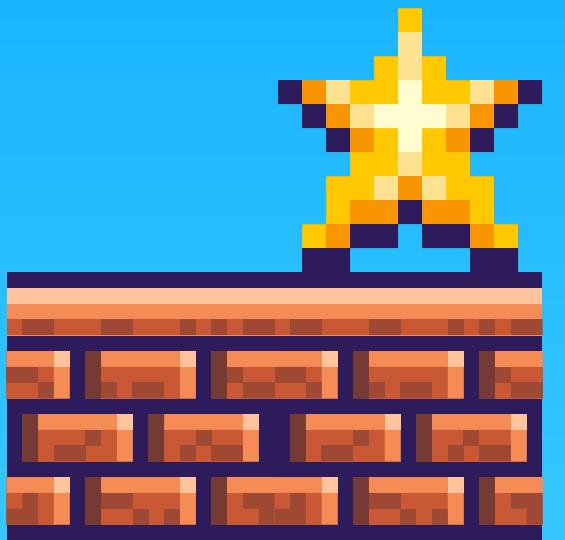


SUPER MARIO BROS

PROGETTO IA



INDICE

Ci sono 6 diversi tipi di gioco!

Problema

Workflow

Implementazione

Analisi dei
Dati

Problemi
Riscontrati

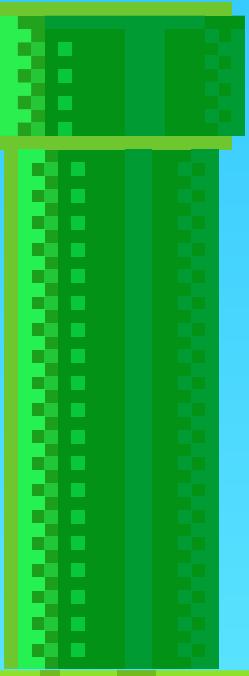
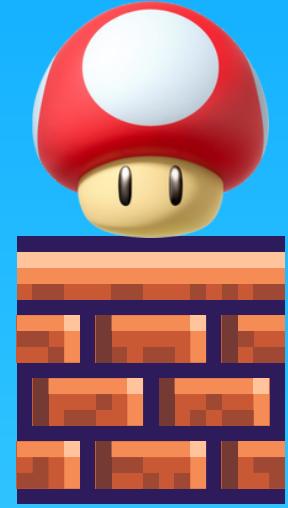
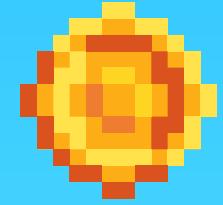
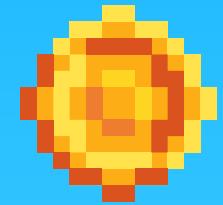
Disponibilità
dei Dati



PROBLEMA

Sviluppo di un agente
intelligente per il gioco
Super Mario Bros

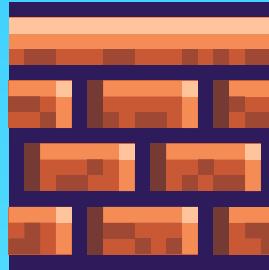
Q-Learning vs SARSA



PROBLEMA

Benchmarking di alcuni algoritmi di RL

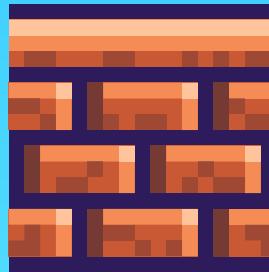
- Q - Learning classico
- Double Q - Learning
- Deep Q - Network
- Double Deep Q - Network



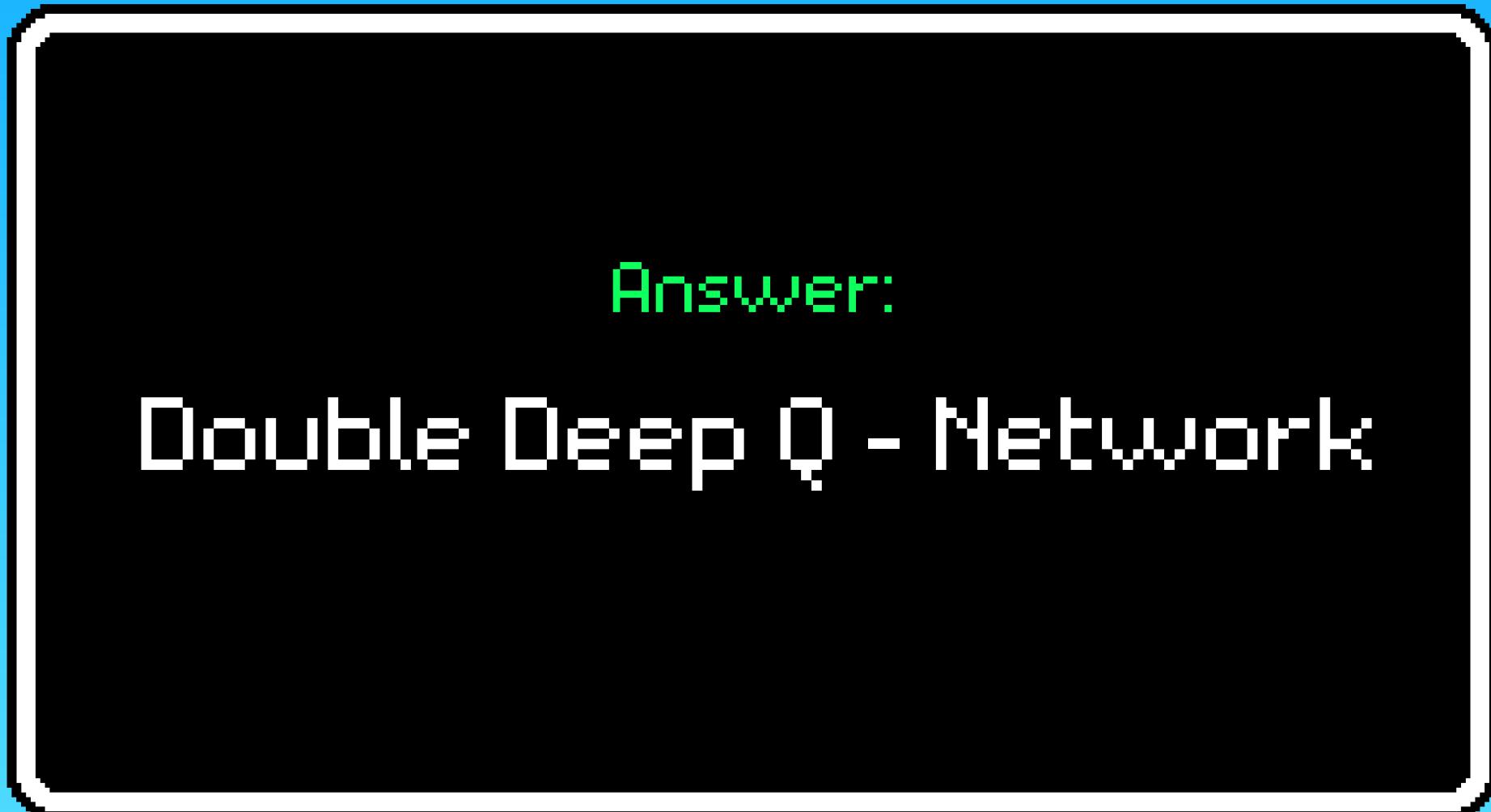
PROBLEMA

Benchmarking di alcuni algoritmi di RL

- Sarsa classico
- Double Sarsa
- Deep Network Sarsa
- Double Deep Network Sarsa



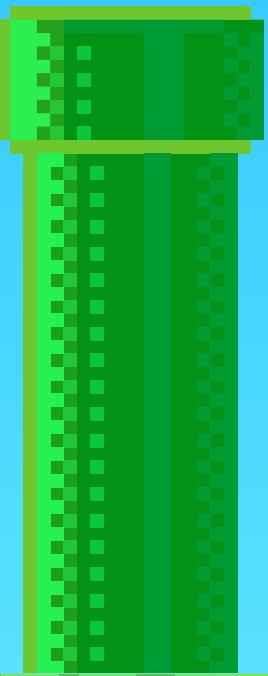
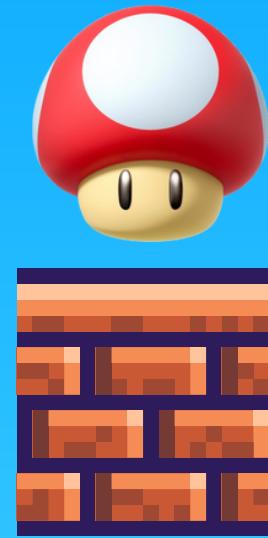
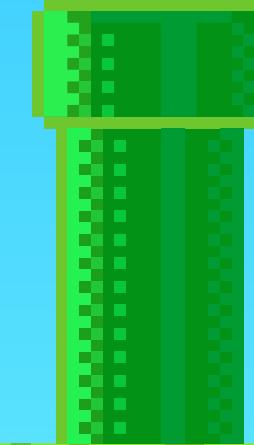
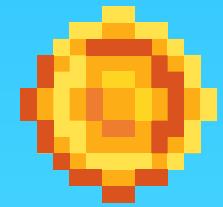
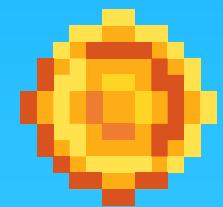
PROBLEMA



WORKFLOW

Completere il primo
livello del gioco

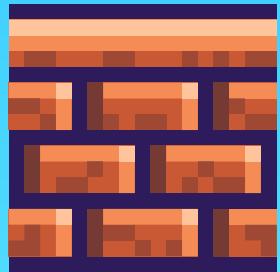
Ricompense e Penalità



WORKFLOW

Gym-super-mario-bros

- RIGHT_ONLY
- SIMPLE_MOVEMENT
- COMPLEX_MOVEMENT



WORKFLOW

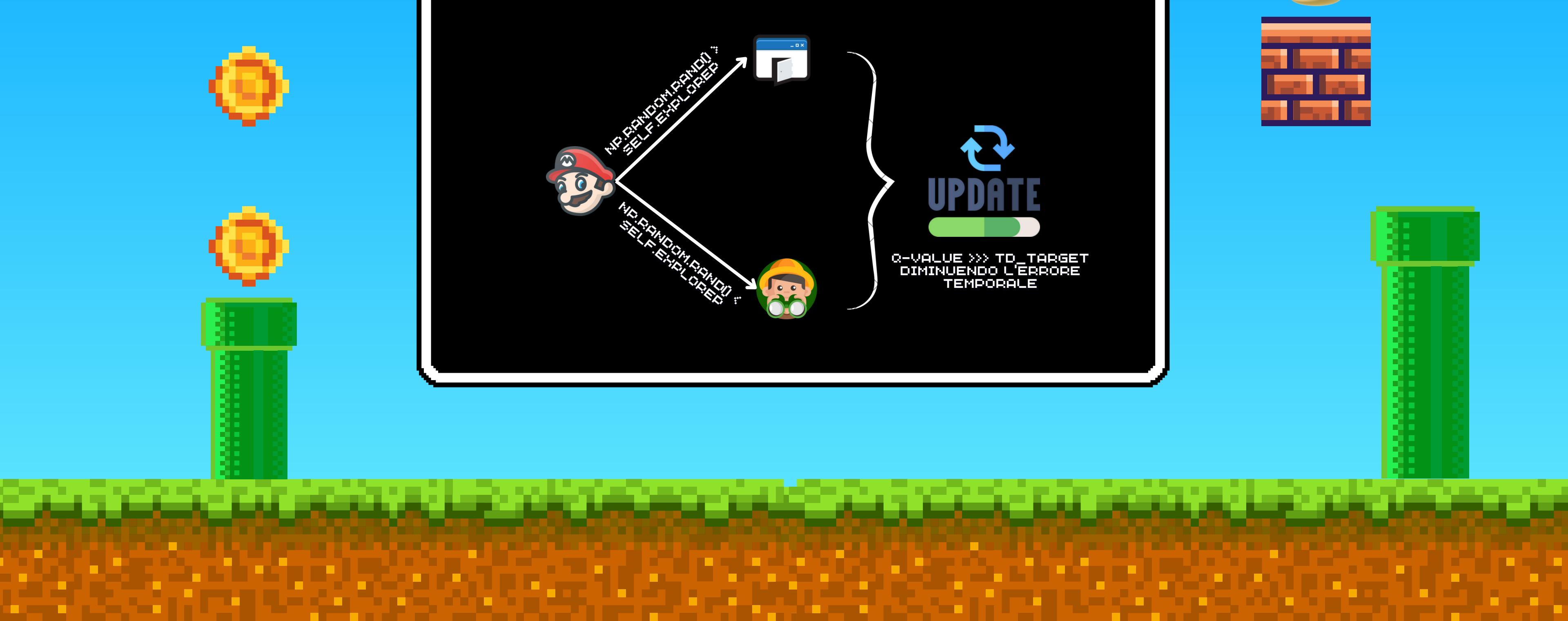
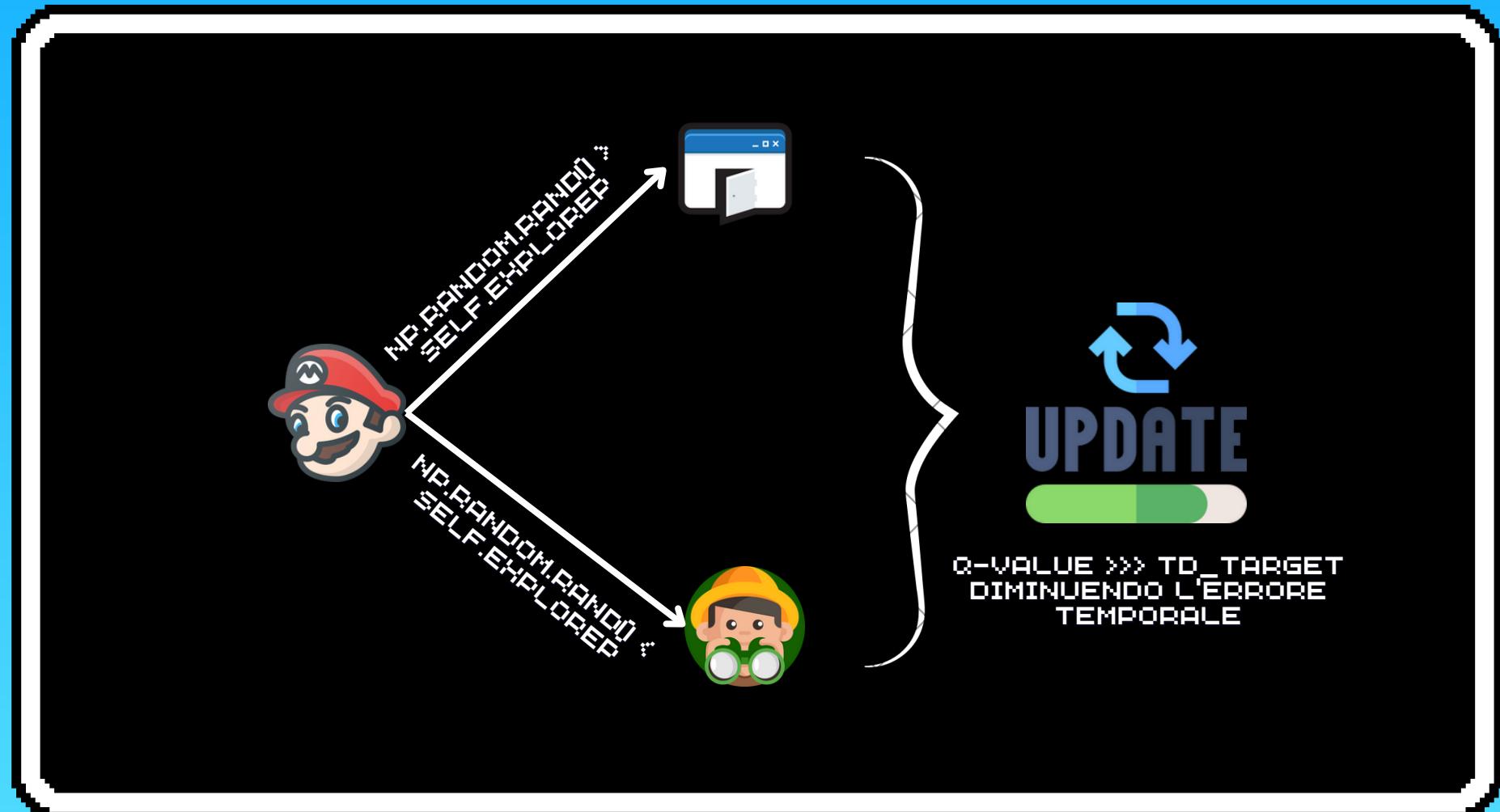


Ricompense	
• time:	- 0.1
• death:	- 100
• extra-life:	+ 100
• mushroom:	+ 20
• flower:	+ 25
• mushroom-hit:	- 10
• flower-hit:	- 15
• coin:	+ 15
• score:	+ 15
• victory:	+ 1000



IMPLEMENTAZIONE

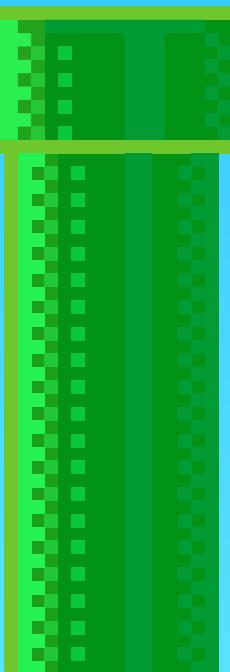
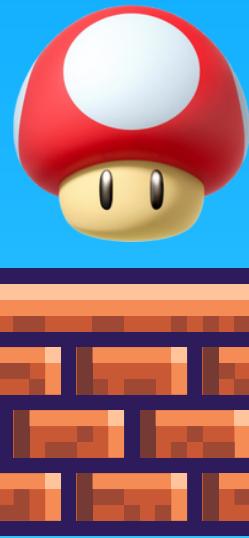
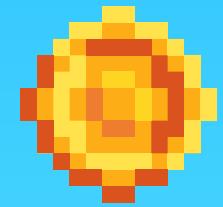
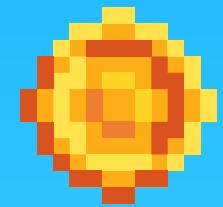
Q-LEARNING



IMPLEMENTAZIONE

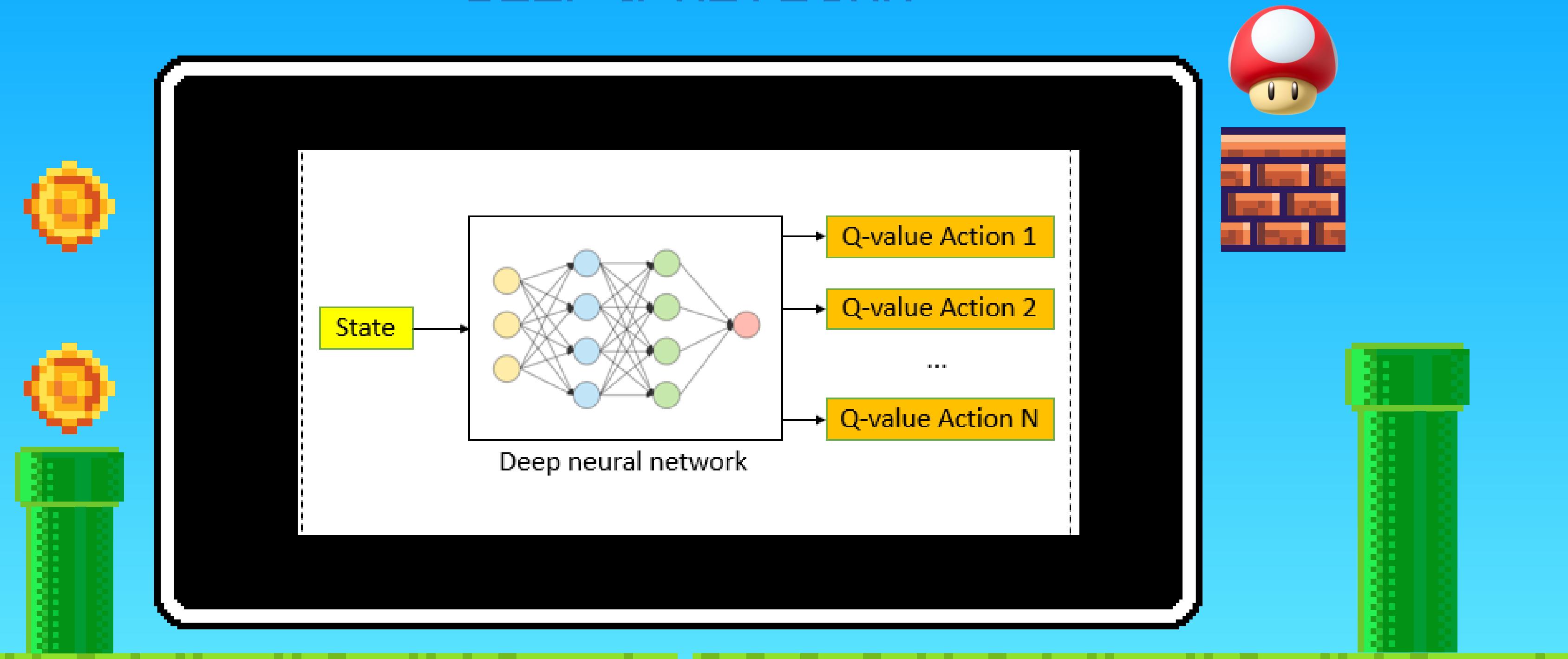
DOUBLE Q-LEARNING

VA A MITIGARE IL PROBLEMA DELLA SOVRASTIMA E SOTTOSTIMA RISPETTO AL Q-LEARNING TRADIZIONALE DATO CHE VA AD UTILIZZARE DUE TABELLE SEPARATE PER STIMARE I VALORI DI Q.



IMPLEMENTAZIONE

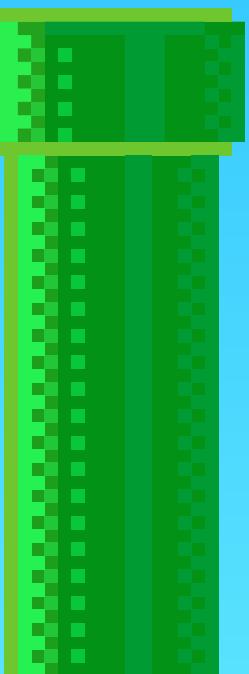
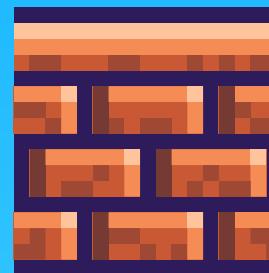
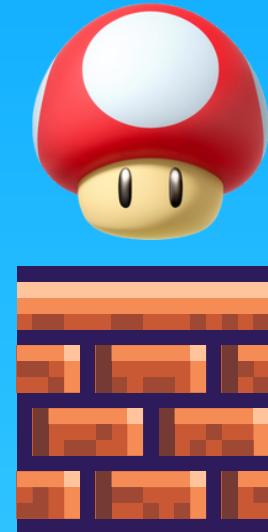
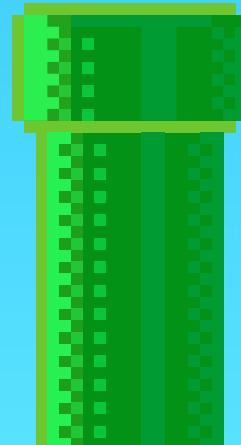
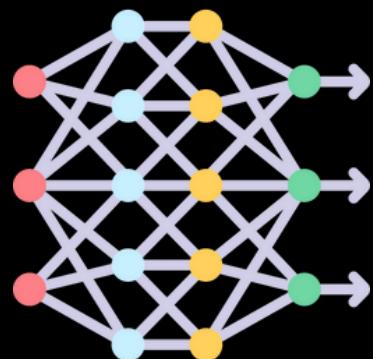
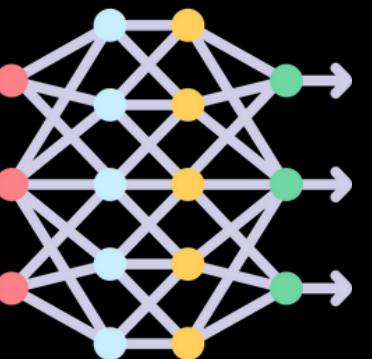
DEEP Q-NETWORK



IMPLEMENTAZIONE

DOUBLE DEEP Q-NETWORK

Durante l'addestramento, la rete "locale" viene utilizzata per selezionare l'azione migliore, mentre la rete "target" viene utilizzata per stimare i valori Q associati a quella azione. Ciò contribuisce a mitigare la sovrastima dei valori Q.



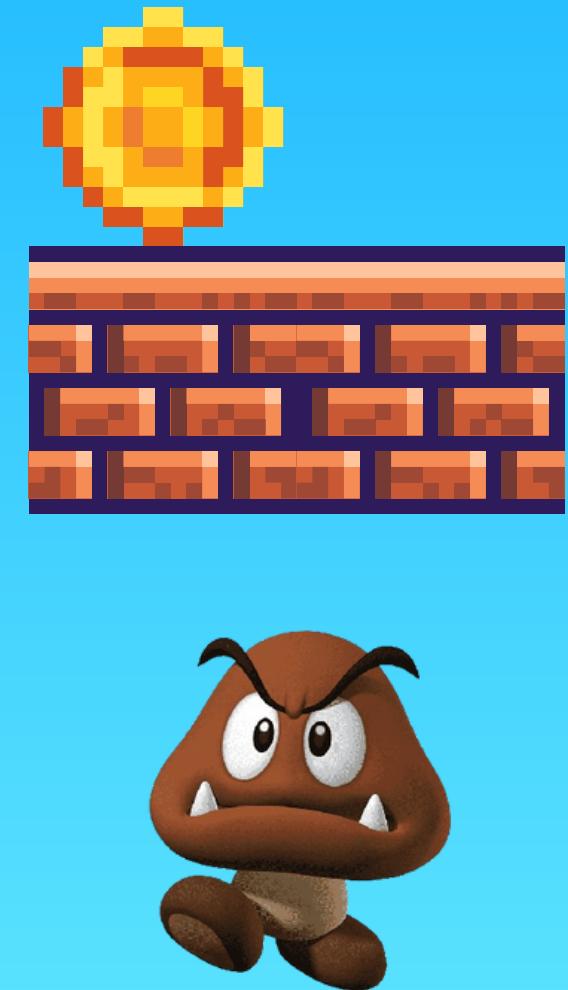
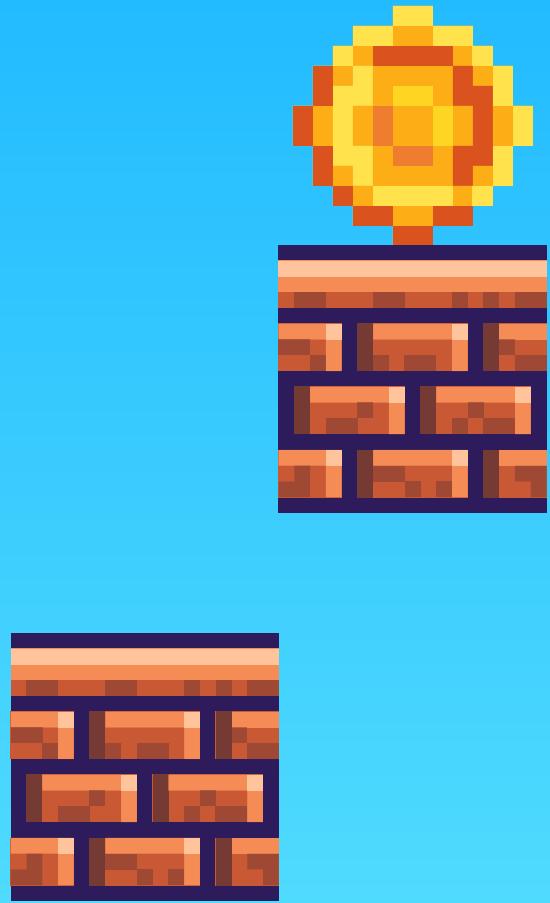
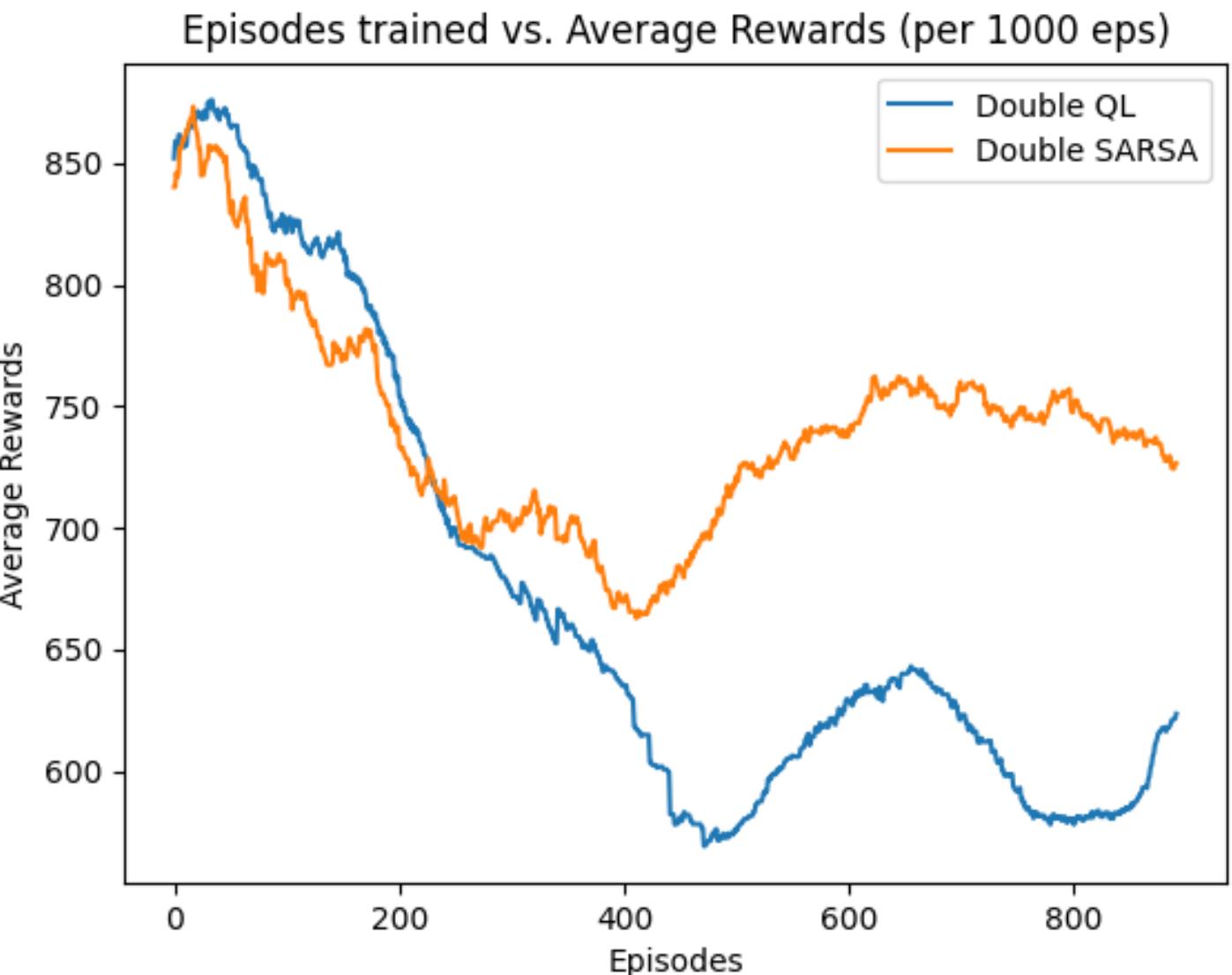
ANALISI DEI DATI

Q-Learning vs Sarsa



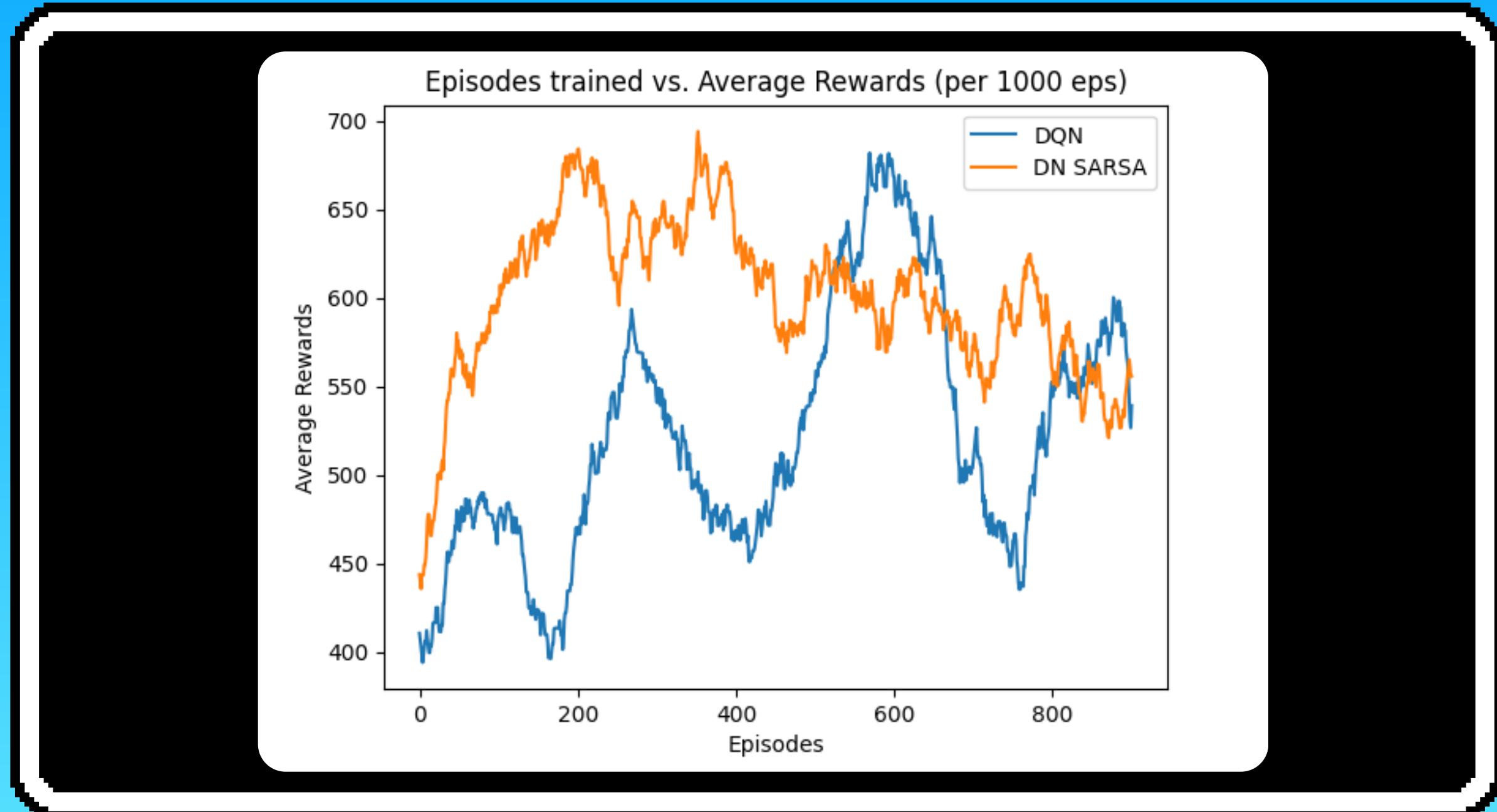
ANALISI DEI DATI

Double Q-Learning vs Double Sarsa



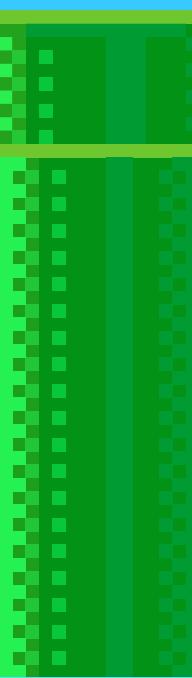
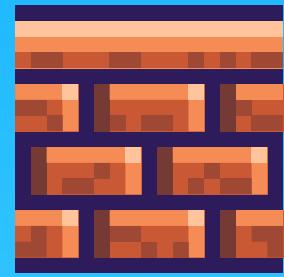
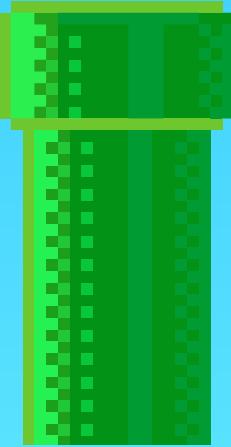
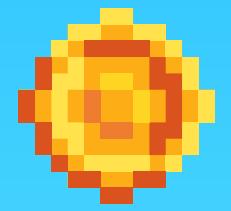
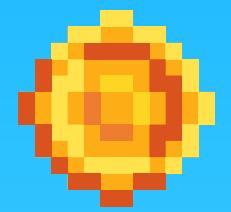
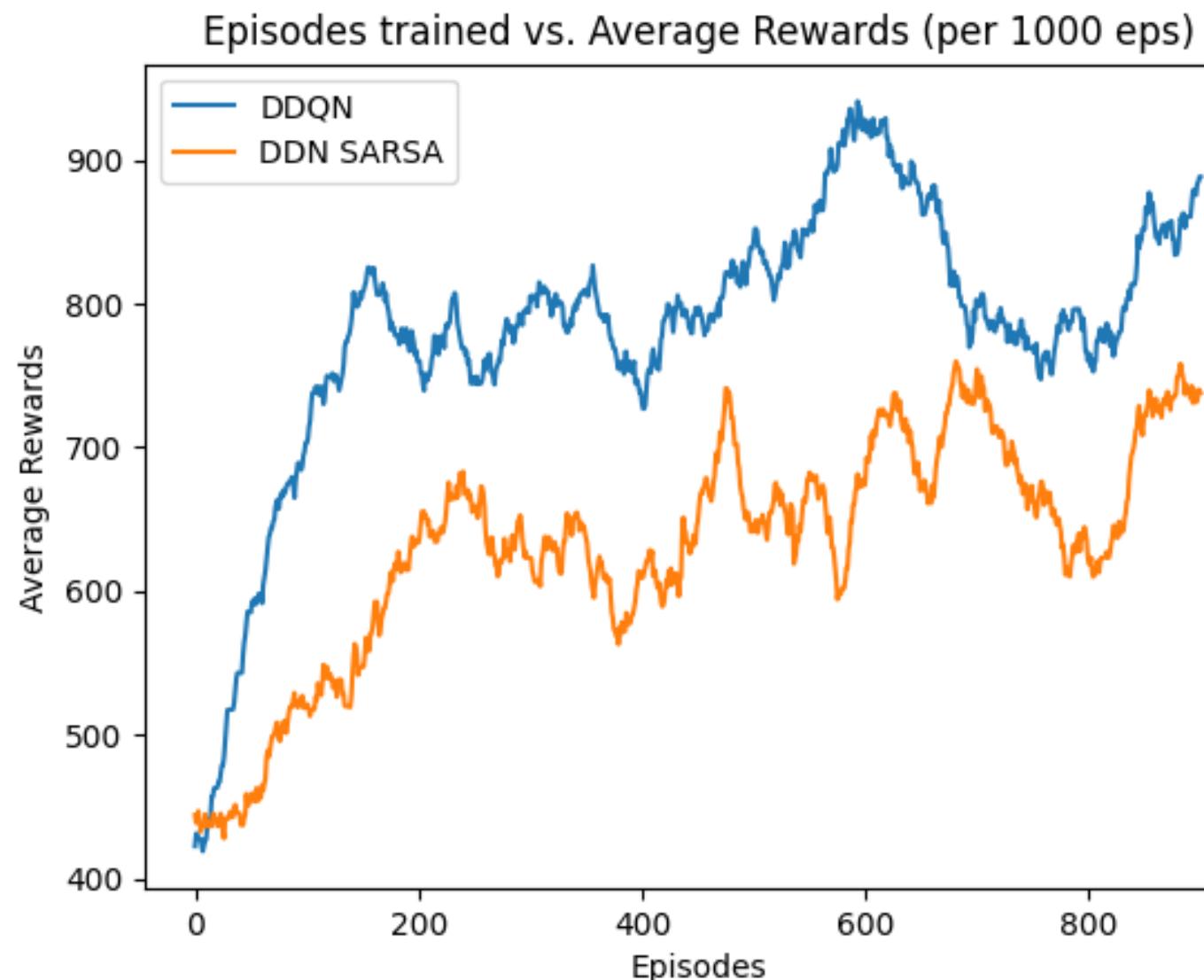
ANALISI DEI DATI

Deep Q-Network vs Deep Network Sarsa



ANALISI DEI DATI

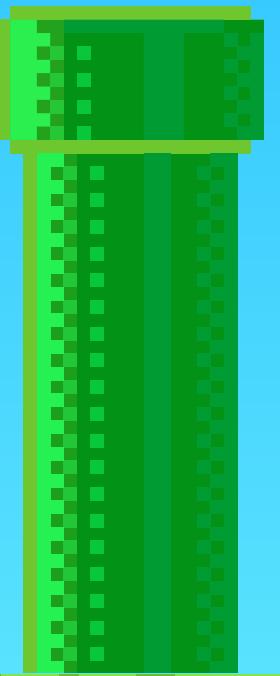
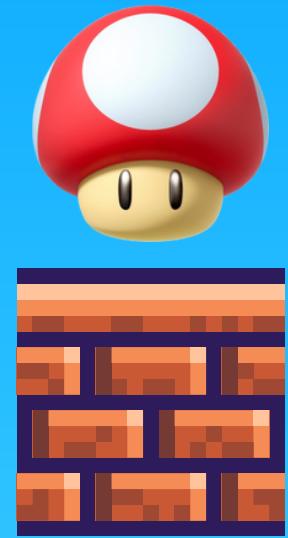
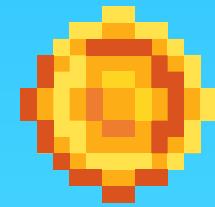
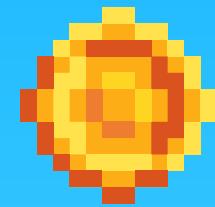
Double Deep Q-Network vs Double Deep Network Sarsa



PROBLEMI RISCONTRATI

Prestazioni del
Q - Learning

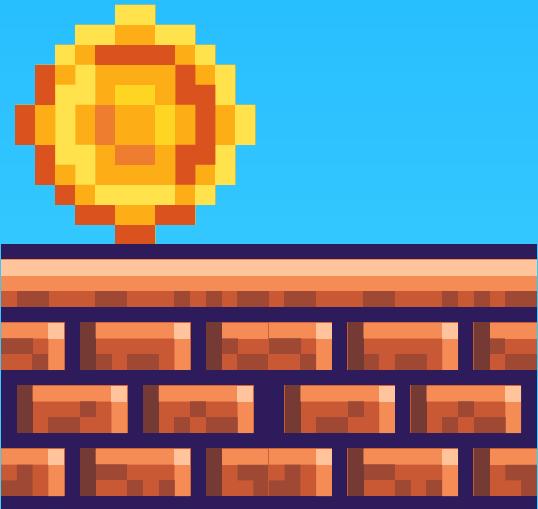
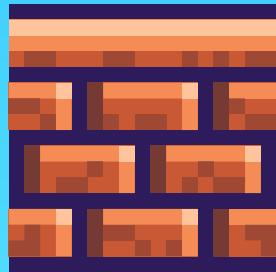
Tempo di esecuzione



PROBLEMI RISCONTRATI

Prestazioni del
Q - Learning

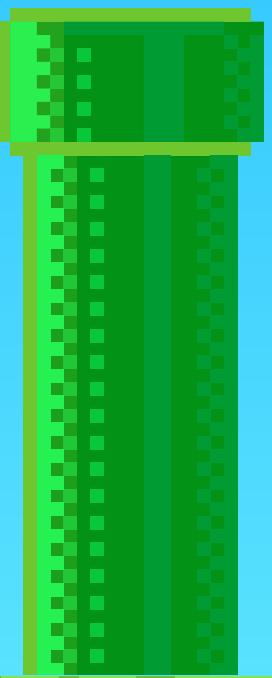
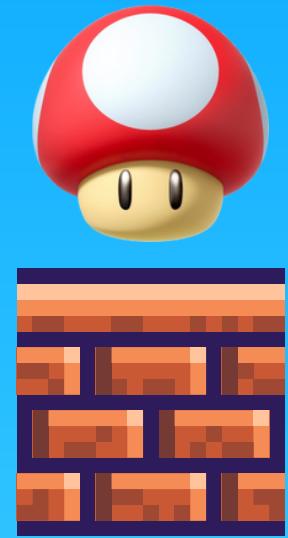
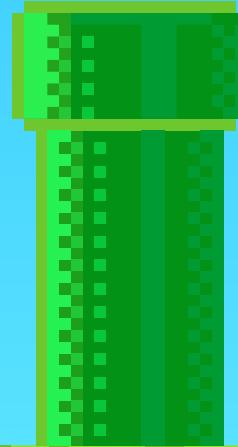
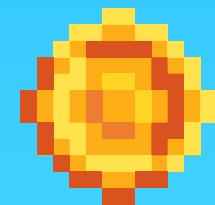
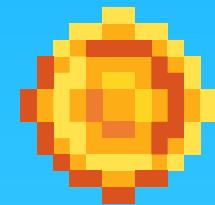
Lento apprendimento



PROBLEMI RISCONTRATI

Prestazioni del
Q - Learning

Livello mai completato



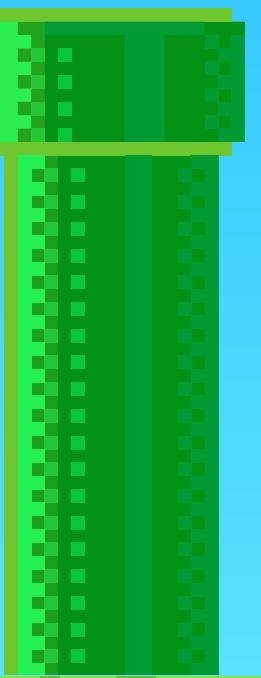
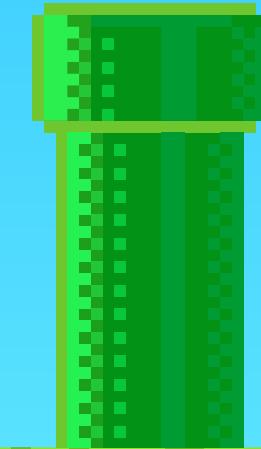
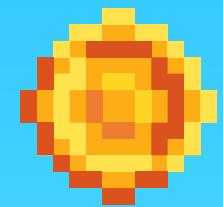
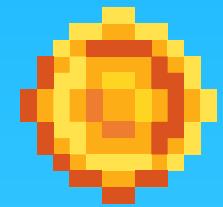
PROBLEMI RISCONTRATI

Soluzioni al nostro
problema:

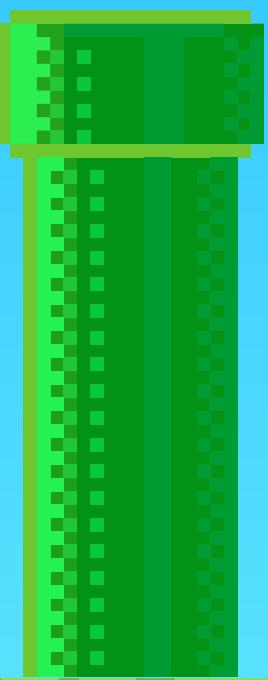
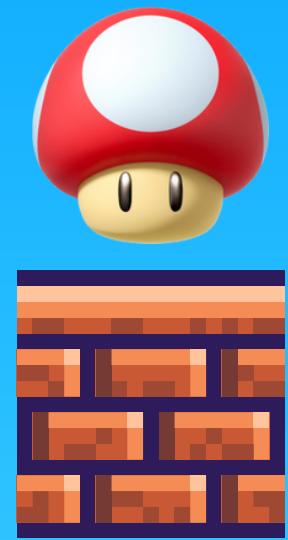
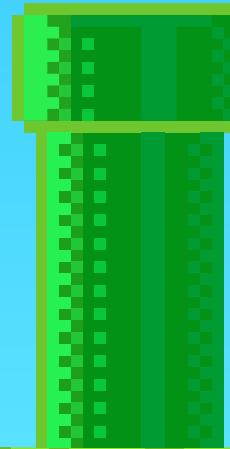
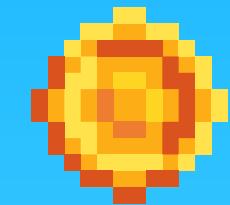
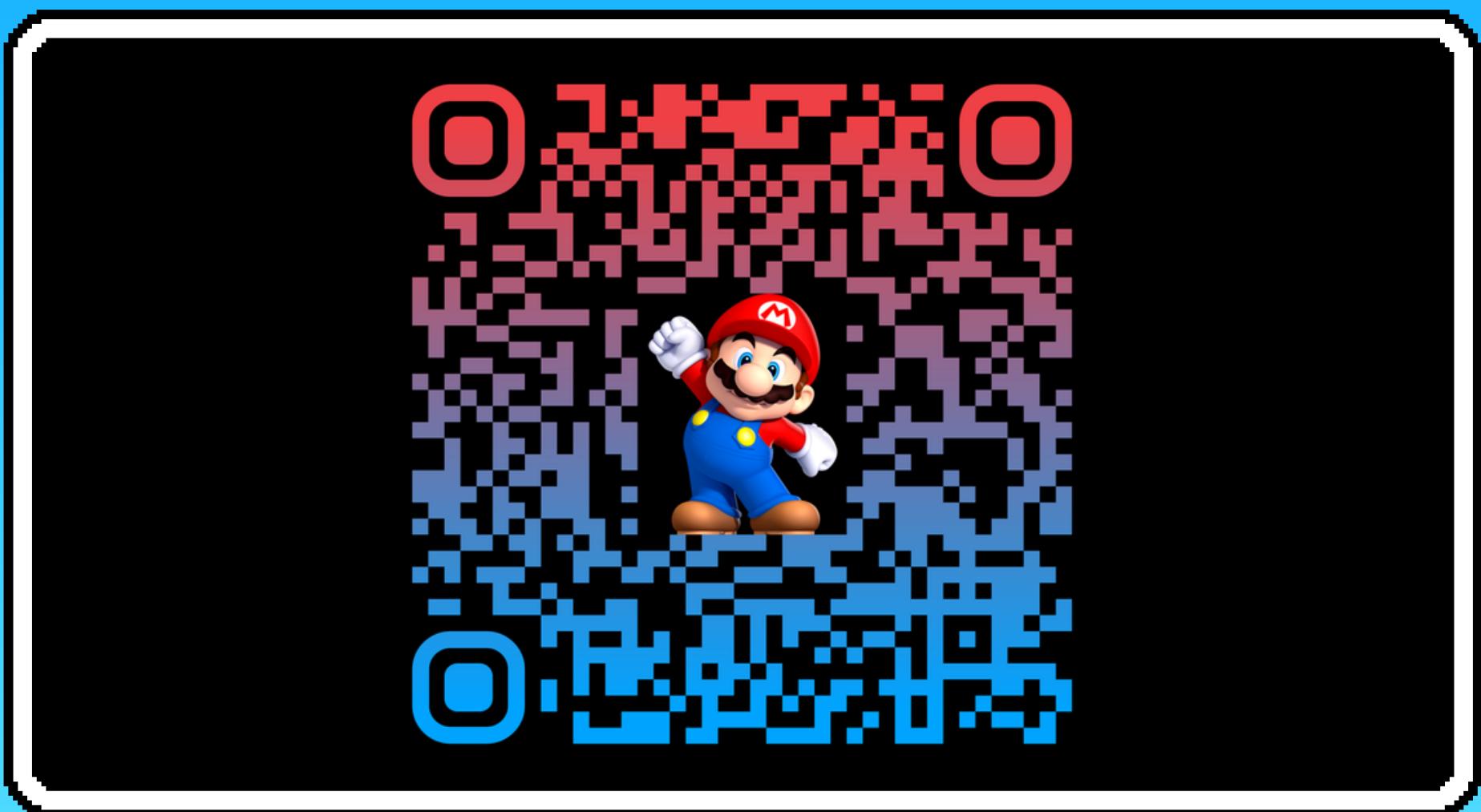
Rete Neurale



DEMO



DISPONIBILITÀ DEI DATI



THANKS FOR
PLAYING

NEXT LEVEL !

