CLUB DE DESARROLLO
DE VIDEOJUEGOS
E INTELIGENCIA ARTIFICIAL

REINFORCEMENT LEARNING

Reinforcement learning (RL) is an area of machine learning concerned with how software agents ought to take actions in an environment so as to maximize some notion of cumulative reward. Reinforcement learning is considered as one of three machine learning paradigms, alongside supervised learning and unsupervised learning.
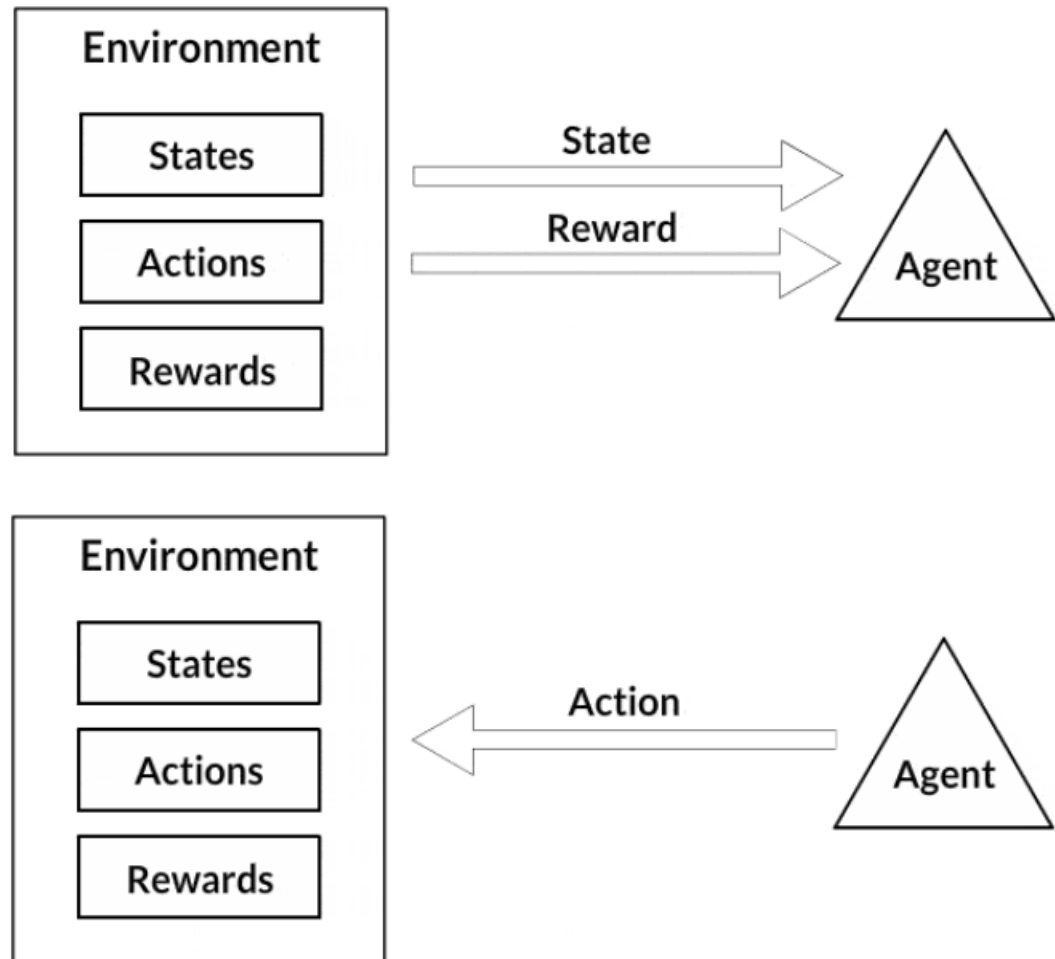
ANALOGY

Sit
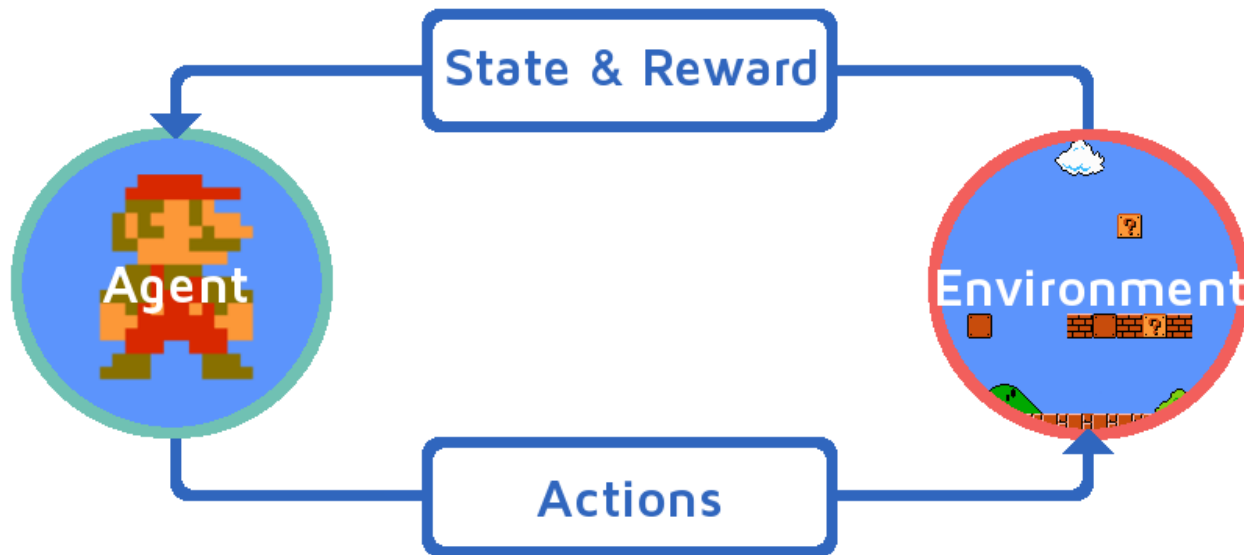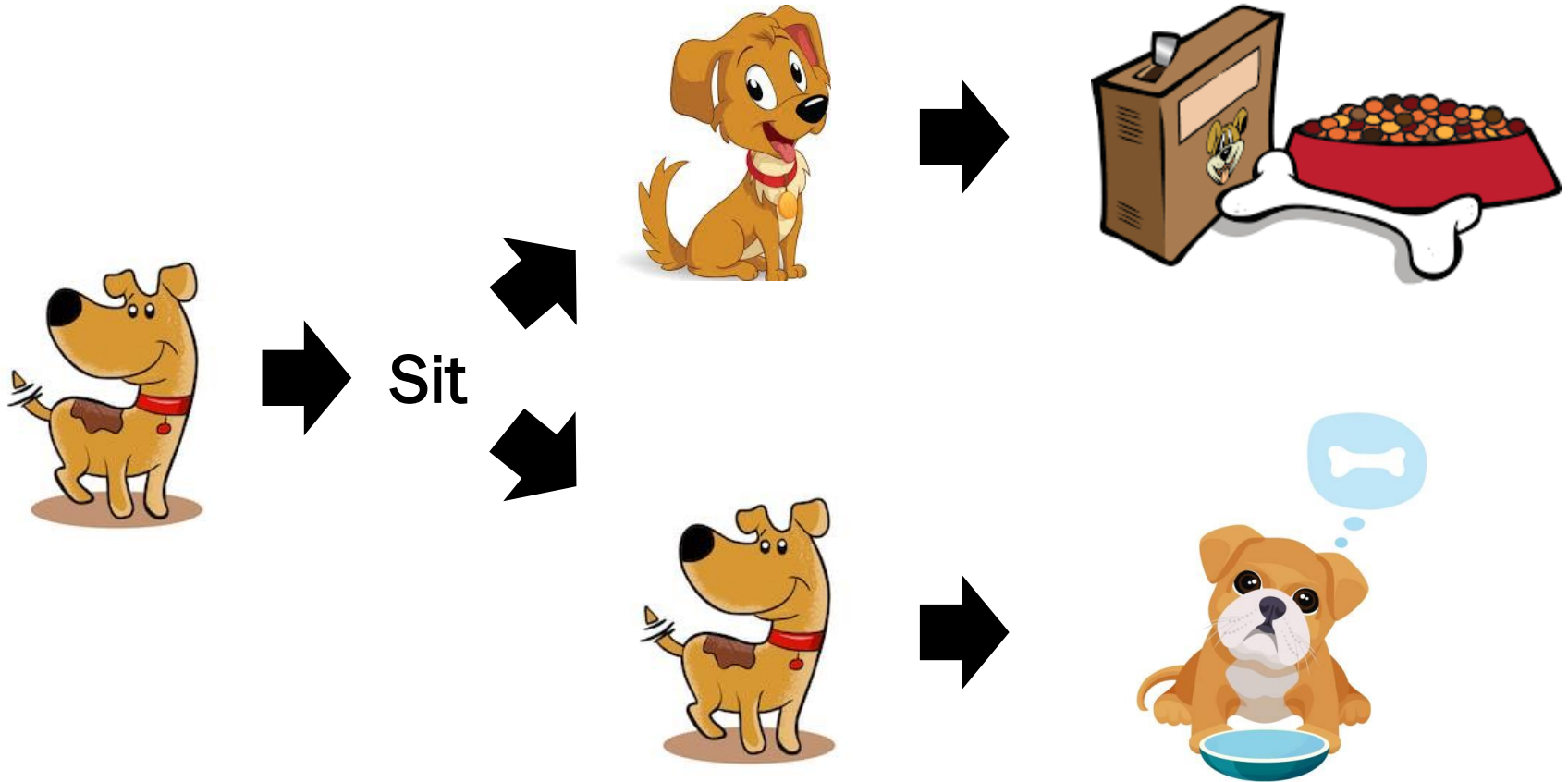
IMPORTANT TERMS

- Environment.

- States.

- Actions.

- Rewards.

- Agent.

Q-LEARNING

Q-learning is a model-free reinforcement learning algorithm. The goal of Q-learning is to learn a policy, which tells an agent what action to take under what circumstances.

Main applications:

- Traffic Light Control

- Self-driving cars

- Robotics

- Personalized Recommendations

- Games

Q-TABLE

Q-Table		Actions					
		South (0)	North (1)	East (2)	West (3)	Pickup (4)	Dropoff (5)
States	0	0	0	0	0	0	0
	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	327	0	0	0	0	0	0
	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	499	0	0	0	0	0	0

BELLMAN EQUATION

$$Q^{new}(s_t, a_t) \leftarrow \underbrace{(1-\alpha) \cdot \underbrace{Q(s_t, a_t)}_{\text{old value}}}_{} + \underbrace{\alpha}_{\text{learning rate}} \cdot \left(\underbrace{r_t}_{\text{reward}} + \underbrace{\gamma}_{\text{discount factor}} \cdot \underbrace{\max_a Q(s_{t+1}, a)}_{\text{estimate of optimal future value}} \right)^{\text{learned value}}$$
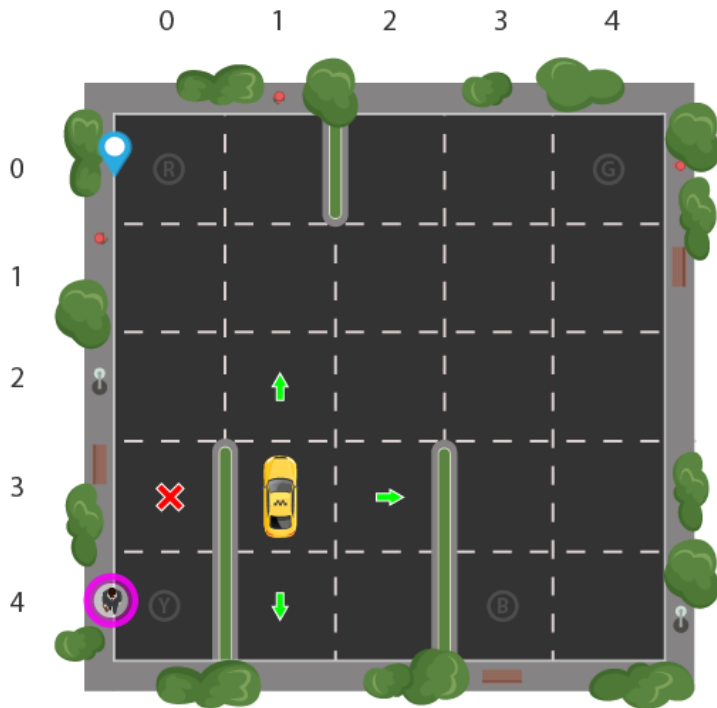
Q-LEARNING

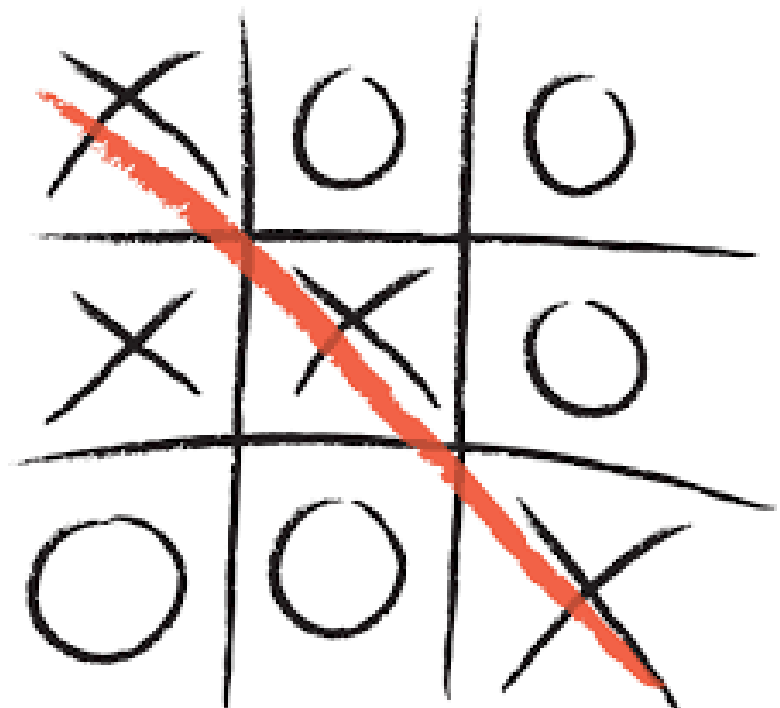| Q-Table		Actions					
		South (0)	North (1)	East (2)	West (3)	Pickup (4)	Dropoff (5)
States	0	0	0	0	0	0	0
	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	328	-2.30108105	-1.97092096	-2.30357004	-2.20591839	-10.3607344	-8.5583017
	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	499	9.96984239	4.02706992	12.96022777	29	3.32877873	3.38230603

PRACTICAL EXAMPLES

Self-Driving Cab

Player of Tic Tac Toe

GENERAL INFORMATION

Meetings: Place:

Monday   20:00 – 21:00   B-101

Facebook Group: CLUB DE DESARROLLO DE VIDEOJUEGOS E INTELIGENCIA ARTIFICIAL YACHAY TECH

CLUB DE DESARROLLO DE VIDEOJUEGOS E INTELIGENCIA...
Miembro desde 4 horas
Hector Mejía está en este grupo

GitHub: https://github.com/yachay-tech-ai