Giovanni **Claudio**

Senior Principal Software Engineer

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Twelve years of experience in perception, computer vision, deep learning and sensor-based robot control

Experience

Senior Principal Software Engineer - AI-Video Technical Lead

London, UK

Medtronic - Digital Surgery — *Jun 2023 - Now*

- Designing and implementing a high-performance video pipeline to provide surgical guidance during robotic-assisted procedures.
- Optimizing and deploying object detection and image segmentation networks on edge devices with Nvidia GPUs.

Senior Robotics Software Engineer

London, UK

ARRIVAL - Mobile Robotics — *Sept 2019 - Jun 2023*

- Developed software for autonomous navigation and simulation of AMRs deployed in the ARRIVAL Microfactory.
- Designed and implemented a vision-based positioning method achieving millimetres and sub-degree accuracy.
- Responsible for the vision system of the Autonomous Mobile Robot WeMo (hardware and software).
- Designed and deployed an automated intrinsic and extrinsic parameters calibration process for the WeMo fleet.
- Implemented automated tools for camera sub-assembly, calibration and end-of-line robot validation.

Autonomous Driving Engineer

Turin, Italy

Italdesign Giugiaro (Volkswagen Group) — *Sept 2017 - Sept 2019*

- Machine Learning and Computer Vision technical lead of InTo: service that improves travel on the metro.
- Responsible for the perception and software architecture of the Pop.Up project: an electric, modular and autonomous flying car.
- Developed perception system for obstacle and free navigable space detection on Wheem-i and Roborace.
- Research, implementation and deployment of perception, mapping/localization and control algorithms.
- Training and deployment of deep neural networks for object detection and semantic image segmentation.

R&D Robotics Engineer

Rennes, France

INRIA, Lagadic Team, Lead by François Chaumette — *Nov 2013 - Aug 2017*

- Implemented sensor-based algorithms for navigation and manipulation on drones, mobile, serial and humanoid robots.
- Built a framework for a rapid prototyping of perception and control algorithms using ROS, MATLAB/Simulink, and V-REP.
- Developed detection, real-time tracking and pose estimation algorithms using 2D and RGB-D cameras.
- Implemented visual servoing control to improve accuracy in grasping and dual arm manipulation.
- Supervised student internships and published scientific articles at ICRA'17 and Humanoids'16.

Robotics Engineer Internship

Nantes, France

IRCCyN — *Feb - Sept 2013*

- Developed a C++ algorithm for pose and velocity estimation of a high-speed parallel robot using vision.
- Designed a visual system with high-performance CoaXPress cameras (reached an acquisition frame rate of 2 kHz).

Education

Master ARIA (Control Engineering, Robotics and Applied Informatics): Advanced Robotics

Italy and France

Double Degree: École centrale de Nantes (ECN) and University of Genoa (UNIGE) — *2011-2013*

Bachelor's Degree in Computer Science Engineering

Italy

University of Genoa (UNIGE) — *2008-2011*

Self-Driving Car Engineer Nanodegree (SDCN)

Udacity

Modules 1 and 2 - In collaboration with Mercedes-Benz, NVIDIA, BMW and Uber — *Feb-Nov 2017*

Skills

Programming	C++, Python
Libraries	OpenCV, PCL
Tools and Software	GIT, CMake, Doxygen, Docker, Kubernetes, AWS S3, ROS, Simulink, TensorRT
OS	GNU/Linux, Microsoft Windows
Robots	Humanoid robots, Manipulators, Self-Driving vehicles, Mobile robots, Drones
Sensors	Camera, Depth Camera, Lidar, Radar, Ultrasonic, IMU, GNSS
Languages	English *(Fluent)*, Italian *(Native)*, French *(Intermediate)*, Spanish *(Basic)*

Projects and Software

InTo — *Italdesign*

AI-Powered Coach Crowding Prediction Service — *Python*

- The system analyzes data coming from on-board and station cameras and it relies on:
  - Convolutional Neural Networks for crowd estimation and people counting.
  - Machine learning algorithm to predict the people exiting from the train.
- Deployed successfully at the Re Umberto station in Turin from May 2019 (video).

Autonomous electric car project — *Italdesign*

Prototype vehicle equipped with Cameras, Lidars, Radars, GNSS, IMU and ultrasonic sensors — *C++, ROS*

- Designed the sensor set and software architecture of the vehicle. Developed and integrated the following functionalities:
  - Perception: 2D and 3D obstacle detection, semantic image segmentation, pedestrian, traffic sign and car detection.
  - Mapping and localization with camera, Lidar, IMU, odometry and GNSS.
  - Planning: trajectory following and decision-making.

Pop.up Next — *Italdesign*

Modular flying taxi in collaboration with Airbus and Audi — *C++*

- Amsterdam Drone Week 2018: 1:4 scale model flying demonstration. Developed the following:
  - Vision-based drone detection and pose estimation from car module.
  - Autonomous navigation for centering and latching with the drone module.

Wheem-i — *Italdesign*

A sharing service to make traveling easier for wheelchair users — *C++*

- Finalist of the $4 million Mobility Unlimited Challenge from the Toyota Mobility Foundation.
- "Wheel-on" semi-autonomous electric devices located in urban hubs. Developing the following:
  - Perception system for obstacle and free navigable space detection.
  - Human-machine shared control with driver assistance system for obstacle avoidance.

Romeo project (with Softbank Robotics) and Comanoid project (with Airbus) — *INRIA*

Perception, navigation, sensor-based control and human-robot interaction — *C++, Python, ROS*

- Delivered the following demonstrations: object localization and grasping, dual arm manipulation, door handle detection and opening, camera-based and audio-based navigation, people following and obstacle avoidance.
- Demonstrations based on object detection, model-based tracking, template tracking, 3D point cloud segmentation, augmented reality, text detection on natural images, face detection and recognition, sound localization and speech recognition.
- Visual servoing in an optimization framework for the whole-body control of humanoid robots.

Other interests

Pop/rock singer and music event organizer

Groups: Organised and led bands and musical events in France, Italy and UK

Member of Mika's choir: Concert at Roundhouse in Chalk Farm, 13 Dec 2012 — *London, UK*

AIMS Summer School: Courses attended: Cabaret class, Vocal Technique, Musical class — *Eastbourne, UK*

1st Place: Singing competition "Solo per una voce". Jury headed by TOSCA. Prize: AIMS Summer School (2012) — *Genoa*