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* NoopResetEnv(env, noop\_max=30)

The env will take random number of step 0 (no action) every time after env is reset.

The noop\_max is the highest number of no action taking.

* MaxAndSkipEnv(env, skip=4)

each time when the env take step, it will take same action for <skip> times, and only the max frame for last two frame.

(usually it should have <skip> obs, because you take <skip> actions. But it return only one obs:

obs.buffer[0] = obs[-2] # the second last obs of the serial action

obs.buffer[1] = obs[-1] # the last obs of the serial action

np.max(obs.buffer, axis=0)

)

* EpisodicLifeEnv(env)

1. if the step cause the life reduce (lose one life), it will return done=True
2. the reset method will only work when the lives is exhausted. Otherwise it will count as step(0)

* FireResetEnv(env)

the environment will try to take fire actions every time after reset.

* WarpFram(env)

Warp frames to 84\*84 and change the color space to grayscale uint8

* ScaleFloatFrame(env)

change the frame from uin8 to float 0~1

>> np.array(observation).astype(np.float32) / 255.0

* ClipRewardEnv(env)

the reward will be clipped to 1,0,-1

>> np.sign(reward)