

# Profit Maximisation of Deforestation based on Reinforcement Learning

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- **The reason of deforestation:**

According to the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, the overwhelming direct cause of deforestation is agriculture. Subsistence farming is responsible for 48% of deforestation; commercial agriculture is responsible for 32%; logging is responsible for 14%, and fuel wood removals make up 5%.

- **The results of deforestation:**

1. Deforestation is a contributor to global warming, and is often cited as one of the major causes of the enhanced greenhouse effect.
2. The water cycle is also affected by deforestation. When part of a forest is removed, the trees no longer transpire this water, resulting in a much drier climate.
3. The rate of erosion occurs from deforestation, because it decreases the amount of litter cover, which provides protection from surface runoff.
4. Deforestation results in decline in biodiversity, and on a natural global scale is known to cause the extinction of many species

- **Our goal in this project:** We are going to simulate the environment of the logging farm, and to minimize the impact on the environment by arranging the logging method reasonably. Meanwhile, we are also going to make different versions of environment so that this simulation would be more practical.

1. Basic mathematical settings
2. Parameters(state, reward, etc..)
3. Updated parameters(GHG, soil feretility)

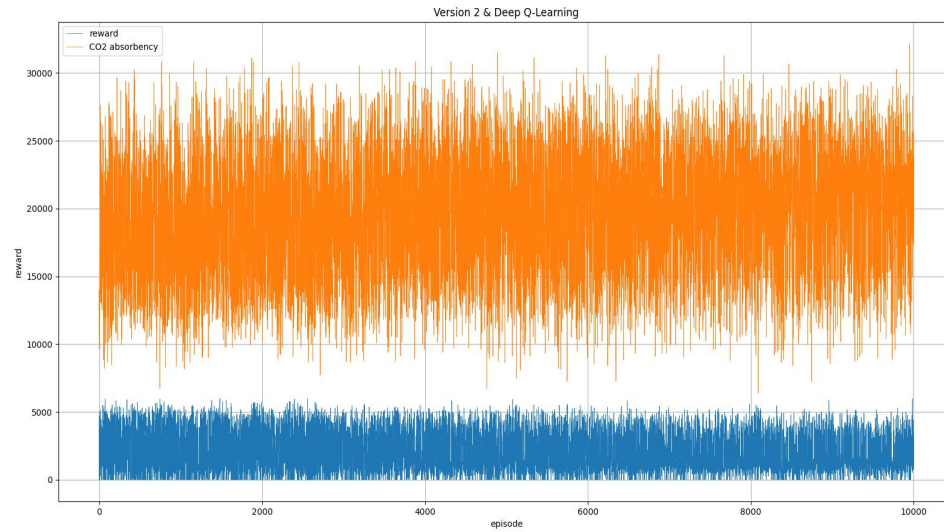


```
total_reward= SUM(reward(state))  
total_co2reward=SUM(value_of_greenhouse_gas_uptake(state))
```

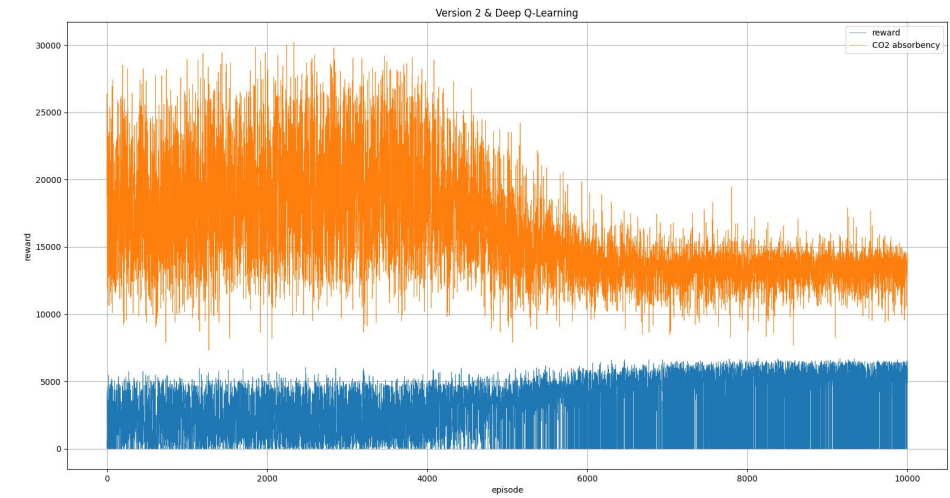
Limitation Factor:  $\text{total\_co2reward} \geq 13000$   
otherwise:  $\text{total\_reward} = 0$

1. Random test
2. Q-Learning
3. Deep Q learning

# Results:



Q learning



Deep Q learning

# Thank you!