Machine learning - Project proposal

1) Title project
Multi-Agent Reinforcement Learning for Coordinated Block Transportation

2) Student member names with student numbers
Thomas Derksen (s2016346)
Maikel Withagen (s1867733)
Steven Bosch (s1861948)

3) Application, explain how you get data or simulator, how many examples, how many inputs, outputs, whether it is an RL, classification, or regression problem.
Our goal is to simulate an environment in which a team of agents has to transport a block to a goal area by using coordinated actions learned by reinforcement learning techniques.

4) Methods. Explain the methods that you will compare. Identify the learning algorithm and the optimization method.
The methods we will compare for now are single-agent q-learning and multi-agent q-learning.

5) Setup of Experiments
We start out with two different agents in a grid that have to cooperate to reach one goal (transporting a block to a goal area). Each time step, the agents can move one cell at a specified cost. We want to compare different machine learning methods and see which one is the most optimal.

If we can do this in a reasonable amount of time, we want to extend our project. Possible ideas are multiple objectives, using more than two agents, or using multiple teams of agents that have to compete. We might also try and compare different machine learning methods.

6) Chosen programming language

(Python)

7) Planning. Describe the different phases and the planning deadlines (until mid January).

We want to finish the simulation before the Christmas vacation. We aren't sure yet how long we will work on our extensions. We just want to see how much time we have left.

References

http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4058979

http://www.researchgate.net/publication/225815648_Multi-agent_Reinforcement_Learning_An_Overview