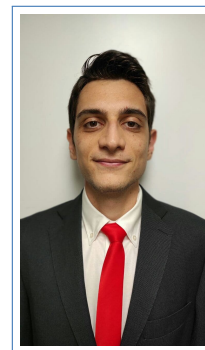


Davide Aloisi

Curriculum Vitae



Rome

Last Update: 07/2023

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📄 [Linkedin Account](#)

Education

- Nov 2023 – **Sapienza University of Rome**, *Doctor of Philosophy*, PhD Program in Automatic Control, Bioengineering and Operations Research.
- Oct 2018 – **Sapienza University of Rome**, *Master of Science (instructed in English)*, Artificial Intelligence and Robotics.
May 2021
- Sep2014 – **Sapienza University of Rome**, *Bachelor's of Science (instructed in Italian)*, Computer and
Oct 2018 *System Engineering*.
- Sep 2009 – **ITIS Galileo Galilei Rome**, *High school*, Technical and Professional Institute Diploma in
Jun 2014 *Electronics and Telecommunications*.

Master's Thesis

Title *Consensus and formation control of unicycle-like robots with discontinuous communication protocols*

Supervisors Professor Andrea Cristofaro

Description This work analyses the formation control problem of a Multi Agent System (MAS) composed by unicycle-like robots with synchronous/asynchronous intermittent communications. Two communication architectures have been considered. The first one is a formation control protocol for a directed network of agents with general dynamics and synchronous intermittent information feedback, in which the consensus can be reached if the communication duration time across each interval is larger than a threshold value. It is obtained from a consensus protocol for intermittent communications. The second one instead is a formation control problem regarding the time-varying formation for a linear MAS under sampling with multiple leaders. ([video link](#))

Bachelor's Thesis

Title *Design and development of a painter robot for the company BPS s.r.l*

Supervisors Professor Paolo Di Giamberardino

Description My role was to create the hardware and software parts of hArt, a robot capable of translating music and the environment into abstract drawings for the company BPS s.r.l. It was created to make seemingly distant and irreconcilable forms of communication interact, drawing inspiration from two American artists who lived in the 1900s: John Cage, musician, and Jackson Pollock, painter. The project stems from the research and experiments carried out by the two artists and intends to express a synthesis of these through a robot capable of processing and transforming the data of a given environment and a given musical performance into a form of abstract art. ([video link](#))

Publications

- Jul 2022 **European Control Conference (ECC)**, *D. Aloisi and A. Cristofaro*.
"Consensus and formation control of unicycle-like robots with discontinuous communication protocols,"
2022 European Control Conference (ECC), 2022, pp. 1055-1060, doi: 10.23919/ECC55457.2022.9838045
([link](#)).

Work Experiences

- Oct 2021 – **Data Scientist**, LEONARDO CYBER SECURITY, Rome, Italy.
Current Main Projects:
- **AWARE**, in collaboration with the Comau company I worked on the integration of a software capable of using AI (Audio and Image processing) algorithms for the identification of defects on helicopter blades through data collected by a robotic arm during the inspection phases;
 - **EU-GUARDIAN**, the project "European framework and proofs-of-concept for the intelligent automation of cyber Defence Incident management" (EU-GUARDIAN) aims at creating a cutting-edge, accurate and reliable Artificial Intelligence (AI) based solution that operates and automates larger parts of incident management and cyber defence processes;
 - **Nightingale**, extrapolate vital parameters through AI algorithms from a human body;
 - **Surveillance Robots**, software development in C++ and Python using ROS, ROS 2 and Nvidia Isaac Sim for the control of quadrupedal robot (equipped with Nvidia boards) and their acquired data and video streams;
 - **GCAP**, the Global Combat Air Programme (GCAP) is a multinational initiative led by the United Kingdom, Japan, and Italy to develop a sixth-generation stealth fighter. The programme aims to replace the Eurofighter Typhoon in service with the Royal Air Force and the Italian Air Force, and the Mitsubishi F-2 in service with the Japan Air Self-Defense Force;
 - **Image Captioning**, development of an AI algorithm in Pytorch to get a text description from a picture;
 - **Intent Analysis**, development of an AI algorithm in Pytorch to get an intent from a phrase;
 - **Business Intelligence**, dashboard development frontend and backend side using Tableau and Qlik.
- July 2021 – **ICT Consultant**, CONNECT REPLY, Rome, Italy.
Sep 2021 IoT solutions for the company's customers.
- Feb 2021 – **Software Engineer**, APX AEROSPACE, Rome, Italy.
May 2021 Development of a software for the "propellant burning rate analysis" capable of obtaining the velocity vs pressure curve of a rocket propellant, following bench pressure tests.
- Jan 2015 – **Technician/ Teacher/ Donation Chief**, FONDAZIONE MONDO DIGITALE, Rome, Italy.
May 2021 Over the years I have carried out the following tasks within the foundation:
- Robotics teacher for classes of children aged between 6/18 years old;
 - Technician responsible for the maintenance of the devices of didactic laboratories and offices;
 - Responsible for the repair and donation of electronic devices for families in financial difficulty (COVID period).
- Jun 2018 – **R & D Engineer**, BPS S.R.L, Rome, Italy.
Sep 2018 It is my Bachelor Thesis project.
- Sep 2011 – **Software Engineer**, ROBOTIC TEAM OF ITIS GALILEO GALILEI, Rome, Italy.
Jun 2014 Member of the robotics team of the ITIS Galileo Galilei Institute of Rome. I was responsible for the software development of our robots, which participated in robotics competitions in the "Lightweight soccer robot" category (Certifications section).

Projects

- 2021 **Doggy, an Arduino DIY quadruped Robot**, ROBOTICS, (Alone), Arduino, 3D printing.
It is a quadruped robot realized with cheap components, the project goal is to provide a very simple robot with a very low price, in such a way everyone will be able to make its own Doggy. The robot mathematic model is based on the 2R Robotic Arm in 3D space: the main idea is to consider the quadruped legs as 4 human arms (independently controlled) and thanks to the end-effector linear trajectories we can realize complex movements ([project link](#)).

- Apr 2020 – **Covid Detector**, MACHINE LEARNING ALGORITHM, (Alone), Python.
- May 2020 For the Virtual reality contest I created a software capable of supporting healthcare personnel during the Covid emergency. The software takes as input the patient's symptoms which are entered by the doctor and a dataset containing a history of old patients whose symptoms and positivity to the virus are known. And the outputs will be: the patient's positive percentage and a text file that will contain the patient's report. ([video link](#))
- 2020 **GAIL algorithm in 2D environment**, ARTIFICIAL INTELLIGENCE, (Alone), Python.
Application and study of the GAIL algorithm through OpenAI Gym Library for the Artificial Intelligence exam (part of Reinforcement Learning) of my master's degree course with a grade of 30/30.
- 2020 **SLAM algorithm for unicycle robot in 2D environment**, ROBOTICS, (Alone), Octave.
Application of the SLAM algorithm in Octave on a unicycle in a 2D environment with only distance measurement. For the Probabilistic Robotics exam of my master's degree course with a grade of 29/30.
- 2020 **Text editor for PDDL language** , ARTIFICIAL INTELLIGENCE, (Team), Python, PDDL.
Development of a text editor for PDDL language capable of compiling, correcting, providing suggestions, commenting and simulating the code. For the Planning & Reasoning exam of my master's degree course with a grade of 30/30.
- 2020 **End to end sound source separation conditioned on instrument labels** , ARTIFICIAL INTELLIGENCE, (Team), Tensorflow,Python.
Realization of a neural network able to extract voice, guitar, bass, drums from an audio file. Deepening the structures of Waveunet, Expanded Waveunet and Demucs. For the Neural exam Networks of my master's degree course with a grade of 30/30.
- 2020 **Fault-tolerant control allocation for multi-rotor UAV**, ROBOTICS, (Team), MATLAB.
Realization of a mathematical model for UAV with n rotors and of a controller able to guarantee the UAV's trajectory tracking task even in case of failure of one or more rotors for the Elective in Robotics exam (module 1) of my Master's degree course with a grade of 30/30.
- 2020 **Fault-tolerant control for UAV multi-agent system** , ROBOTICS, (Team), MATLAB.
Realization of a controller capable of managing the formation control task for a MAS (multi agent system) composed of drones in the event of one or more failures for the Elective in Robotics exam (module 4) of my master's degree course with vote 30/30.
- 2020 **Augmented Reality for daVinci Research Kit Simulator** , MEDICAL ROBOTICS, (Team), V-Rep,C++.
Realization of a simulator of the daVinci robot used in the medical field for the Medical Robotics exam of my master's degree course with a grade of 30/30.
- 2020 **RunnerBot Videogame**, INTERACTIVE GRAPHICS, (Alone), Javascript.
Creation of a video game for the Interactive Graphics course in my course of studies in Artificial Intelligence and robotics with a grade of 30/30 ([game link](#)).
- 2020 **CycleGan application for image processing**, ARTIFICIAL INTELLIGENCE, (Alone), Python, Tensorflow.
Creation of a CycleGAN for the modification of the images depicting the facades of the buildings. For the Vision and Perception exam of my master's course with project grade of 30/30.
- 2019 **Semantic Mapping: teaching the robot the objects of the environment**, ARTIFICIAL INTELLIGENCE, (Alone), Python,Google Speech Recognition.
The purpose of this project was to create a program capable of giving orders to an agent by taking as input only the voice of a human being for the Artificial Intelligence exam (part of Human Robot Interaction) of my master's degree course with a grade. 30/30.
- 2019 **Bayesian filter for malware detection** , ARTIFICIAL INTELLIGENCE, (Alone), Python.
I created a Bayesian filter for the task of detecting some types of malware for Android devices for the Machine Learning exam of my master's degree course with a grade of 30/30.
- 2018 **Neural network for boat picture detection**, ARTIFICIAL INTELLIGENCE, (Alone), Python, Keras.
I created a neural network capable of recognizing types of boats in photos for the Machine Learning exam of my master's degree course with a grade of 30/30.

- 2017 **L.E.O (Learning Environment Onwards)**, ROBOTICS, (Team), Arduino.
L.E.O. was born from my cooperation with Alessio Di Brigida, in following our different experiences as robotics teachers with kids of all age groups. The idea was to make a innovative way of teaching classrooms, developing one useful tool to explain any subject and at the same time such to involve the kids ([project link](#)).
- 2016 **Find Frank**, ANDROID GAME, (Alone), Unity 3D, C#.
Realization of an indie game for Android devices with the Unity 3D Game Engine ([video link](#)).
- 2015 **Quitrax**, ANDROID GAME, (Alone), Unity 3D, C#.
Realization of a horror game for Android devices with the Unity 3D Game Engine ([video link](#)).
- 2014 **Ardufonino**, OPEN SOURCE TELEPHONE, (Alone), Arduino, C.
ArduFonino is an opensource mobile phone created with arduino, capable of making and receiving calls and sending and receiving messages using the GSM network ([video link](#)).

Skills & Abilities

AI	Pytorch, Keras, Tensorflow.
Programming Languages	C, C++, C#, Python, Java, Javascript, Html, Scala, LaTeX, PDDL, Prolog, Lego Mindstorm, Git, Markdown, FHIR.
Software and Simulators	LabVIEW, MATLAB, Simulink, Eagle, 123Design, V-Rep (ex Coppelia Robotics), ROS, ROS2, Nvidia Isaac Sim, Octave, Arduino, Lego Mindstorm, Unity 3D (Game Engine), Postman, FHIR, Qlik, Tableau, Docker, VirtualBox.
OS	Ubuntu, Windows, MacOS
Boards	Arduino, Raspberry, ESP32, Nvidia Isaac Sim, Lego Mindstorm
Lab. Tools	Wave Generator, Oscilloscope, Multimeter, Amperometer, Tester.
Other	Good knowledge in AC/DC circuits, Good knowledge of sensors (Ultrasonic, IR, Encoders, Accelerometers, GPS, Capacitive, Microphone ...), 3D printing, CAD Design.

Certifications and Competitions

- 2023 **Tensorflow Developer Certificate**, TENSORFLOW, ([link](#)).
- 2022 **Qlik Sense Business Analyst Certification February 2021 release**, QLIK SENSE CERTIFIED, ([link](#)).
- 2022 **Custom Models, Layers, and Loss Functions with TensorFlow**, COURSERA, Deeplearning.AI, ([link](#)).
- 2022 **DeepLearning.AI TensorFlow Developer Specialization (Professional Certificate)**, COURSERA, Deeplearning.AI, ([link](#)).
- 2022 **Sequences, Time Series and Prediction**, COURSERA, Deeplearning.AI, ([link](#)).
- 2022 **Natural Language Processing in TensorFlow**, COURSERA, Deeplearning.AI, ([link](#)).
- 2022 **Convolutional Neural Networks in TensorFlow**, COURSERA, Deeplearning.AI, ([link](#)).
- 2022 **Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning**, COURSERA, Deeplearning.AI, ([link](#)).
- 2022 **Reinforcement Learning (Specialization)**, COURSERA, University of Alberta, ([link](#)).
- 2022 **A Complete Reinforcement Learning System (Capstone)**, COURSERA, University of Alberta, ([link](#)).
- 2022 **Prediction and Control with Function Approximation**, COURSERA, University of Alberta, ([link](#)).
- 2021 **Davra Certified AEP Developer**, DAVRA.
- 2021 **Sample-based Learning Methods**, COURSERA, University of Alberta, ([link](#)).
- 2021 **Start Your API Testing Journey With Postman Tool**, COURSERA, ([link](#)).

- 2021 **Fundamentals of Reinforcement Learning**, COURSERA, University of Alberta, ([link](#)).
- 2021 **Tableau Public for Project Management and Beyond**, COURSERA, ([link](#)).
- 2017 **The Big Smart Hack Rome**, OLIVETTI, 1° place, (Team).
I won this Hackathon by creating a machine learning algorithm capable of calculating the probability of successful cultivation of a given plantation based on environmental data collected by an Olivetti device ([link](#)).
- 2016 **Space App Rome**, NASA, 4° place, (Team).
Realization of a robot prototype for exploration of dangerous places for humans with the possibility of extracting materials from the ground by storing them inside ([link](#)).
- 2015 **Global Junior Challenge**, FONDAZIONE MONDO DIGITALE, 1° place, (Alone).
Winner of the competition with my project "Ardufonino", a telephone made with the Arduino microcontroller able to make / receive calls and send / receive sms messages ([link](#)).
- 2014 **Austrian Open**, ROBOCUP, 1° place, (Team).
Winner with my school team in the Robocup Junior light weight soccer category.
- 2014 **RoboCup Junior João Pessoa (worldcup winner)**, ROBOCUP, 1° place, (Team).
Winner with my school team in the Robocup Junior light weight soccer category ([link](#)).
- 2014 **Romecup Junior**, ROBOCUP, 1° place, (Team).
Winner with my school team in the Robocup Junior light weight soccer category.
- 2014 **Space App Rome**, NASA, 2° place, (Team).
Realization of a modular robot prototype for space for a Hackathon organized by NASA ([link](#)).
- 2013 **RoboCup Junior Eindhoven (worldcup)**, ROBOCUP, 5° place, (Team).
With my school team in the Robocup Junior light weight soccer category ([link](#)).
- 2014 **Space App Rome**, NASA, 3° place, (Team).
Realization of a rover robot prototype rocky environments for a Hackathon organized by NASA([link](#)).
- 2013 **Austrian Open**, ROBOCUP, 1° place, (Team).
Winner with my school team in the Robocup Junior light weight soccer category ([link](#)).
- 2013 **Romecup Junior**, ROBOCUP, 1° place, (Team).
Winner with my school team in the Robocup Junior light weight soccer category.
- 2012 **National register of excellence**, INDIRE, (Alone).
I won two Romecups (competitions at national level), respectively in the years 2012 and 2013, I was included in the National Register of Excellence of the MIUR.

Languages

Italian **Native Speaker**
English **B2 level**

Sphere of Interest

- Legged/Human/Industrial/Wheeled/Medical Robots, Computer Technology, Control Theory, Electronic, Artificial Intelligence, Machine Learning, Deep Learning, Drones, Autonomous Vehicle, Mapping, Localization, Multi Agent Systems, Cyber Security.