Autonomous and Adaptive Systems

Introduction to the Course/Administrivia

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Topics of the Module

▸ Machines that learn through experience: Reinforcement Learning (including Deep Reinforcement Learning)

▸ Machines that create: Generative Deep Learning

▸ Autonomous Machines: Foundational Models and Generative Agents

▸ Algorithmic Game Theory and Multi-agent Learning

▸ Bio-inspired adaptive systems

▸ Ethical and philosophical implications of AI

▸ What's next: going beyond human-level intelligence, AI safety and alignment, self-awareness and controllability.

Administrivia: Organisation of the Module

▸ We will have a variety of activities, including practical sessions, discussion of research papers with students' presentations, etc.

▸ Strong focus on the state-of-the-art (and what's next): we will read papers from leading AI/ML conferences (but also classics from the ML field), try software, etc.

▸ I will suggest papers to read before lectures, which will discuss together.

▸ The participation to these activities contributes to the final mark as discussed above.

Administrivia: Assessment

▸ The assessment will be based on an oral exam (90%) and class participation (10%).

▸ 6 oral exam sessions that will be announced on the course webpage and on the institutional website.

▸ The credit for the class participation is only valid during the current academic year. It cannot be transferred to the following one.

Administrivia: Assessment

▸ 6 exams per year:

  ▸ June and July

  ▸ September and October

  ▸ end of December/January and February

▸ The exam will be structured as follows:

  ▸ Discussion of a compulsory mini-project with presentation (max 3 slides + slide for the title) with a working demo if possible.

  ▸ Questions about the topics covered during the module.

Administrivia: Assessment

▸ The title and type of mini-project does not need to be approved in advance.

▸ The project can be of two types (please note that this is different with respect to the previous academic years). Either:

  ▸ A project based on the *procgen* environment (more on this environment later in the course); or

  ▸ A project based on an environment designed by you.

▸ The project has to be about solving a problem in reinforcement learning (and/or generative learning) linked to the topics of the module.

Administrivia: Assessment

▸ An up to 6-page short report (paper-style) about the project has to be submitted in advance, in any case **before the exam registration deadline**.

▸ You need to submit the code together with the report.

▸ Please submit the report by email to the tutor of the course (giorgio.franceschelli@unibo.it).

  ▸ You should not submit zip files but a link to a repository (cloud service, GitHub, etc).

Administrivia: Project

▸ Indications about potential projects will be made during the course.

▸ Many material online: **reusing/repackaging code is not considered a valid project**.

▸ I will provide clear indications about what constitute an original contribution. This will become clear after covering the relevant topics in the module.

Administrivia: Plagiarism

▸ The report/code will be checked for plagiarism.

▸ You should not use any code that you find online.

  ▸ In case you use any code (even a couple of lines), this should be stated.

  ▸ The fact you re-used code will be taken into consideration in the final assessment of the project.

  ▸ The core part of the project in any case must be original, you cannot just submit a modified version of a project found in GitHub for example.

▸ I will follow the procedures of the University in case of plagiarism cases.

Administrivia: Format of the Report

▸ The report has to be written in English.

▸ The report must be submitted using the NeurIPS LaTex style that can be found at this address:

https://neurips.cc/Conferences/2023/PaperInformation/StyleFiles