

Q-learning Project Documentation - C++ ELEC-A7150

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1 Overview

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2 Software structure

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3 Instructions for building and using the program

Cmake creates the Makefiles, and make uses the Makefiles to build the project.

- Install required packages if they're not installed already 'sudo apt install cmake libcairo2-dev'
- Move to the build folder in the q-learning-9 folder. 'cd q-learning-9/build/'
- Create Makefile. 'cmake ..'

Build targets can be listed, built together, built separately and removed:

- List targets that can be built. 'make help'
- Compile everything. 'make' or 'make all'
- Compile main. 'make main'
- Compile tests. 'make qtests'
- Remove compiled targets. 'make clean'
- The executable compiled targets will be in the build folder as: 'main' 'qtests'

4 Testing

Source files for testing are in the 'test' folder. Unit tests are implemented for the classes that pertain to the learning algorithm. more content

5 Worklog

Nov 6th to 12th

Anssi: Configured the programming environment, i.e., linux virtual machine. Planned the learning classes; what functions they will need and what member

data they will use. Planned the distribution of roles between Mikael and myself, as we are the group members that implement the learning algorithm. 15 hours

Nov 13th to 19nd

Anssi: Continued planning the project, made the UML picture for the plan. 3 hours

Nov 20th to 26th

Anssi: Planned the Q-learning implementation with Mikael and started coding. My responsibilities are the AgentLearning and Qtable classes. 10 hours

Nov 27th to Dec 3rd

Anssi: Implemented functions in the Qtable class and in the Agent class and re-named the Agent class as AgentLearner. Made tests for these functions. Changed Q-table data structure from vectors to maps. 30 hours

Dec 4th to 10th

Anssi: Implemented functions in the Qtable class and in the Agent class, for converting actions and states to keys for the Q-table map and choosing the Action. Also for saving and loading Q-table from a file. 25 hours

Dec 11th to 17th

Anssi: Finalized AgentLearner class and Qtable class and implemented the Simulation class with Visa. Tried to visualize the Q-table with Cairo graphics library, but didn't have time to finish. Debugged and optimized the learning process. 30 hours

Dec 18th

Anssi: Wrote the documentation. x hours