]

Ph.D. fellow in Human-Robot Collaboration

Aalborg University - Technical Faculty of IT and Design

City: Aalborg | **Country:** Denmark

Link: https://vbn.aau.dk/en/persons/153215

The research aimed to develop machine learning algorithms that leverage multi-modal sensor data to enhance safety, foster trust and ergonomic behavior, and create more user-friendly robot control systems for human operators in industrial human-robot collaboration.

- Research projects
- Visiting researcher at the German Aerospace Center (DLR) and Italian Institute of Technology (IIT)
- Participation in workshops and conferences
- Dissemination and Press-Media

Research Line: Human - Robot Collaboration

Laboratory: Human - Robot Interaction

[02/12/2020 – 31/03/2021] **Master's Thesis Internship**

University of Siena

City: Siena | **Country:** Italy

Link: https://www.campagna-robotics.com/commanding-grasping-robot

This study aimed to manipulate real-world objects through virtual reality. Specifically, a virtual hand was controlled within the environment using a CyberGlove III, IMU MPU 6050, and Leap Motion Controller, facilitating real-time interaction. Haptic feedback was provided during interactions with virtual objects. The motions performed in the virtual environment were replicated in the real world by teleoperating a robotic manipulator, utilizing the object's pose in the virtual space.

Experiments were conducted at the SIRSLab laboratory at the University of Siena under the supervision of Professor Domenico Prattichizzo.

[04/2018 – 09/2018] **Bachelor's Thesis Internship**

University of Siena

Address: 53010, Siena, Italy

This experiment involved analyzing real-world videos for object detection on highways. The primary objective was to identify and classify various vehicles, such as cars, using the OpenCV library, which is well-suited for image manipulation, tracking, and object recognition. The study aimed to enhance the accuracy and efficiency of vehicle detection in dynamic traffic environments.

EDUCATION AND TRAINING

[15/01/2022 – 14/01/2025] **Ph.D. Fellow in Human-Robot Collaboration**

Aalborg University - Technical Faculty of IT and Design https://vbn.aau.dk/en/persons/153215

Address: Rendsburggade 14, 9000, Aalborg, Denmark | | **Level in EQF:** EQF level 8

The research aimed to develop machine learning algorithms that leverage multi-modal sensor data to enhance safety, foster trust and ergonomic behavior, and create more user-friendly robot control systems for human operators in industrial human-robot collaboration.

- Research projects
- Visiting researcher at the German Aerospace Center (DLR) and Italian Institute of Technology (IIT)
- Participation in workshops and conferences
- Dissemination and Press-Media

Research Line: Human - Robot Collaboration

Laboratory: Human - Robot Interaction

[01/05/2024 – 30/06/2024] **Visiting Researcher**

DLR - German Aerospace Center https://www.dlr.de/en/zlp/about-us

City: Augsburg | **Country:** Germany |

[01/10/2023 – 29/02/2024] **Visiting Researcher**

Italian Institute of Technology (IIT) https://www.iit.it/

City: Genoa | **Country:** Italy |

The novel framework leverages Preference-Based Optimization (PBO) and considers three renowned interaction parameters: the robot's velocity profile, the separation distance between the human and the robot, and the vertical proximity to the user's head. By continuously refining these parameters based on qualitative feedback from human collaborators, the system adjusts the robot's trajectories dynamically. This personalization aims to create a safe and ergonomic environment for the user. A chemical scenario was developed as a testbed for this framework.

The experiments were conducted under the supervision of Dr. Arash Ajoudani at the Human-Robot Interfaces and Interaction.

[30/09/2018 – 25/04/2021]

Master's Degree: Computer and Automation Engineering- Robotics and Automation

University of Siena - Department of Information Engineering and Mathematical Sciences https://computer-automation.unisi.it/it

Address: 56, Via Roma, San Niccolò, 53010, Siena, Italy | | **Final grade:** Achieved a degree score of 109 out of 110, missing a perfect average by 0.06 | **Level in EQF:** EQF level 7 | **Thesis:** Commanding Grasping Robot through Virtual Reality and Simulated Wrenches

Link: https://www.campagna-robotics.com/projects

The program aims to provide advanced knowledge on the main technologies and applications of artificial intelligence, machine learning, industrial automation, and robotics. It equips participants with the skills necessary for the design, management, development, and technological innovation in the field of advanced hardware and software system architectures, as well as in control systems and robotics.

Thesis available here

Projects:

- *Control of Allegro Hand Using ROS:* Developed a system for controlling the Allegro Hand through the Robot Operating System (ROS).
- *Machine Learning Algorithm for Atari Breakout:* Created a Python-based implementation of the classic game Atari Breakout, utilizing machine learning techniques to predict optimal moves for successful gameplay.
- *Project Decision Analysis: Cooperative Robots:* Designed a cooperative system where two robots transport an object from an initial to a final position while avoiding collisions. The project aimed to identify optimal policies that minimize costs, employing Dynamic Programming, Markov Processes, and Monte Carlo simulations.
- *Project Filtering Techniques: Network Agents:* Established a network of agents arranged in a ring structure to facilitate information exchange regarding their states. The objective was to estimate these states using both the Kalman Filter and Extended Kalman Filter.
- *Project Network Optimization: Lin-Kernighan Algorithm:* Implemented the Lin-Kernighan algorithm for network optimization purposes.

[31/08/2020 – 14/11/2020]

Erasmus Traineeship

Aarhus University (AU)

Country: Denmark |

Link: https://www.campagna-robotics.com/commanding-grasping-robot

Using Unity3D, a virtual environment was created to display an avatar of the subject's hand. Through the Oculus Rift, the user could see the virtual hand, objects, and a contact-detection sphere that contained the target object for grasping. The hand's position and

rotation were tracked using Optitrack Motive, a precise tracking software for objects and rigid bodies. Forces applied by the hand to the sphere were transmitted through haptic devices, providing feedback on the generalized forces exerted. The wrench applied to the center of mass of the sphere was considered equivalent to that applied to the actual object.

[01/10/2019 – 31/03/2020]

Erasmus for Studies

Technical University of Munich (TUM)

City: Munich | **Country:** Germany |

Link: https://www.campagna-robotics.com/projects

Courses

- Dynamic Human-Robot Interaction
- Human-Centered Neuroengineering for Cybathlon
- Advanced Robot Control and Learning

Relevant Projects

- Developed a grasping algorithm designed for individuals with disabilities, enabling them to select objects by focusing on them with an eye-tracking device and indicating their intention to grasp using an EMG Myo armband. The various components are interconnected through the ROS framework.
- Participated in the *Robothon Competition*, focused on identifying types of waste and appropriately sorting them using the Franka Panda robot

[2014 – 2018]

Bachelor's Degree: Computer and Information Engineering

University of Siena - Department of Information Engineering and Mathematical Sciences https://ing-informatica-informazione.unisi.it/it

Address: 56, Via Roma, San Niccolò, 53010, Siena, Italy | | **Level in EQF:** EQF level 6 |
Thesis: Experimentation for real video of systems for Object Detection

The program of study includes an in-depth exploration of foundational and specialized subjects in Information Engineering, offering a broad range of specialized courses in the fields of Computer Science, Automation, Telecommunications, and Electronics.

High School Graduation

Tito Sarrocchi Scientific and Technological High School

Address: 53010, Siena, Italy | | **Final grade:** 100/100 | **Level in EQF:** EQF level 5

RESEARCHER SOCIAL PROFILES

Social Profiles for Research

- **ORCID:** 0000-0002-2422-1663
- **RESEARCHID:** ADG-0240-2022

- **SOCIAL PROFILES:**

1. Personal Website
2. Aalborg University Profile
3. LinkedIn
4. ORCID
5. Google Scholar
6. ResearchGate
7. Loop
8. Web of Science
9. Academia
10. IEEE Collabratec

PUBLICATIONS

[2024] **Promoting Trust in Industrial Human-Robot Collaboration through Preference-Based Optimization**

Campagna, G., Lagomarsino, M., Lorenzini, M., Chrysostomou, D., Rehm, M., & Ajoudani, A. (2024). Promoting Trust in Industrial Human-Robot Collaboration through Preference-Based Optimization. *IEEE Robotics and Automation Letters*.

[2024] **A Data-Driven Approach Utilizing Body Motion Data for Trust Evaluation in Industrial Human-Robot Collaboration**

Campagna, G., Dadgostar, M., Chrysostomou, D., & Rehm, M. (2024). A Data-Driven Approach Utilizing Body Motion Data for Trust Evaluation in Industrial Human-Robot Collaboration. In *33rd IEEE International Conference on Robot and Human Interactive Communication, IEEE RO-MAN 2024*. IEEE.

[2024] **Analysis of Facial Features for Trust Evaluation in Industrial Human-Robot Collaboration**

Campagna, G., Chrysostomou, D., & Rehm, M. (2024, May). Analysis of Facial Features for Trust Evaluation in Industrial Human-Robot Collaboration. In *2024 IEEE International Conference on Advanced Robotics and Its Social Impacts (ARSO)* (pp. 1-6). IEEE.

[2024] **Investigating Electrodermal Activity for Trust Assessment in Industrial Human-Robot Collaboration**

Campagna, G., Chrysostomou, D., & Rehm, M. (2024). Investigating Electrodermal Activity for Trust Assessment in Industrial Human-Robot Collaboration. In *21st International Conference on Ubiquitous Robots (UR 2024)*. IEEE.

[2023] **Analysis of Proximity and Risk for Trust Evaluation in Human-Robot Collaboration**

Campagna, G., & Rehm, M. (2023, August). Analysis of proximity and risk for trust evaluation in human-robot collaboration. In *2023 32nd IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)* (pp. 2191-2196). IEEE.

[2023] **Trust Assessment with EEG Signals in Social Human-Robot Interaction**

Campagna, G., & Rehm, M. (2023, December). Trust Assessment with EEG Signals in Social Human-Robot Interaction. In *International Conference on Social Robotics* (pp. 33-42). Singapore: Springer Nature Singapore.

[2024] **An EEG Benchmark Data Set for Data-Driven Trust Assessment in Social HRI**

Rehm, M., Pontikis, I., & Campagna, G. (2024). An EEG Benchmark Data Set for Data-Driven Trust Assessment in Social HRI. In *Proceedings International Conference on Social Robotics*. Springer.

[2024] **Does Robot Anthropomorphism Improve Performance and User Experience in Teleoperation?**

Villani, A., Baldi, T. L., D'Aurizio, N., Campagna, G., & Prattichizzo, D. (2024). Does Robot Anthropomorphism Improve Performance and User Experience in Teleoperation?. In *2024 IEEE-RAS International Conference on Humanoid Robots*.

[2019] **Commanding Grasping Robot through Virtual Reality and Simulated Wrenches**

Campagna, G. (2019). Commanding Grasping Robot through Virtual Reality and Simulated Wrenches.

OTHER ARTICLES SUBMITTED

- "*A Systematic Review of Trust Assessments in Human-Robot Interaction*", submitted to ACM Transactions on Human-Robot Interaction (THRI)
- "A Multi-Modal Model for Trust Evaluation in Industrial Human-Robot Collaboration", submitted to IEEE Robotics and Automation Letters (RA-L)
- "*Fostering Trust through Gesture and Voice-Controlled Robot Trajectories in Industrial Human-Robot Collaboration*", submitted to IEEE ICRA 2025

PEER REVIEWING SCIENTIFIC ARTICLES

[2023] **A coaching Approach to define Emotional Intelligence for Robots**

IEEE International Conference on Robotics and Automation (ICRA)

ACTIVITY

Trust, Acceptance and Social Cues in Human-Robot Interaction – SCRITA

Workshop at 32nd IEEE International Conference on Robot and Human Interactive Communication (RO-MAN 2023)

ASIMOV: Adaptive Social Interaction based on user's Mental mOdels and behaVior in HRI

Workshop at 15th International Conference on Social Robotics (ICSR 2023)

[01/03/2022] **10th Annual Aalborg Robotics Workshop**

HONOURS AND AWARDS

[02/2022] **Qualification to the profession of Robotics and Automation Engineer in section A, Information Engineering sector, class LM-32**
Awarding institution: University of Florence
Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_df1fe34317d74161a1e58cb14c91d199.pdf

[30/06/2022] **Registration of Master Thesis in Italian Database PubbliTesi for recognition of one among best thesis**
Awarding institution: PubbliTesi
Link: https://www.linkedin.com/feed/update/urn:li:activity:6948250431697395712/

[2024] **Finalist for the Digital Sustainability Award**

Finalist for the Master's thesis for the first recognized research foundation in Italy dedicated to exploring topics related to digital sustainability

Link: https://sostenibilitadigitale.it/events/digital-sustainability-day-2/

NETWORKS AND MEMBERSHIPS

[23/02/2022 – Current] **IEEE MEMBERSHIP**

Link: https://www.ieee.org/

[23/02/2022 – Current] **IEEE ROBOTICS & AUTOMATION SOCIETY (RAS) MEMBERSHIP**

Link: https://www.ieee-ras.org/

[23/02/2022 – Current] **TECHNICAL COMMITTEE FOR HUMAN-ROBOT INTERACTION & COORDINATION**

Link: https://www.ieee-ras.org/human-robot-interaction-coordination

[Current] **IDA (Ingeniørforeningen i Danmark)** Denmark

The Danish Society of Engineers, IDA is a professional body and trade union for technical and scientific professionals.

Link: https://ida.dk/

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

English

LISTENING B2 **READING** C1 **WRITING** B2

SPOKEN PRODUCTION B2 **SPOKEN INTERACTION** B2

French

LISTENING A1 **READING** A1 **WRITING** A1

SPOKEN PRODUCTION A1 **SPOKEN INTERACTION** A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

My Digital Skills

Tools & Technologies

EMG Myo Armband | Linux and Windows operative systems | Xsens | MATLAB | Git Hub | Latex | C and C++ | OpenCV | Franka Emika Panda Robot | Python | ROS | Unity3D | Universal cobots | Leap Motion | KUKA Robots | Industrial cameras | Optitrack Motive

Generic Skills

Digital Mindset | Digital Awareness | Knowledge Networking | Virtual Communication | Digital Team Working

Other skills and Applications

Machine Learning | Deep Learning | Reinforcement Learning | Dynamic Programming | Automation | Optimization | Object Detection | Kalman Filtering | Robotics Grasping | Data Analysis | Teleoperation | Human-Robot Interaction | Robotics | Tracking | Monte Carlo Simulation

ORGANISATIONAL SKILLS

Organisational skills

- Team management
- Goal setting
- Decision-making skills
- Problem solving skills
- Strategic thinking and planning

COMMUNICATION AND INTERPERSONAL SKILLS

Communication and interpersonal skills

- Active listening
- Conflict resolution
- Good communication skills
- Emotional intelligence

DRIVING LICENCE

Cars: B

CERTIFICATIONS

FIRST

FIRST - University of Cambridge, 10 08 2021, Certificate Number: B6014466 - European Level: B2

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_b7ef89cc2c9d4016ac1b52f5f42035f0.pdf

PET

PET - University of Cambridge, 01 05 2014, Certificate Number: 0044043424 - European Level: B1

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_db96ce0b8949475280806ce046801885.pdf

DELF A1

DELF - DELF, 26 11 2009 - European Level: A1

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_b0c55e801df345f7903d46b02269a3b4.pdf

ECDL ADVANCED AM4

ECDL ADVANCED MODULE AM4, AICA, 19-01-2012, N° ADV026100

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_32ffe3230edc479fa3a2003bf9e572c9.pdf

ECDL CORE

ECDL CORE, AICA, 23-04-2010, N° IT 1526910

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_9975058b339a467c89d1134e5c705c34.pdf

[22/10/2023] **Formazione Generale Lavoratori**

"*Formazione Generale Lavoratori*" refers to general training for workers on workplace safety and regulations in Italy.

Corso AiFOS EL/350792, Attestato n. U185600

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_8c29b64fcf48442298b1b968f430e50c.pdf

COURSE

Deep Learning

- Machine learning fundamentals
- Deep learning concepts
- Deep learning methods including deep neural networks, long short-term memory recurrent neural networks, convolutional neural networks

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_8c2fd8c40d054f129506c4c059e295fa.pdf

Reinforcement Learning and Dynamic Programming

- Markov decision processes
- Dynamic programming for infinite time and stopping time
- Reinforcement learning

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_8d74c6afd42f4f36a580d71cb488ac93.pdf

Architecture of Machine Learning Systems

- Essential concepts of modern Machine Learning systems
- TensorFlow
- Machine Learning pipelines.

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_a2999cf1b607485baf3c06d5a6131e46.pdf

Data Quality Management

- Provide an overview of the most effective assessment and improvement techniques
- Discuss the main data quality issues in data integration
- Data Profiling
- Data Cleaning

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_d3728e11d03242d9927f57d67cf74182.pdf

Data and Machine Learning Operations

- Data Augmentation
- Labeling
- Cleaning
- Pre-processing
- Transfer learning

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_77f754ae9f3049dfb5350b148f939d96.pdf

Signal and Spectral Analysis extracting information from noisy data

- Filtering, statistical signal processing, estimation theory, maximum likelihood, power spectral density estimation, modelling, least squares, autoregressive, nonnegative matrix factorizations, sparsity, periodic signals, Fourier analysis, line spectra.

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_4cdfa6600eb54a7d992200e7a6b3be32.pdf

Management of Research and Development

- Insight in how to carry out R&D projects in an organizational context and how to manage own projects.

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_733b2466c966484b9b6895c540e0fb4d.pdf

Academic Writing in English

- English academic writing

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_74296c5533e249da9ac168e3b9df274c.pdf

Writing and Reviewing Scientific Papers

- Writing and reviewing scientific papers

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_0ad760830eee4d728c7d721bb1f2f557.pdf

Applying the Danish Code of Conduct for Research Integrity to your Research

- Principles of research integrity, planning phase, personal data regulation, data management, conflicts of interest, dissemination of results

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_6768b194139a455eb5d1d624c481d100.pdf

Online Profiles, Dissemination and Metrics

- Open Access publishing
- Researcher profiling – to strengthen the exposure of own research and research profile
- Research evaluation – introduction to traditional and new methods including h-index and alternative metrics
- Copyright and plagiarism

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_d6bf0dd9954d40e695f03bfd458c99fb.pdf

Problem-Based Learning

- Problem-Based Learning (PBL) is a learner-centered approach that involves researching, applying knowledge, and integrating theory to solve a specific problem.

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_9f0a8f0b307942ddb6ca14233307850a.pdf

International Scientific Networking

- The course focuses on building global connections and collaborations within the scientific community to enhance research and knowledge exchange.

Link: https://www.campagna-robotics.com/_files/ugd/1d4f1d_3d11241b35664f1b8f14d9cb55a4e93b.pdf

PROJECTS

[15/01/2022 – 15/01/2025]

Automatic Assessment of Trust in Human-Robot Interaction

Trust is essential for effective automation. In Human-Robot Interaction, trust becomes more complex due to the robot's physical presence alongside the operator. Current research relies on post-hoc trust measurements, which help optimize system design but don't allow for real-time trust adjustments during tasks. This project aims to: **(i)** identify trust indicators in industrial Human-Robot Collaboration, **(ii)** collect sensor data and train

machine learning models for real-time trust prediction, and **(iii)** adapt robot behavior based on predicted trust levels to ensure efficient task performance.

Link: https://www.campagna-robotics.com/projects

[01/10/2023 – 29/02/2024] **Promoting Trust in Industrial Human-Robot Collaboration through Preference-Based Optimization**

The novel framework leverages Preference-Based Optimization (PBO) and considers three renowned interaction parameters: the robot's velocity profile, the separation distance between the human and the robot, and the vertical proximity to the user's head. By continuously refining these parameters based on qualitative feedback from human collaborators, the system adjusts the robot's trajectories dynamically. This personalization aims to create a safe and ergonomic environment for the user. A chemical scenario was developed as a testbed for this framework.

Link: https://www.campagna-robotics.com/projects

[05/2020 – 07/2020] **Cooperation Robots**

The project focuses on optimizing collaboration between two robots in a 2D industrial environment, where they transport objects from an initial to a final position while avoiding collisions. The robots operate on a hexagonal grid, with six possible movement directions. One robot has a malfunction, deviating from its path with probabilities of 0.2 (left) and 0.1 (right), while maintaining the desired path with probability 0.7. The objective is to develop an optimal policy that minimizes the task completion time, factoring in movement time, collision penalties, and the distance between robots. The object itself is static and does not collide with obstacles.

Link: https://www.campagna-robotics.com/cooperation-robots

[05/2020 – 07/2020] **Lin Kernighan Algorithm**

The Traveling Salesman Problem (TSP) is a classic combinatorial optimization problem that seeks the cheapest route to visit a set of cities and return to the starting point. It can be viewed as finding a minimum-weight Hamiltonian cycle in an edge-weighted graph. The Lin-Kernighan (LK) algorithm is a local search method for solving TSP, where it starts with an initial tour and iteratively performs k-opt moves—exchanging k edges to reduce the tour length. This process repeats until no further improvements are possible, often with randomized starting points for multiple attempts.

Link: https://www.campagna-robotics.com/lin-kernighan-algorithm

[09/2019 – 04/2020] **Shape-Based Grasping Techniques with Eye Tracking Device**

The loss of a hand greatly impacts autonomy in daily, work, and social activities. Current prosthetics offer limited support due to poor control interfaces and a lack of tactile feedback, hindering effective grasping. To address this, a system was developed for prosthetic hands that enables adaptive grasping based on object shape. The system extracts the user's intent via EMG signals from a Myo Armband and provides visual feedback using an Eye Tracking Device and YOLO for real-time object recognition. ROS integrates both EMG and visual data to ensure proper grasping.

Link: https://www.campagna-robotics.com/shape-based-grasping-techniques

[02/2020 – 03/2020] **Robothon: Beach Clean Up Challenge**

Protecting the planet from pollution is a critical challenge, with coastal cleanups being a particularly demanding task typically performed by workers. Through the Technical

University of Munich (TUM), I participated in the Robothon competition, where we developed a robotic platform to assist in beach cleaning. The robot autonomously sorted various objects by identifying, classifying, and placing them into the appropriate containers.

Link: https://www.campagna-robotics.com/robothon-beach-cleanup-challenge

[10/2018 – 02/2019] **Atari Breakout and Self-Supervised Learning**

A supervised learning algorithm applied to the famous game Atari Breakout.