CM50270 Reinforcement Learning

Project Description

Due Date: As shown in Moodle.
Submission via Moodle.
This coursework is allocated 100 marks. It will determine 40% of your mark for the unit.

What you need to do

Apply reinforcement learning to a problem of your choice. Your objective is to solve the problem to the best of your ability. You can choose any suitable problem that engages your interest, with one requirement: it should not be possible to solve the problem using a tabular representation of the value function. You can use any reinforcement learning method; you are not limited to the algorithms that we explicitly covered in the lectures.

You are strongly encouraged to work in groups of 5 students. You are free to form your groups on your own. All members of a group are expected to receive the same mark. However, if there are credible, documented reasons for doing so, I will differentiate the marking of group members. I sincerely hope that this will not be necessary. Multiple groups can work on the same problem. You are welcome to work in groups of fewer than 5 students, or work individually, should you wish to do so.

Please submit:
(1) project report,
(2) video presentation of the project,
(3) source code, and
(4) video of agent performance before and after learning.

The project report should describe the problem you address, present your approach (or approaches, if you experimented with more than one approach), and evaluate how well you have solved the problem. It should discuss alternative solution methods that are applicable, along with the relative merits of your approach. The report should describe your personal experience with the project, for example, the difficulties or any pleasant surprises you have encountered along the way. Finally, explain how you would take this work further if you were given more time. Do not explain material that has been discussed in the lectures. For example, there is no need to explain Q-learning or function approximation. For algorithms not discussed in the lectures, cite relevant scientific literature. The report should be written in LaTeX, using the template provided. It

should be no longer than 6 pages, excluding references and appendices. A single report should be submitted by each group.

Video presentation of the project should present the most important pieces of information in the report. It should be no longer than 7 minutes, recorded at your natural speaking tempo. All group members should take part in the video presentation.

All four components of the submission will be assessed jointly. You will lose 10 marks each for the following: missing video of agent performance before and after learning; missing video presentation of the project; one or more group members missing from the video presentation; report not written using the latex template provided.

Your work will be assessed using the following criteria:
— Clear, precise, and concise description of the reinforcement learning problem addressed, including the states, actions, and rewards.
— Difficulty of the problem addressed.
— Quality of the solution developed.
— Rigour in evaluation.
— Discussion of alternative approaches, their strengths, and their weaknesses.
— Clear, concise, and well-organised writing and presentation.
— Depth of understanding of reinforcement learning (your experience with the project and proposed future work will be particularly important in assessing this)

Feedback

Feedback will be provided via Moodle within 2 weeks after the submission deadline.

Late submissions

The university policy will be followed on late submissions. If a piece of work is submitted after the submission date, the maximum possible mark will be 40% of the full mark. If work is submitted more than five days after the submission date, student will receive zero marks.

If you need an extension, please contact your Director of Studies.

Plagiarism

Do not plagiarise. Plagiarism is a serious academic offence. For details on what it is and how to avoid it, please visit http://www.bath.ac.uk/library/help/infoguides/plagiarism.html