**Environment**

# Gym

Open AI published a reinforcement learning toolkit, gym. It includes the Arcade learning environment(Bellemare *et al.*, 2012) ran on Stella Atari emulator. Therefore, user can train AI agents for a large number of Atari games from the gym library.

# Ice Hockey in Atari Game

Ice Hockey, an Atari video game released in 1981. It has two game modes: single and 2-player multiplayer. Ice Hockey has two teams, one team wear yellow cloth and green pants, another team wear blue cloth and red pants. Each team has two roles, goalie and offense. In this game, the action control is taken by either goalie or offense of a team, who is closer to the hockey puck. The whole time for a game episode is 3 minutes.

# Ice Hockey in gym

In the gym library, Ice Hockey has an observation shape (210,10,3); it has 3 layers of RGB, each layer is shaped in height 210 and width 160.

Space: Discrete

﻿timestep\_limit = ﻿max\_episode\_steps

﻿Trials = 100

Ram version Vs. Non-ram Version

Deterministic? No

NoFrameSkip?

﻿

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | frameskip | ﻿max\_episode\_steps | repeat\_action\_probability | Type |
| ﻿IceHockey-ram-v0 | - | ﻿﻿10000 | 0.25 | ram |
| ﻿IceHockey-ram-v4 | - | ﻿100000 | - | ram |
| ﻿IceHockey-ramDeterministic-v0 | 4 | ﻿100000 | 0.25 | ram |
| ﻿IceHockey-ramDeterministic-v4 | 4 | ﻿100000 | - | ram |
| ﻿IceHockey-ramNoFrameskip-v0 | 1 | ﻿400000 | 0.25 | ram |
| ﻿IceHockey-ramNoFrameskip-v4 | 1 | ﻿400000 | - | ram |
| ﻿IceHockey-v0 | - | ﻿10000 | 0.25 | image |
| ﻿IceHockey-v4 | - | ﻿100000 | - | image |
| ﻿IceHockeyDeterministic-v0 | 4 | ﻿100000 | 0.25 | image |
| ﻿IceHockeyDeterministic-v4 | 4 | ﻿100000 | - | image |
| ﻿IceHockeyNoFrameskip-v0 | 1 | ﻿400000 | 0.25 | image |
| ﻿IceHockeyNoFrameskip-v4 | 1 | ﻿400000 | - | image |

﻿['NOOP', 'FIRE', 'UP', 'RIGHT', 'LEFT', 'DOWN', 'UPRIGHT', 'UPLEFT', 'DOWNRIGHT', 'DOWNLEFT', 'UPFIRE', 'RIGHTFIRE', 'LEFTFIRE', 'DOWNFIRE', 'UPRIGHTFIRE', 'UPLEFTFIRE', 'DOWNRIGHTFIRE', 'DOWNLEFTFIRE']

 102-key keyboard layout

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| - | (32,) | (119,) | (100,) | (97,) | (115,) | (100,119) | (97,119) | (100,115) |
| - | ESC | W | D | A | S | D,W | A,W | D,S |
| NOOP | FIRE | UP | RIGHT | LEFT | DOWN | UPRIGHT | UPLEFT | DOWNRIGHT |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| (97,115) | (32,119) | (32,100) | (32,97) | (32,115) | (32,100,119) | (32,97,119) | (32,100,115) | (32,97,115) |
| A,S | ESC,W | ESP,D | ESC,A | ESC,S | ESC,D,W | ESC,A,W | ESC,D,S | ESC,A,S |
| ﻿DOWNLEFT | ﻿UPFIRE | ﻿RIGHTFIRE | ﻿LEFTFIRE | ﻿DOWNFIRE | UPRIGHTFIRE | ﻿UPLEFTFIRE | ﻿DOWNRIGHTFIRE | ﻿DOWNLEFTFIRE |

# 

pygame 1.9.4

﻿Python 3.7.0

﻿

**Objectives**

# Clustering Vs. Self-supervised learning Vs. unsupervised learning

Self-Supervision: A form of unsupervised learning where the data provides the supervision (https://project.inria.fr/paiss/files/2018/07/zisserman-self-supervised.pdf)

# AlexNet Architecture vs. ImageNet Vs. ResNet

# PASCAL: self-supervised pre-training, then train Faster-RCNN

# Tracking learning Vs. motion learning

# TDC (temporal distance Classification) vs. TCN(time contrastive network)

TDC > TCN

TDC 🡪 unsupervised learning

**References**

Bellemare, M. G. *et al.* (2012) ‘The Arcade Learning Environment: An Evaluation Platform for General Agents’, *arXiv e-prints*, p. arXiv:1207.4708.

anomalies

Trivial