

Project #3



CORRELATED-Q EDITION

Problem

Description

As you encountered in the first project, replication of previously published results can be an interesting and challenging task. You learned that researchers often leave out important details that cause you to perform extra experimentation to produce the right results.

For this project, you will be reading “Correlated Q-Learning” by Amy Greenwald and Keith Hall. You are then asked to replicate the results found in Figure 3(parts a-d). You can use any programming language and libraries you choose.

Procedure

- Read the paper.
- Develop a system to replicate the experiment found in section "5. Soccer Game"
 - This will include the soccer game environment
 - This will include agents capable of Correlated-Q, Foe-Q, Friend-Q, and Q-learning
- Run the experiment found in section "5. Soccer Game"
 - Collect data necessary to reproduce all the graphs in Figure 3
- Create graphs demonstrating
 - The Q-value difference for all agents
 - Anything else you may think appropriate
- Write a paper describing your agents and the experiments you ran
 - 5 pages maximum -- really, you will lose points for longer papers.
 - PDF format please

- Describe the game
- Describe the experiments/algorithms replicated: implementation/outcome/etc
- Explain your experiments
- The paper should include your graphs
 - And, discussions regarding them
- Discuss your results
 - How well do they match?
 - Significant differences?
- Describe any problems/pitfalls you encountered
 - What steps did you take to overcome them
 - What assumptions you made
 - Justifications for such assumptions
- Do not include a link to your code
- Upload your code to a **private** Georgia Tech GitHub repository
 - <https://github.gatech.edu/>
 - - 20 points if you do not submit a link to your code
 - Make a README.md file for your repository
 - Include thorough and detailed instructions on how to run your source code
 - Add all the TA's to your repository
 - tbail3, jsu46, afeuerstein3, pkolhe3, mmorales34, cserrano7, tzhu71, aecoffet3, vfelso3
- Make a README.md file in your repository
 - Include thorough and detailed instructions on how to run your source code
- Create another README.txt with a link to your code.
 - This will be uploaded to Canvas.
- Celebrate your mastery of Reinforcement Learning!

Your grade will largely be based upon your report and analysis.

Resources

The concepts explored in this homework are covered by:

- Lectures
 - Game Theory (all of them)
- Readings
 - Greenwald-Hall (2003)



Submission Details

Due Date: **April 22, 2018** ([AOE/UTC-12](#))

Your deliverables are a report in PDF format and your source code.

The report should include a description of the experiment replicated, how the experiment was implemented, and the outcome of the experiment. You should describe how well the results match the results given in the paper as well as significant differences. Also describe any pitfalls you ran into while trying to replicate the experiment from the paper (e.g. unclear parameters, contradictory descriptions of the procedure to follow, results that differ wildly from the published results). What steps did you take to overcome those pitfalls? What assumptions did you make? Why are these assumptions justified?

Upload the PDF of your report and your readme.txt to Canvas:

<https://gatech.instructure.com/courses/10883/assignments/8124>

It is your responsibility to ensure that the files have been transferred properly. Please check the uploaded files on Canvas and make sure that BOTH files are present in your last submission. Missing files will lead to a severe penalty or no points for this project.

