Michele Cipriano
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Education

2020–*Current* **Sapienza University of Rome**, *Rome*, Italy.
- PhD in Automatic Control, Bioengineering and Operations Research (ABRO)
- Supervisor: Giuseppe Oriolo

2016–2020 **Sapienza University of Rome**, *Rome*, Italy.
- MSE in Artificial Intelligence and Robotics, *110/110 cum laude*
- Thesis: "Planning and Executing Humanoid Gaits in a World of Stairs"
- Supervisor: Giuseppe Oriolo

2015–2016 **University of Leeds**, *Leeds*, United Kingdom.
- Erasmus+ student in Computer Science

2013–2016 **University of Parma**, *Parma*, Italy.
- BSc in Computer Science, *109/110*
- Thesis: "Study and Experimentation of Hand Detection Technique with Deep Learning Algorithms"
- Supervisor: Federico Bergenti

Publications

Journals

2022 **M. Cipriano, P. Ferrari, N. Scianca, L. Lanari, G. Oriolo**, Humanoid Motion Generation in a World of Stairs, Submitted to *Robotics and Autonomous Systems*.

Projects

2020–*Current* **Humanoid Navigation Framework**, *PhD Research Project*.
A C++ framework for humanoid navigation built upon ROS. It provides a set of sensor-based anytime footstep planners, MPC for trajectory optimization and support to localization and mapping modules for navigation in both known and unknown dynamic environments. This project extends the master thesis and its development is currently ongoing.

Apr 2022 **Autonomous Humanoid Navigation in Large-Scale Environments**, *Autonomous and Mobile Robotics*, Final Project Supervisor.
Development of a global-planner for humanoid navigation in large-scale unknown environments and integration with a RRT*-based footstep planning module.

Mar 2022 **Planning Parking Maneuvers for a Car-Trailer Vehicle**, *Autonomous and Mobile Robotics*, Final Project Supervisor.
OMPL implementation of a car-trailer vehicle for motion planning in presence of obstacles and jackknifing phenomenon handling in case of backward maneuvers.

Apr 2021 **Improving Footstep Planning Algorithms by Efficient Nearest Neighbor Searching**, *Autonomous and Mobile Robotics*, Final Project Supervisor.
Development of a dynamic transformation of a k-d tree on non-Eucliden topologies to speed up the RRT*-based footstep planning module of a humanoid navigation framework.

Jan 2020 **Planning and Executing Humanoid Gaits in a World of Stairs**, *Master's Degree Thesis*.

Development of a pipeline for humanoid robot locomotion in unknown environments using terrain mapping, footstep planning and variable height MPC. The project has been developed in C++ and Python using ROS and the B-Human framework. Experiments have been performed on a NAO humanoid robot. It has been presented as final project for the *Master Degree in Artificial Intelligence and Robotics* at Sapienza University of Rome, Italy.

Mar 2019 **Planar Monocular SLAM**, *Probabilistic Robotics Project*.

A graph-based SLAM C++ implementation of a total least squares algorithm on a planar robot equipped with a monocular camera. The project has been presented as final project for the *Probabilistic Robotics* module at Sapienza University of Rome, Italy.

Feb 2019 **HRP4 Torso Pose Estimation**, *Robotics Project*.

Implementation of an EKF-SLAM module for the HRP4 humanoid robot to estimate the pose of the torso using joint encoders, the IMU and an RGBD camera. The project has been developed in C++ using V-REP for simulating the environment. It has been presented as final project for the *Autonomous and Mobile Robotics* and *Robotics 2* modules at Sapienza University of Rome, Italy.

Jan 2019 **Atari LTLf/LDLf**, *Deep Reinforcement Learning with Temporal Logics*.

Implementation of the Q-Learning algorithm with LTLf/LDLf goals applied on the Atari Breakout Gym environment. It has been presented as final project for the *Reasoning Robots* module at Sapienza University of Rome, Italy.

Sep 2018 **Binarized Neural Networks**, *Neural Networks Project*.

Implementation of a binarized neural network architecture in TensorFlow with the aim of improving memory usage by replacing arithmetic operations with bitwise operations. The project has been presented as final project for the *Neural Networks* module at Sapienza University of Rome, Italy.

Jul 2018 **Video Classification**, *Deep Learning for Computer Vision Project*.

Video classifier implemented in TensorFlow using Mask R-CNN and LSTM. The networks have been trained on a subset of the ActivityNet dataset. The project has been presented as final project for the *Vision and Perception* module at Sapienza University of Rome, Italy.

Jun 2018 **Pepper HRI**, *Human-Robot Interaction Project*.

A Human-Robot Interaction module for the robot Pepper using NAOqi APIs and MODIM framework. The project has been developed in Python and it has been presented as final project for the *Human-Robot Interaction* module at Sapienza University of Rome, Italy.

Mar 2018 **Pong DQN**, *Deep Reinforcement Learning Project*.

Implementation of the Deep Q-Learning algorithm with experience replay in TensorFlow and OpenAI Gym. The algorithm has been applied on the environment Pong. It has been presented as final project for the *Reinforcement Learning* module at Sapienza University of Rome, Italy.

Feb 2018 **Coordination of Soccer Players**, *Multi-Agent Systems Project*.

Implementation of a role assignment algorithm in the context of the RoboCup Standard Platform League. The project has been developed in C++ and validated in a simulated 5 vs. 5 match using the B-Human framework. It has been presented as final project for the *Multi-Agent Systems* module at Sapienza University of Rome, Italy.

Oct 2017 **The Knowledge Bot**, *Chatbot*.

A chatbot application developed in Python, Keras and PyTorch which makes use of Telegram APIs (Telepot), BabelNet and BabelFy services and word embeddings generated by Word2Vec. It has been presented as final project for the *Natural Language Processing* module at Sapienza University of Rome, Italy.

Jul 2017 **Procedural Solar System**, *WebGL Application*.
A WebGL application inspired by the videogame "No Man's Sky", developed in Javascript, THREE.js and GLSL as project for the *Interactive Graphics* module at Sapienza University of Rome, Italy. The project consists in generating a solar system which planets' meshes are generated pseudorandomly with procedural algorithms.

May 2016 **Risotto**, *Restaurant Management System*.
A project developed in Java for the *Software Engineering* module at University of Leeds, United Kingdom. It has been awarded as best project by Elder Studios, a company based in Huddersfield, United Kingdom.

Programming Knowledge

Languages C++, Python, MATLAB, LaTeX.

Libraries ROS, Eigen, GridMap, KDL. Experience with TensorFlow, Keras, PyTorch and bash.

Tools git, Make, CMake, catkin, Gazebo, CoppeliaSim.

Awards

2018 **Robothon Intesa Sanpaolo Make it Real**, *First Place*.
Winner of the hackathon organized by Intesa Sanpaolo Innovation Center. The project consisted in programming the robot Pepper to make it interact with customers of Euronics stores.

2016 **Best Software Engineering Project**, *First Place*.
Winner of the best software engineering project for the module *Software Engineering* at University of Leeds. The project (*Risotto: A Restaurant Management System*) has been selected by Elder Studios.

2011-2012 **Italian Olympiads in Informatics**, *Bronze Medal*.
Bronze medal at Italian Olympiads in Informatics (2011). Two stages of preparation for International Olympiads in Informatics (December 2011 and February 2012). Finalist at Italian Olympiads in Informatics (2012).

Summer School

Jul 2022 **Summer School SIDRA 2022**, *Bertinoro*, Italy.
- *Nonlinear and Adaptive Control Techniques for Advanced Aerospace Systems*
- *Network Systems in Science and Technology*

Jul 2021 **Summer School SIDRA 2021**, *Bertinoro*, Italy.
- *Game Theory and Network Systems*
- *Modeling and Control of Soft Robots*

Languages

Italian **Mother tongue**

English **Professional knowledge**

Personal Information

LinkedIn `https://www.linkedin.com/in/michelecipriano/`

GitHub `https://github.com/micco00x`

Website `https://micco00x.github.io/`