

Claudio Coppola

PhD in Robotics, Machine Learning Expert

London, UK

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Robotics and AI researcher with a passion for developing intelligent assistant agents that help people, combining state-of-the-art machine learning with real-world robotics.

Experience

Founding Senior Research Engineer – VLA

Humanoid

Aug 2024 – Present

London, UK

- Built the company's end-to-end imitation learning infrastructure – spanning data collection, training, and deployment – enabling successful robot manipulation PoCs with partners.
- Trained and deployed advanced imitation and VLA policies (ACT, Diffusion Policy, Pi0/Pi0.5) across multiple robot platforms.
- Directed the integration and teleoperation of dexterous five-finger hands on the humanoid robot, and led sensor and end-effector design for alpha and beta prototypes.
- Managed large-scale pretraining data collection, coordinating robotic operators and data engineers to ensure quality, throughput, and process improvement.

Machine Learning Applied Scientist

Amazon

Jul 2022 – Aug 2024

London, UK

- Developed and deployed Deep Learning solutions for demand forecasting and Cost Estimation, deployed on the AWS cloud infrastructure, resulting in 1M in savings each.
- Led the team in scoping, data engineering, and software architecture design.

Scientific Advisor

Queen Mary University of London/University College London

Jul 2022 – Jul 2024

London, UK

Supervised the development of:

- a VR and exoskeleton-based system for dexterous robot manipulators.
- an Imitation Learning model of robot manipulation primitives.

Postdoctoral Researcher

Queen Mary University of London

May 2019 – Jun 2022

London, UK

Developed:

- ROS-based *teleoperation platform* for a dexterous manipulator
- a supervised Machine Learning system to segment long-horizon manipulation skills from demonstrations.
- a robust robot grasp exploration system based on Bayesian Optimization.

Research Associate

University of Lincoln

May 2017 – May 2018

Lincoln, UK

- Developed state-of-the-art Machine Learning Ensemble for Human Activity Recognition and Re-identification systems for mobile assistive robots used in the EU H2020 research projects ENRICHME and FLOBOT.
- Conducted demonstrations for AI and Mobile Robotics courses.

Other Experiences

- **BrainStation** - Lead Instructor - (Nov 2023 - Apr 2024):
- **2Watch** - ML Engineer Contractor - (Jan - Dec 2020):
- **Entrepreneur First** - LD11 Cohort Member - (Oct 2018 - Jan 2019)
- **Buzzoole** - Lead ML Engineer - (May 2018 - Oct 2018)
- **KPMG** - Business Intelligence Consultant - (Jan - Jun 2014):

Education

PhD in Robotic Perception

University of Lincoln

Jul 2014 – Aug 2018

Lincoln, UK

- Developed a Machine Learning workflow for Human Social Activity Segmentation using real-world RGB-D data for assistive robotics.

MSc cum Laude in Computer Science Engineering

University Federico II of Napoli

Oct 2011 – Dec 2013

Napoli, Italy

- Top 5% Student
- Focus: Computer Vision, Machine Learning, Signal Processing.
- Thesis: *Iris Liveness detection for authentication systems based on Iris Recognition*

BSc in Computer Science Engineering

University Federico II of Napoli

Oct 2011 – Dec 2013

Napoli, Italy

- Top 5% Student
- Focus: Software Engineering, Artificial Intelligence, Control Theory.
- Thesis: *Algorithm and systems for voice recognition.*

Technical Skills

- **Machine Learning & AI** - Flow Matching, Diffusion, Deep Learning, Bayesian Optimization, Ensemble Learning, Supervised/Unsupervised Learning, Reinforcement Learning.
- **Frameworks** - Lerobot, Huggingface, ROS, Pytorch, Scikit-learn, Lightning, Mujoco, Pandas, Streamlit, Docker, AWS, Kinect SDK2, OpenCV.
- **Methodological** - Robot Manipulation, Machine Learning, Time-Series Forecasting, Computer Vision, Mobile Robotics, Optimization, Scientific writing, Software Engineering.

Programming Skills

Proficient: Python, Matlab, SQL.

Experienced: C, C++, C#, Java, bash

Certifications

- **Machine Learning** - *Stanford University on Coursera*
- **Deep Learning Specialization** *deeplearning.ai on Coursera*
- **Deep Reinforcement Learning Nanodegree** *Udacity*
- **Fundamentals of Reinforcement Learning** *University of Alberta on Coursera*
- **BMVA Computer Vision Summer School 2015** *Swansea University.*

Awards

- 2022 **PD Enrichment Awards** - *Alan Turing Institute*
- 2022 **AI-Net PostDoc Awards** - *DAAD*
- 2020 **Hult regionals winner** - *Hult Foundation*
- 2016 **Research Travel Award** - *Santander*
- 2016 **Research Travel Awards** - *EURAI*

Relevant Projects

Machine Feeding Policy

Humanoid - Trained a policy ($\pi_0/\pi_{0.5}$)-like policy for a continuous machine feeding of bearing rings of multiple sizes (50mm, 110mm, 130mm).

- Trained a policy using data from the specific task (machine-feeding) and from a bussing task in a co-training regime.
- The policy achieved a 200 UPH throughput. Running over a
- Contributed to the open-source library Lerobot, improving its usability in the dataset creation and conversion.

Imitation Learning Flywheel

Humanoid - Developed the Imitation Learning infrastructure, allowing scaling robot behaviour training efforts to multiple tasks per day.

- Developed:
 - ◇ a system that records robot teleoperation data for 2 different robot platforms (Aloha, RBY2, HMND01).
 - ◇ The data conversion procedures to aggregate imitations into a trainable dataset.
- Trained and deployed on a real robot, successful imitation learning policies for tote-handling, grocery picking and machine feeding scenarios.
- Contributed to the open-source library Lerobot, improving its usability in the dataset creation and conversion.

Skill Segmentation for Long-Horizon Robot Task Learning

Queen Mary University of London - Developed methods to automatically segment robot dexterous manipulation skills from long-horizon demonstration videos, enabling the learning of complex tasks. Work published as [6].

- Designed and implemented features capturing robot proprioception and tactile data for skill segmentation.
- Built and compared machine learning models (Random Forests and Deep Learning) using scikit-learn and PyTorch for robust skill segmentation.
- Enabled robots to learn complex skills from long demonstrations, improving automation capabilities in manufacturing.
- Released a dataset of robot teleoperation data to facilitate further research in robot learning from demonstrations.

The early version of the approach utilised *Random Forests* [8], whereas the recent formulation employs a custom Deep-Learning model. The data collected has been made available here.

RoboPuppeteer: Dexterous robot teleoperation system

Queen Mary University of London - Developed a low-cost (£200) teleoperation system for an UR5 robot with Allegro hand, enabling real-time control with vision-based hand tracking and haptic feedback using a custom vibrotactile glove. Work published in [9].

- Implemented a safe inverse kinematics system in ROS for accurate robot pose control.
- Integrated a custom haptic glove for tactile feedback, enhancing user control during manipulation using Arduino.
- Validated finger mapping logic, rigorous testing in Mujoco simulations and live robot demonstrations.

Source code & videos available here.

Other Projects

Details of other projects can be found on my [personal page](#)

Publications & Invited Talks

Invited Talks

- "How to Train your Robot: Teaching Robot Behaviour Using Teleoperation". Where Is My Robot Butler? - Future House *London, UK* 2024
- "Human Activity Recognition and Monitoring" Symposium of the British Machine Vision Association 2017 (BMVA), *London, UK*.
- Learning Human Actions: from Perception to Robot Learning, University of Leeds, UK
- Learning Human Actions: from Perception to Robot Learning, University of Lincoln, UK

Journals

- [1] Giudici, G, Coppola, C, Althoefer, K, Farkhatdinov, I, Jamone, L. (2025) Haptic Stiffness Perception Using Hand Exoskeletons in Tactile Robotic Telemanipulation. **Accepted to IEEE Robotics and Automation Letters**
- [2] Xompero, A., Donaher, S., Iashin, V., Palermo, F., Solak, G., Coppola, C., ... & Cavallaro, A. (2022). The CORSMAL benchmark for the prediction of the properties of containers. *IEEE Access*.
- [3] Siddiqui, M. S., Coppola, C., Solak, G., & Jamone, L. (2021). Grasp Stability Prediction for a Dexterous Robotic Hand Combining Depth Vision and Haptic Bayesian Exploration. *Frontiers in Robotics and AI*, 237.
- [4] Coppola, C., Cosar, S., Faria, D., & Bellotto, N. (2019). Social Activity Recognition on Continuous RGB-D Video Sequences. *International Journal of Social Robotics*, 1–15.

Conferences & Workshops

- [5] Giudici G., Bonzini Aramis A., Coppola C., Althoefer K., Farkhatdinov I. & Jamone L. (2024). "Leveraging Tactile Sensing to Render both Haptic Feedback and Virtual Reality 3D Object Reconstruction in Robotic Telemanipulation", **Submitted to IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2024**
- [6] Mao X., Giudici G., Coppola C., ..., Zhibin Li & Lorenzo Jamone(2024). Segmenting long-horizon teleoperated robot manipulation demonstrations using multi-modal single-skill data for flexible robot learning. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2024*
- [7] Dawood A. B., Coppola C. & Althoefer K. Learning Decoupled Multi-touch Force Estimation, Localization and Stretch for Soft Capacitive E-skin. *IEEE International Conference of Robotics and Automation (ICRA) 2023*
- [8] Coppola C., & Jamone L.(2022). Master of Puppets: Multi-modal Robot Activity Segmentation from Teleoperated Demonstrations. In *2022 IEEE Conference on Development and Learning (ICDL)*.
- [9] Coppola C., Solak G. & Jamone L.(2022). A portable and affordable system for the teleoperation of dexterous robotic hands using Leap Motion hand tracking and vibrotactile feedback. In *2022 31st IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*.
- [10] Zenha R., Denoun B., Coppola C. & Jamone L. (2021). Tactile Slip Detection in the Wild Leveraging Distributed Sensing of both Normal and Shear Forces. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2021*
- [11] Xompero, A., Donaher, S., Iashin, V., Palermo, F., Solak, G., Coppola, C., ... & Cavallaro, A. (2021). Multi-modal estimation of the properties of containers and their content: survey and evaluation. *arXiv preprint arXiv:2107.12719*.
- [12] Siddiqui, M. S., Coppola, C., Solak, G., & Jamone, L. (2021, September). Discovering Stable Robot Grasps for Unknown Objects in Presence of Uncertainty Using Bayesian Models. In *Annual Conference Towards Autonomous Robotic Systems* (pp. 46-55). Springer
- [13] Iashin V. and Palermo F. and Solak G. and Coppola C. (2020). Filling Mass Estimation Using Multi-modal Observations of Human-robot Handovers. *CoRR*, abs/2012.01311.
- [14] Coppola, C., Cosar, S., Faria, D., & Bellotto, N. (2017). Automatic detection of human interactions from RGB-D data for social activity classification. In *2017 26th IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)* (pp. 871-876).
- [15] Fernandez-Carmona, M., Cosar, S., Coppola, C., & Bellotto, N. (2017). Entropy-based abnormal activity detection fusing RGB-D and domestic sensors. In *2017 IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI)* (pp. 42-48).
- [16] Coppola, C., Faria, D., Nunes, U., & Bellotto, N. (2016). Social activity recognition based on probabilistic merging of skeleton features with proximity priors from RGB-D data. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2021*.
- [17] Cosar, S., Coppola, C. & Bellotto, N. (2017). Volume-based Human Re-identification with RGB-D Cameras. In *VISIGRAPP (4: VISAPP)* .
- [18] Coppola, C., Krajnik, T., Duckett, T., & Bellotto, N. (2016). Learning temporal context for activity recognition. In *European Conference on Artificial Intelligence (ECAI2016)*.
- [19] Coppola, C., Mozos, O., Bellotto, N.(2015). Applying a 3d qualitative trajectory calculus to human action recognition using depth cameras. In *IEEE/RSJ IROS Workshop on Assistance and Service Robotics in a Human Environment*.

Peer-Review Work

Actively contributed to the academic community through peer review for the following conferences and Journals on Robotic perception, Robot Learning and Machine Learning:

Conferences: IROS; ICRA; ICAR; ICDL; IJCNN; ROMAN;

Journals: Nature Machine Intelligence; Transaction of Robotics; Cognitive Systems Research; IEEE Transactions on Haptics; IEEE RA-L; MDPI Applied Sciences;