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| --- | --- |
| Notation & Parameters | Description |

**QLearning / SARSA**

**Alpha (α) Learning Rate**

The agent updates its knowledge with a mix of old and new information; the exact update is based on the α value.

**Range** : 0 < α ≤ 1

α=0 means no learning

α=1 means complete overwrite of previous learning.

**Gamma (γ) Discount Factor**

The agent balances immediate rewards with future rewards. The exact weight depends on the γ value.

**Range:** 0 ≤ **γ** ≤ 1

**γ** =0 means only immediate rewards are considered

**γ** =1 means future rewards are as important as immediate ones.

**Epsilon (ε) Exploration Rate**

The agent explores and exploits with varying probability; the balance between exploration and exploitation depends on the ε value.

**Range:** 0 ≤ **ε** ≤ 1

**ε** =0 means no exploration

( pure exploitation)

**ε** =1 means complete exploration

( random greedy actions).

**Q(s, a) Q-value table** Represents the value of taking

Action (a) in State (s).

**Reward**  Outcome received after performing an action.

Determines the feedback for the action taken.

**Range**: positive (1),neutral (0) , negative (-1)

**-1** indicate undesirable outcomes, **1** indicate desirable outcomes , **0** indicate neutral outcomes.

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| --- | --- |
| Notation & parameters | Description |

**Whale Optimization Algorithm**

**α** Linearly decreasing coefficient from 2 to 0

Coefficient vector for exploration vs. exploitation

**r**  Random number in the range [0,1]

**A** Coefficient controlling Exploration vs

Exploitation

**C** Coefficient controlling the distance to the

Prey

**D** Distance vector to the prey

**B** Spiral parameter (typically 1)

**l** Random number controlling the spiral

movement

**p** Probability determining the mode

(exploration vs. exploitation)

**X\*** Position of the best solution found so far

(prey)

**X** Current position of the whale

**Population** Number of whales (search agents) ;Set to 100

X(t+1)​=X∗(t)−D⋅exp(b⋅l)⋅cos(2πl)

**\*please update the above given formula for equation 6**

**Also cross check all the parameters once incase any missing**