

Implementierung eines Double DQN in Atari Video Pinball

Reinforcement Learning

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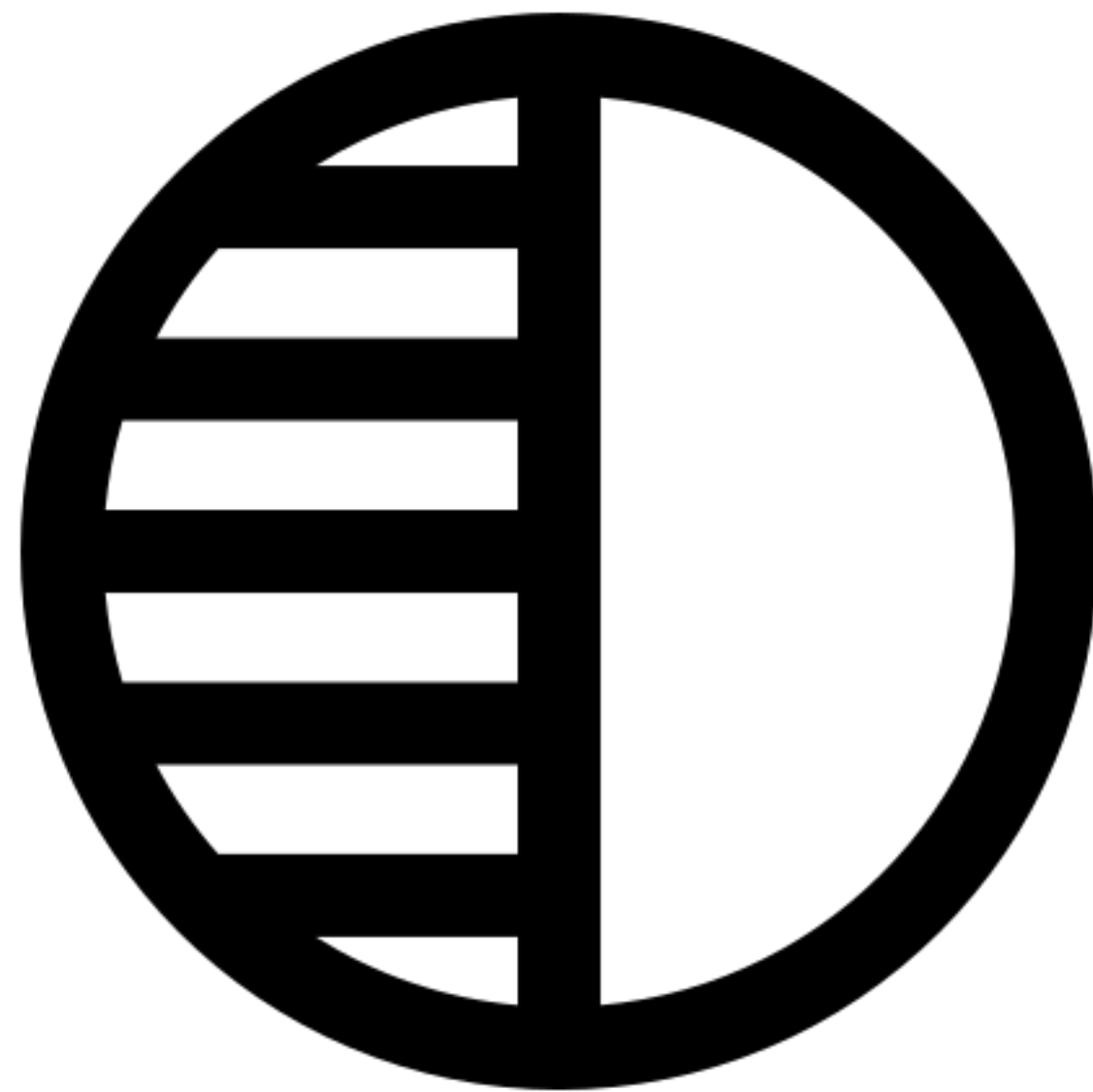
Atari Video Pinball

- Atari Video Pinball:
 - Videospiel von Atari, Inc., veröffentlicht 1980
 - Simuliert das Erlebnis eines Flipperautomaten
- Steuerung:
 - Verwendung eines Joysticks zum Steuern der Flipper und zum Starten des Balls
- Punktesystem:
 - Verschiedene Punkte für Treffer auf Spinner, Bumper, Drop Targets, Rollover und Spezialziele
 - Extra Ball durch Treffen des Atari-Logos viermal

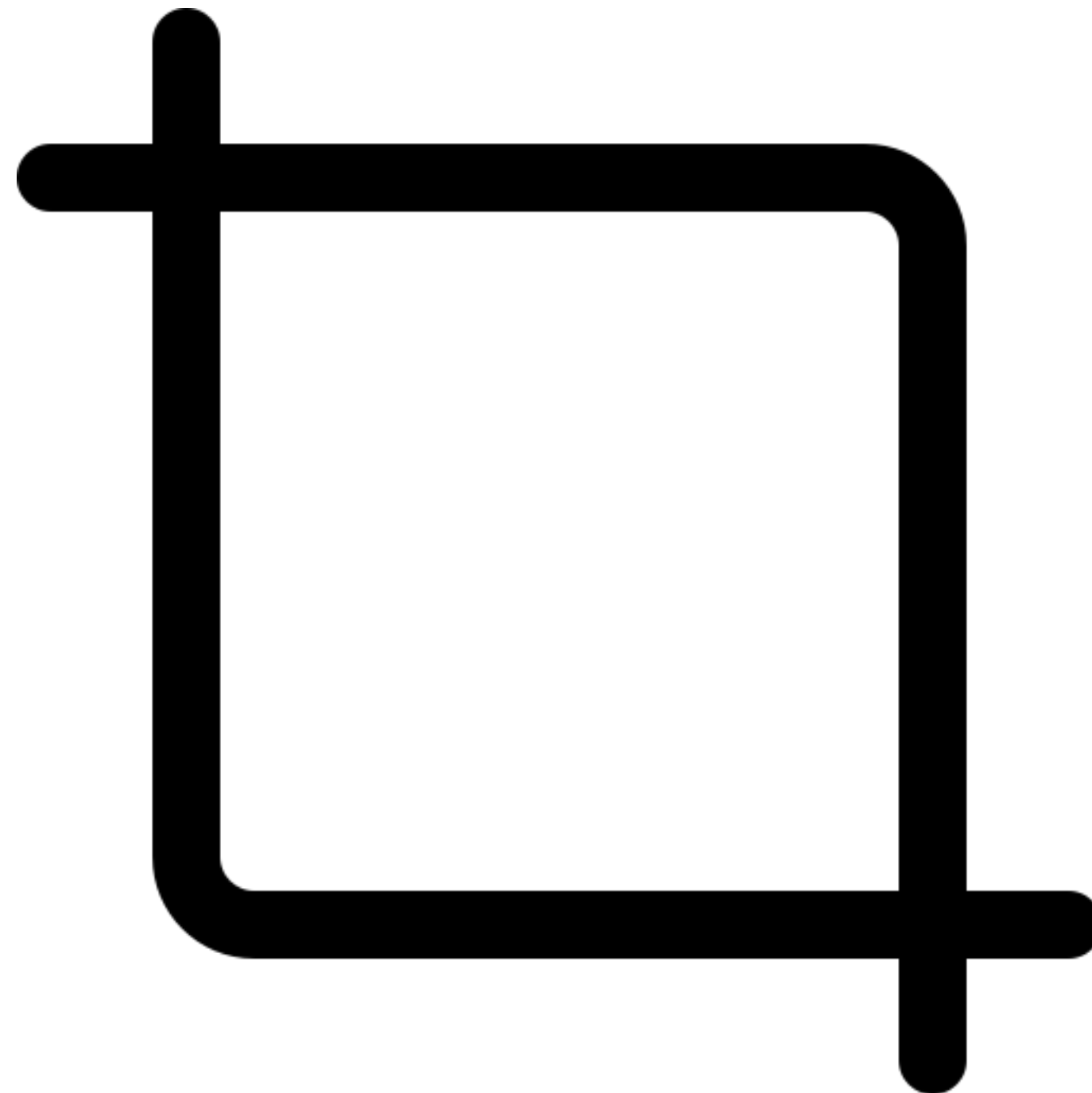


- World's first video attraction to simulate an actual pinball game.
- 1 to 4 players
- Compact cabinet size
- 3-D blacklight "Disco" playfield combined with video scoring objects and features
- Pinball rules and scoring
- "Nudge" feature
- "Extra Ball", "Specials", via replay levels
- 3 or 5 ball
- Extended play
- 4 languages
- Famous Atari pinball sound effects

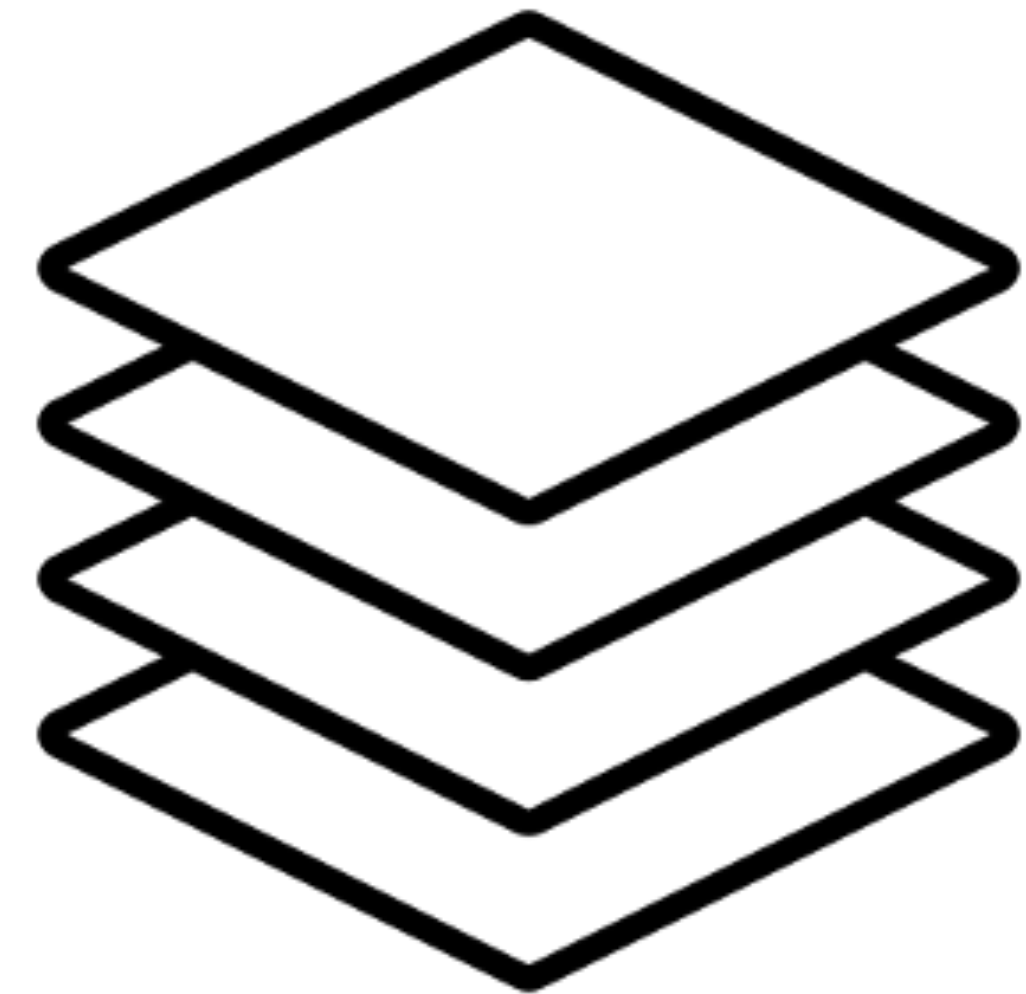
Preprocessing



Grayscale

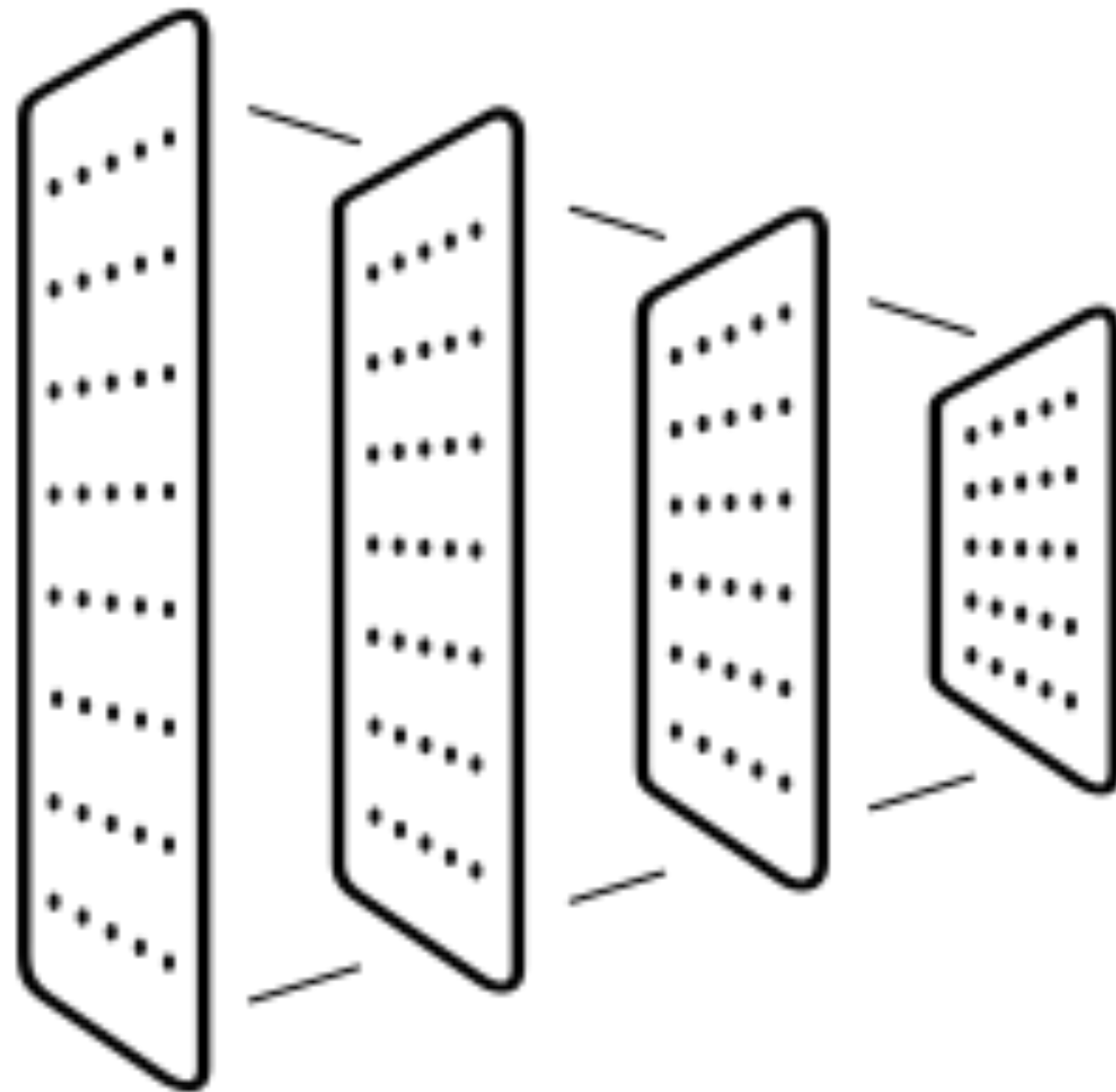


Cropping to 84x84 pixels



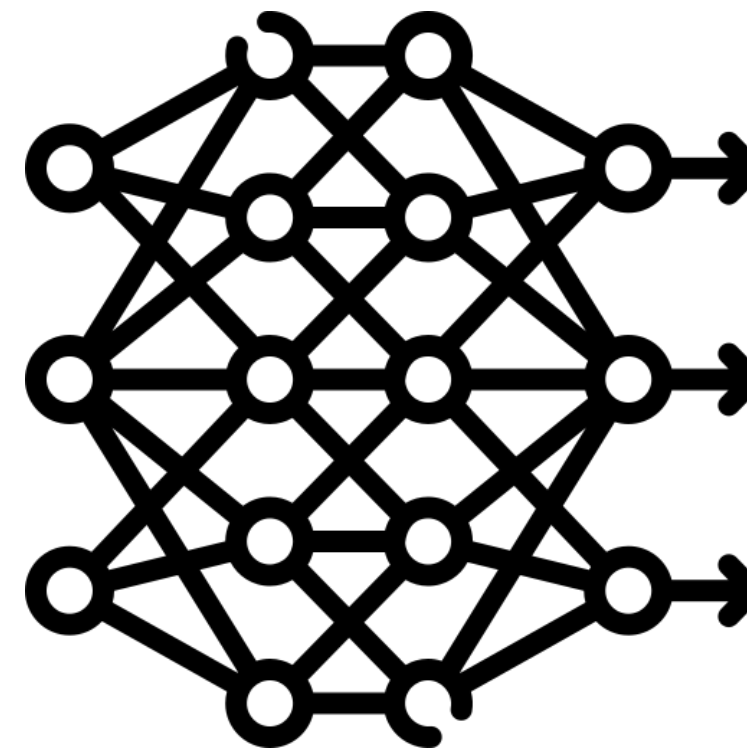
Stacking 4 frames

Architektur



CNN
4x84x84
32x20x20
64x9x9

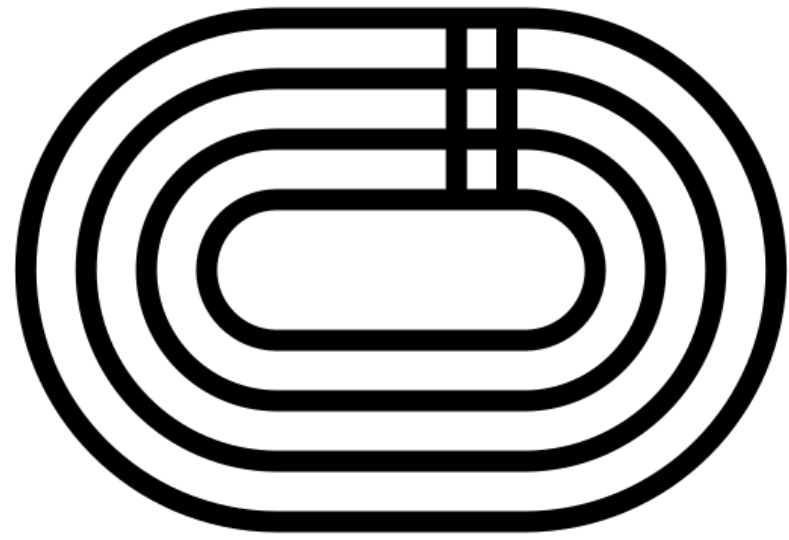
+



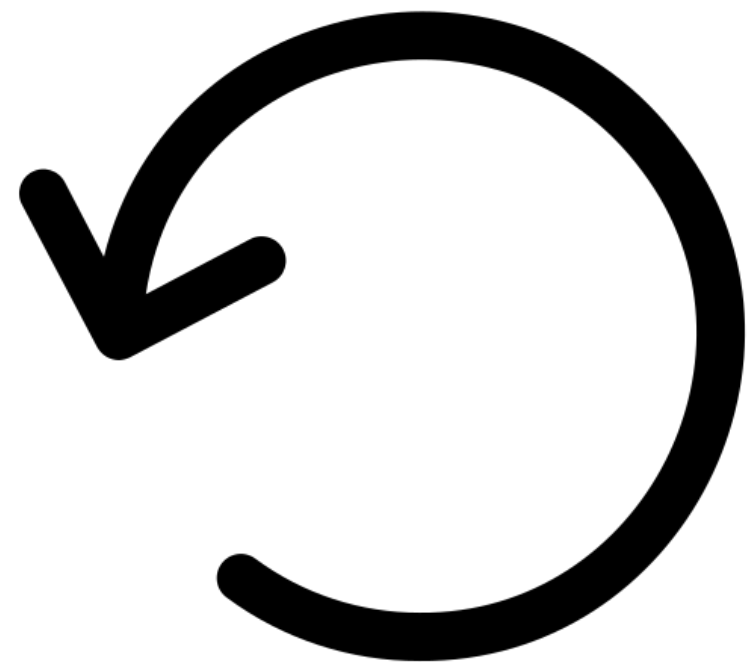
3136x9



Training



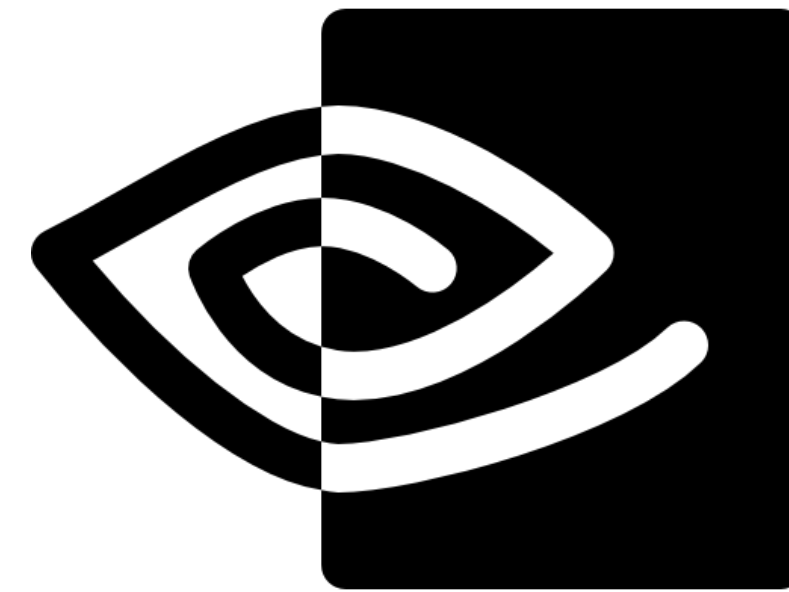
500 epochs



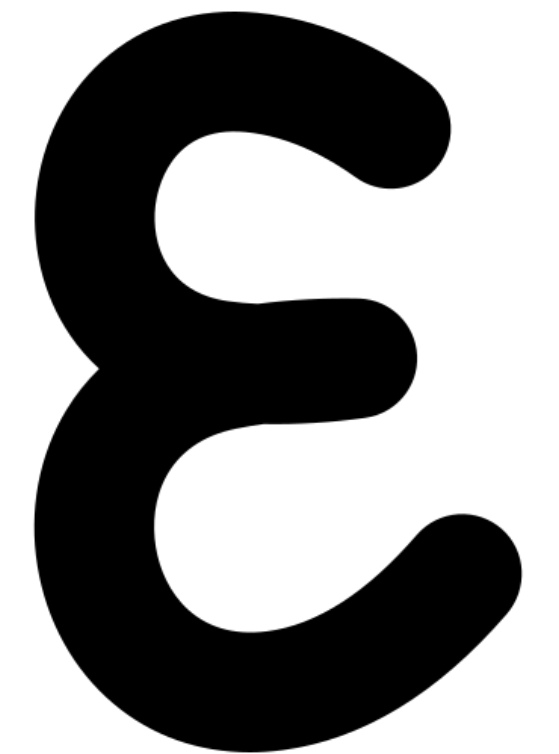
Replay Memory



4 hours training

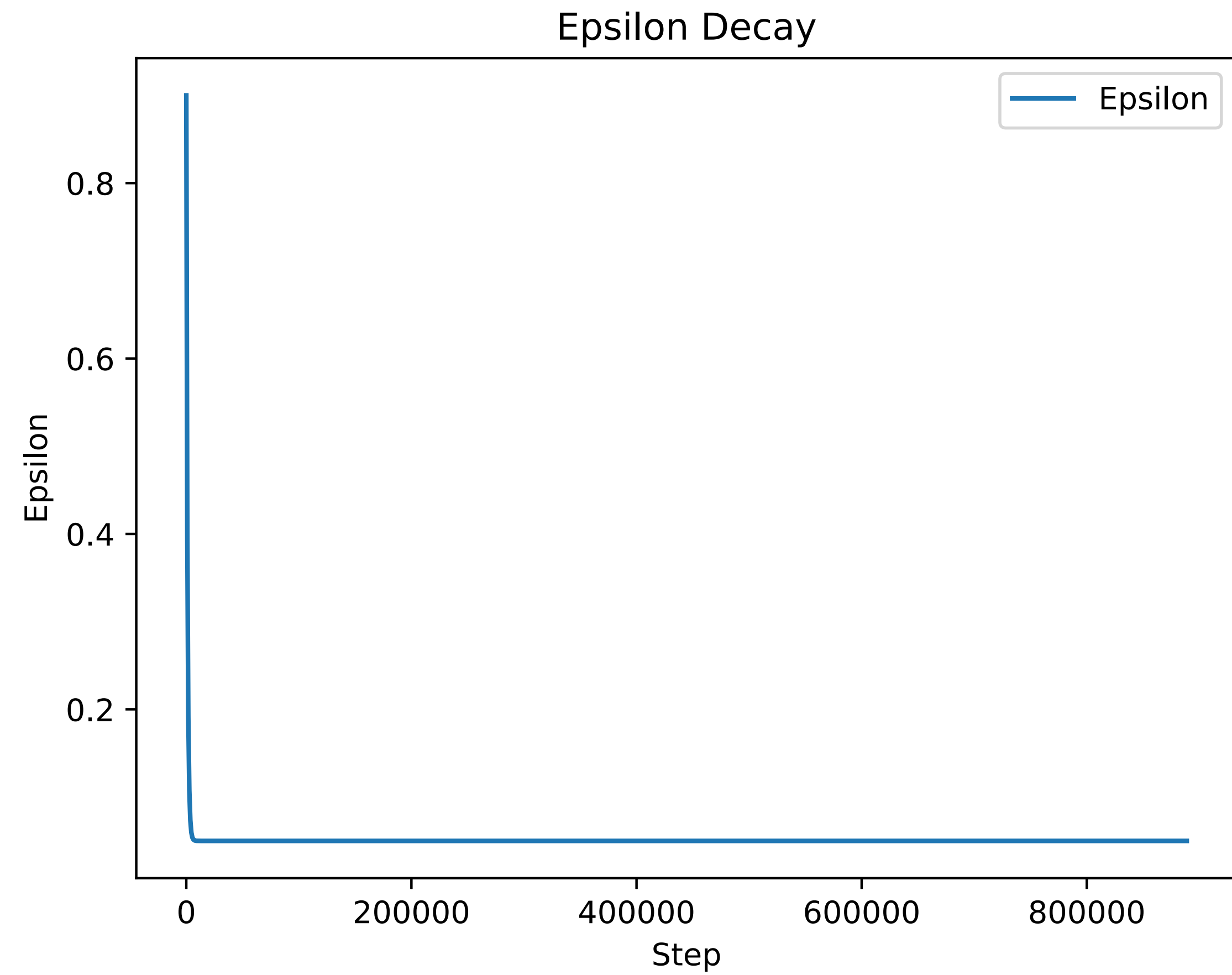


NVIDIA Tesla
T4 GPU

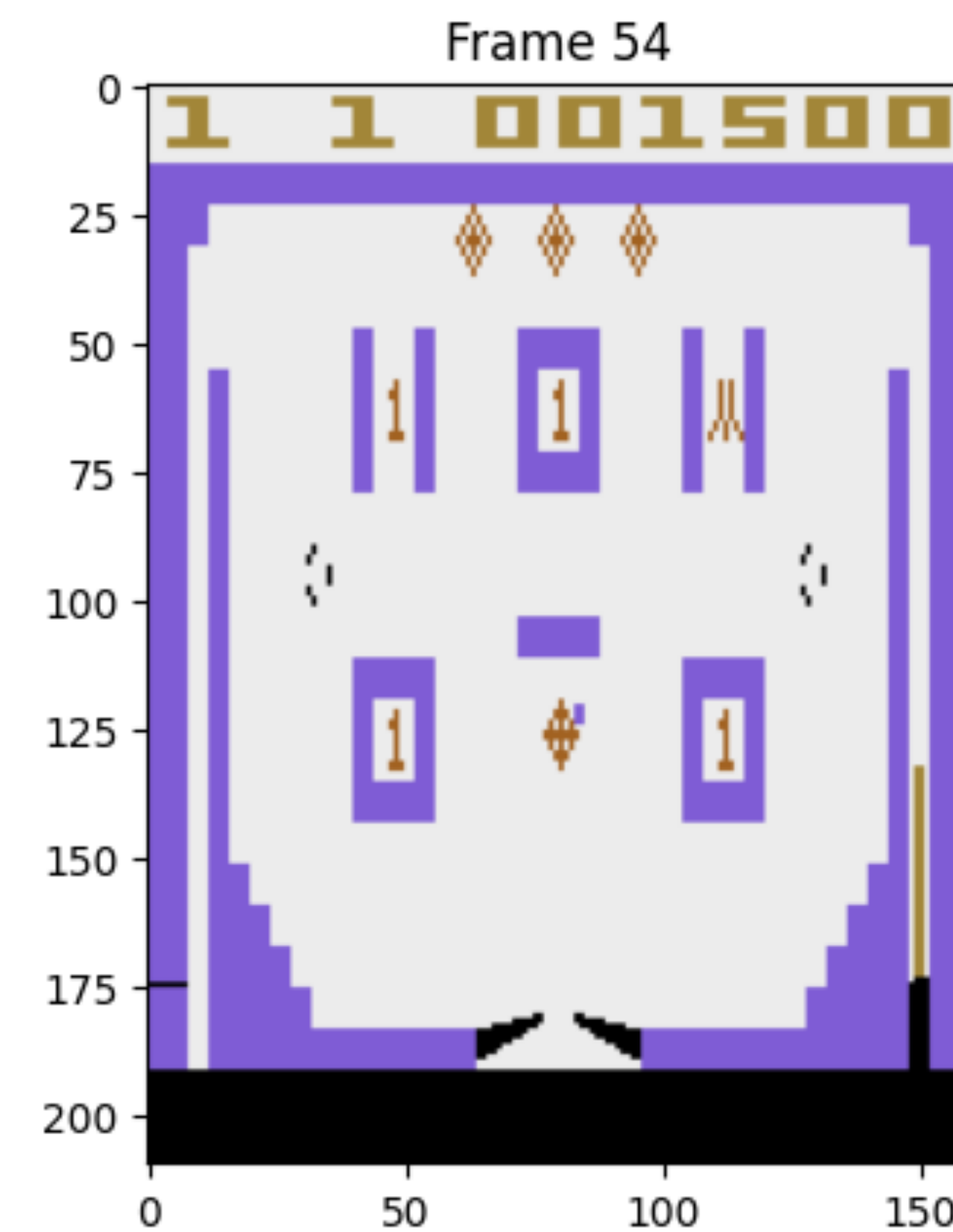
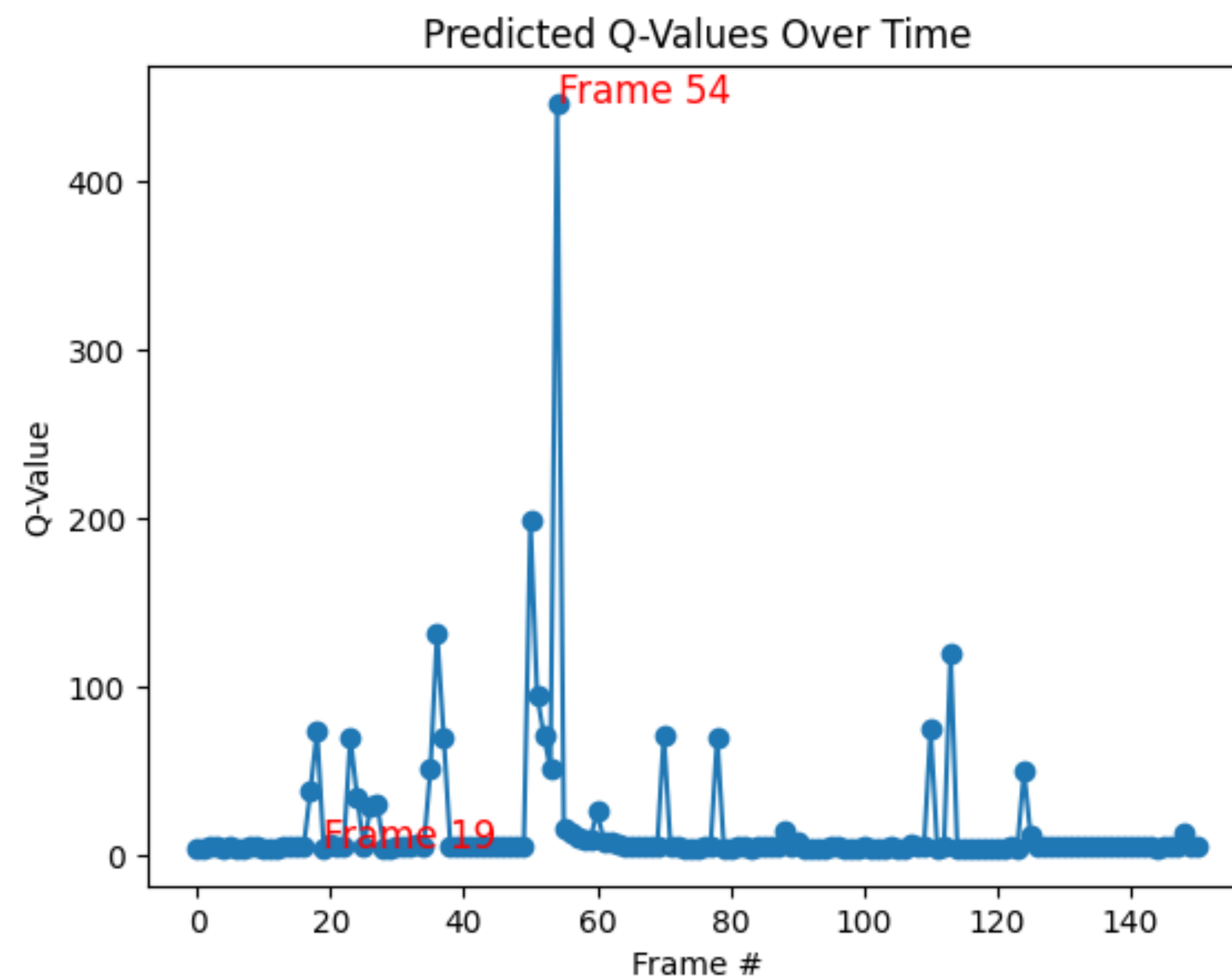
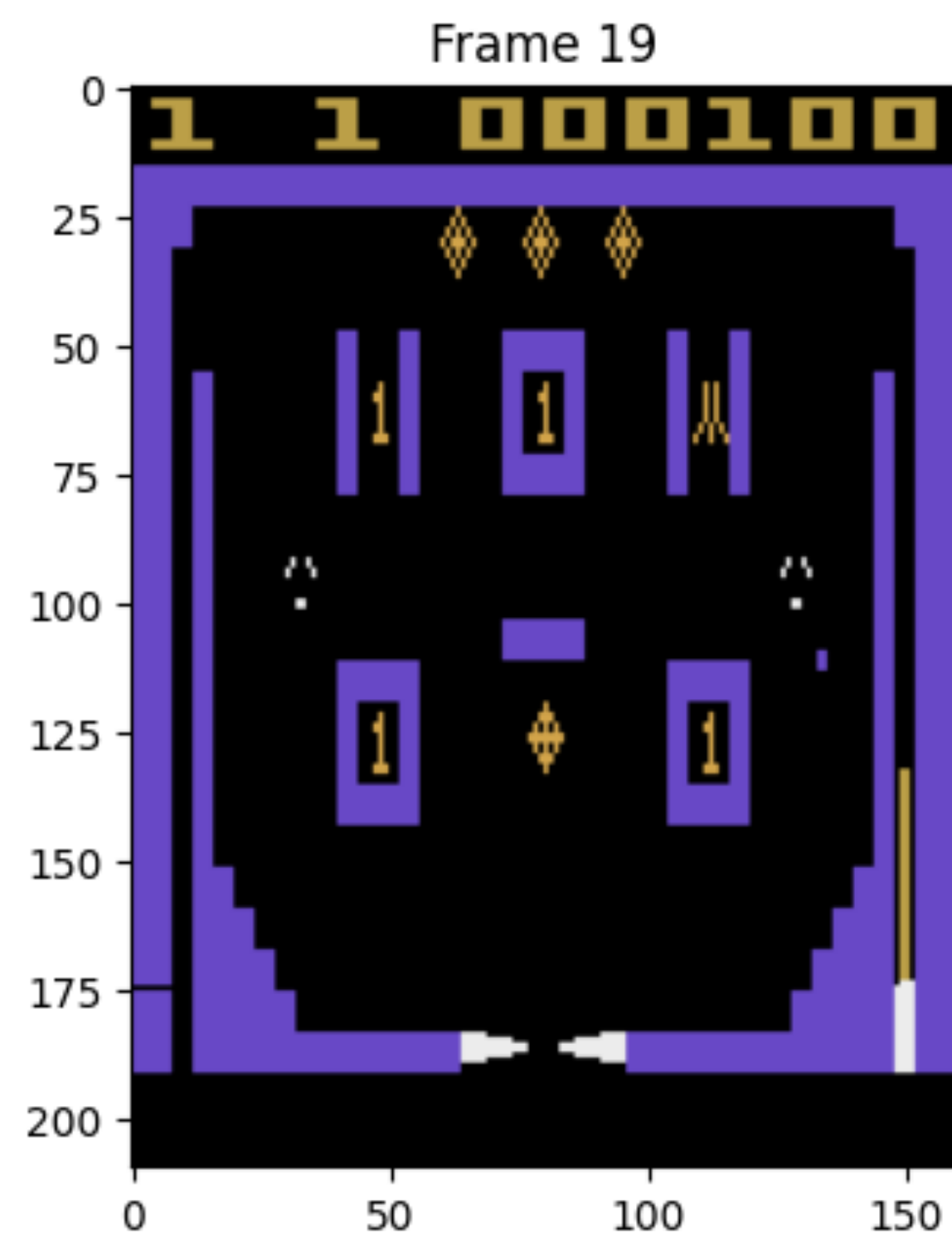


Epsilon-Greedy

Training Insights



Training Insights



Results & Demo

Model	Average Reward per Epoch
Baseline*	2931.6
DQN	12078.8

*Flippers are always active