

Profit Maximisation of Deforestation based on Reinforcement Learning

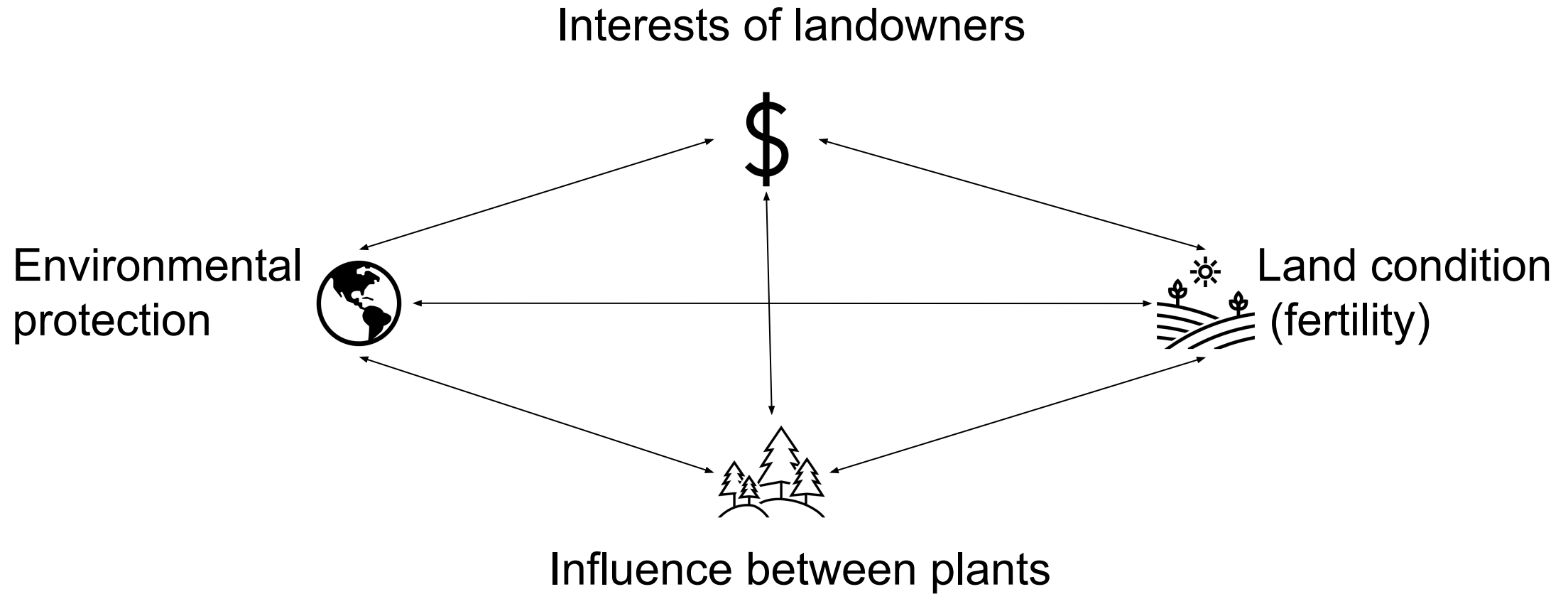
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Problem caused by Deforestation



Every year more than 10,000 kilometers of forest are deforested,
0.5 billion metric tons of carbon per year.



- Action_space
- Observation_space

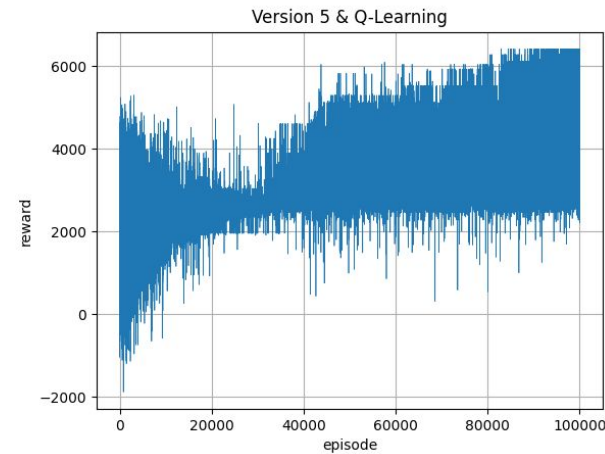


- Action space: 8 (0-7)

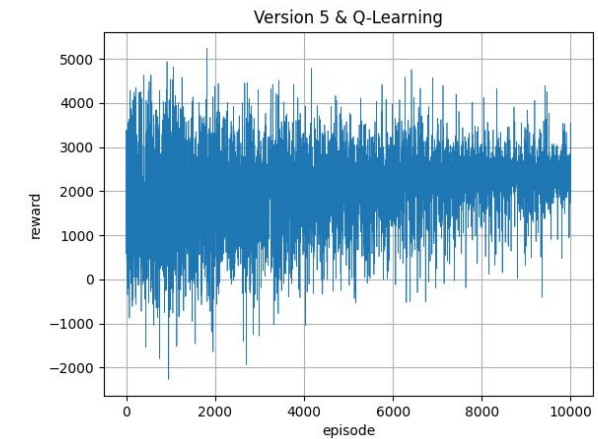
0	Do nothing
1-7	Cut down the corresponding age of trees

- Observation space: (10*10*2)
 - 10*10*1 → show the age of trees of corresponding grids
 - 10*10*1 → show fertility of corresponding grids
- Each step(The order of some rules is important)
 - If tree not been cut down, the fertility of grid will reduce
 - If the tree age is 7, the empty grid around this tree, will get a seed, and grow up next year
 - If tree not been cut down, it will grow up, which will be influenced by fertility
 - If tree been cut down(empty grid), the fertility of grid will recover.
 - Move to next year(end at 15 year)

WEIGHT_TIMBER
WEIGHT_GREENHOUSE_GAS
MAX_FERTILITY
MINIMUM_REQ_GHG_10
MINIMUM_REQ_TIMBER_1
RANDOM_SEED

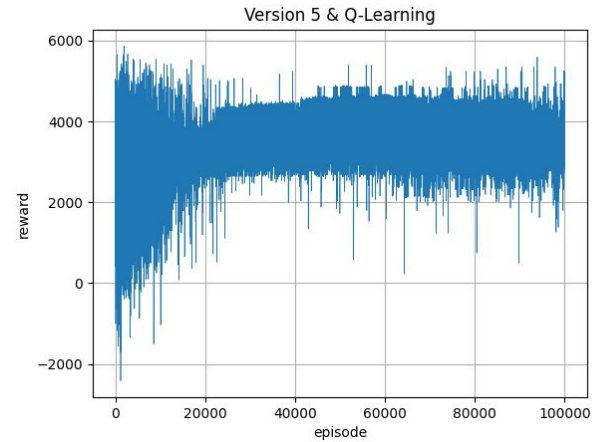


MINIMUM_REQ_GHG_10 = 0
MINIMUM_REQ_TIMBER_1 = 0

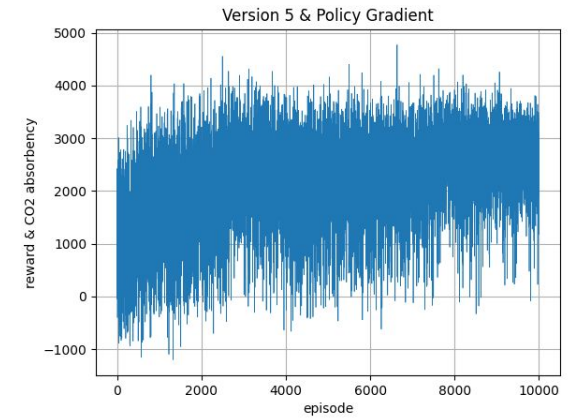


MINIMUM_REQ_GHG_10 = 2000
MINIMUM_REQ_TIMBER_1 = 50

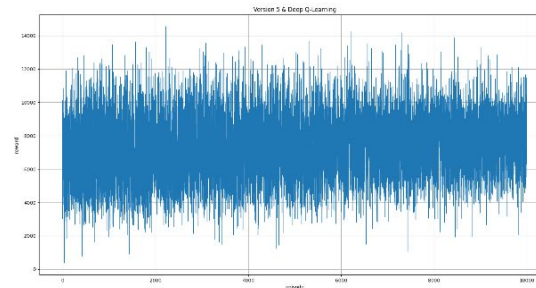
1. Random test
2. Q-Learning
3. DQN
4. Policy Gradient



Q-learning



Policy Gradient



DQN

1. Coding: version 1, version 1.2 and version 2
2. Docstring
3. Parameters Adjusting
4. Documentation(part):
 - Experimental Reproducibility and Generalization
 - Reporting

Thank you for attention!

