Curriculum vitae

PERSONAL INFORMATION

Roberto Cipollone

ACTIVITIES

2020/21 — Teaching Assistant for "Tecniche di programmazione"

Winner of Sapienza 6/2020 Teaching Assistant call for the course "Tecniche di programmazione", DIAG, for the academic year 2020/21.

Dec 2021 — Paper presentation at AIRO@AIxIA-2021

"*Exploiting Different Levels of Abstractions for Sample Efficient Reinforcement Learning*", Roberto Cipollone, Giuseppe De Giacomo, Marco Favorito, Luca Iocchi and Fabio Patrizi.

This paper has been accepted and presented at the AIRO workshop, held within the AIxIA 2021 conference.

A significantly extended and reviewed version of this work has been submitted at the ICAPS 2022 conference and it is currently under review.

2021 – now — Research activity

Both my personal interests and skills are mainly related to Reinforcement Learning (RL) and its integrations with some techniques from the areas of Formal Methods and Machine Learning. In particular, the current research activity focuses around:

- Learning in environments with large but structured state spaces, and the study of abstractions in RL.
- RL methods for environments that do not satisfy the Markov assumptions on rewards or observations.

2021 — Attendance to courses, seminars

- 32nd European Summer School in Logic, Language and Information (ESSLLI).
- Theoretical Foundations of SAT/SMT Solving Workshop. Simons Institute events.
- Games and Equilibria in System Design and Analysis Workshop. Simons Institute events.
- PhD courses in Advanced topics in Reinforcement Learning, Formal Methods, and others.

EDUCATION

Nov 2020 – now
Ph.D. student in Engineering in Computer Science
2° year
Sapienza University of Rome

Research field:

- Methods for the application of Temporal Logics to RL, in order to act in environments that produce complex observations.
- Study and development of learning agents able to act in non-Markovian domains.

Member of the WhiteMech research group: whitemech.github.io

Advisor: Giuseppe De Giacomo

Jan 2016 – Oct 2020
Master of Science in Artificial Intelligence and Robotics
Sapienza University of Rome

Course taught in English

Grade 110 /110 with honors

Thesis:

- Title: Symbol Grounding in Deep Reinforcement Learning agents for non-Markovian rewards.
- Pdf link: `cipollone/master-thesis`.
- Supervisor: Giuseppe De Giacomo.

Course main topics:

- Machine Learning: neural networks, probabilistic models and recent architectures.
- Artificial Intelligence: classical logics, temporal logics, planning.
- Robotics: manipulators, mobile robotics, localization.

Oct 2012 – Dec 2015
Bachelor of Computer and System Engineering
Sapienza University of Rome

Grade 110 /110 with honors

Thesis:

- Title: Project of a digital PID controller for quadcopter pose stabilization from gyroscopic and accelerometric measures.
- Supervisor: Alessandro de Luca.

Course main topics:

- Fundamental engineering subjects.
- Linear systems and controls theory.
- Programming paradigms and complexity.

PROGRAMMING EXPERIENCE

Languages and tools

I am proficient in the following programming languages, which I used both for university-related and personal projects, and for implementations of techniques from recent research papers:

- Python
- C++
- Java
- C
- Simulink
- MATLAB
- JavaScript

Other skills

- Neural networks experience: deep knowledge of Tensorflow 1 and 2. I frequently trained models on remote Cloud Computing services with GPU support. I also know Keras and PyTorch.
- Proficient user of the Linux terminal (GNU tools, Vim, Tmux).
- Text processing: experienced user of LaTeX and TikZ.
- Remote processing and virtualization: ssh for remote computing and Docker.

Some projects

Multinav2 : Implementation for the paper "Exploiting Different Levels of Abstractions for Sample Efficient Reinforcement Learning", Roberto Cipollone et al. Incremental Reinforcement learning with reward shaping derived from prior knowledge. To be released after publication (Python, Tensorflow2).

AtariEyes : Learning to interpret (features extraction) and to play (Deep Reinforcement Learning) on the Atari games. Agent goals can be complex tasks with non-Markovian rewards. Master thesis repository. (Python, Tensorflow2).

SPMatch : Implementation of a 3D reconstruction algorithm from pairs of stereo images (C++).

Maxout-NN : Flexible implementation of Maxout neural networks; units with built-in activation (Python, Tensorflow).

Trace-DFA : Exact process identification from execution traces: it allows to learn a model of the unknown process that has generated the execution logs. (Java, SAT solvers).

CycleGAN : Implementation of CycleGAN network. It can be trained to generate semantically transformed pictures or photorealistic images. Example: aerial view to terrain map, and vice versa.

PERSONAL SKILLS

Mother tongue Italian

Other languages English.

Master degree courses, exams, thesis and final discussion completely held in English. Professional level in reading and writing technical documents. Above B2 level in all other areas.

Studied in London: BRITISH STUDY CENTRES Great Things Start Here Feb 2016 — ST GEORGE INTERNATIONAL THE LANGUAGE SPECIALISTS Established 1962 Sep 2013

Rome, 17/01/2022

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