```
dqn = DQNAgent(model=model, nb_actions=nb_actions, policy=policy, memory=memory,
               processor=processor, nb_steps_warmup=agent_nb_steps_warmup, gamma=.99,
               #target_model_update=agent_target_model_update,
               train_interval=agent_train_interval, batch_size=agent_batch_size
               #enable_double_dqn=True,
               #enable_dueling_network=True, dueling_type='avg'
               )

# https://github.com/keras-rl/keras-rl/tree/master/examples
#dqn = DQNAgent(model=model, nb_actions=nb_actions, memory=memory, nb_steps_warmup=10,
#               enable_dueling_network=True, dueling_type='avg', target_model_update=1e-2, policy=policy)

#dqn.show_hyperparams()
# TO-DO
# model.compile(loss='binary_crossentropy', optimizer='adam', metrics=['accuracy'])
optimizer = optimizer_type # TO-DO
dqn.compile(optimizer, metrics=['mae'])

'''
def huber_loss(a, b, in_keras=True):
    error = a - b
    quadratic_term = error*error / 2
    linear_term = abs(error) - 1/2
    use_linear_term = (abs(error) > 1.0)
    if in_keras:
        # Keras won't let us multiply floats by booleans, so we explicitly cast the booleans to floats
        use_linear_term = K.cast(use_linear_term, 'float32')
    return use_linear_term * linear_term + (1-use_linear_term) * quadratic_term

loss=huber_loss
custom_objects={'huber_loss': huber_loss}
self.model.compile(optimizer, loss=huber_loss)
'''
```

```
"\ndef huber_loss(a, b, in_keras=True):\n    error = a - b\n    quadratic_term = error*error / 2\n    linear_term = abs(er
```

```
# Timestamp para el nombre de archivo de pesos
now = datetime.now()
date_time = now.strftime("%Y%m%d%H%M")

# Nombre del archivo para guardar los pesos
weights_filename = 'dqn_{}_weights.h5f'.format(ENV_NAME)
weights_filename = date_time + '_' + weights_filename

# checkpoint por intervalo
saved_model= date_time + '_dqn_PartialRunPong_weight_{step}.h5'
checkpoint = ModelIntervalCheckpoint(saved_model, interval=50000)

# logs para TensorBoard
tb_log_dir = 'logs/tmp'
tb_callback = TensorBoard(log_dir=tb_log_dir, histogram_freq=0, write_graph=True)

nb_steps = 1750000
nb_steps = train_steps
# Entrenamento con diferentes callbacks
#dqn.fit(env, nb_steps=nb_steps, visualize=False, callbacks=[checkpoint, tb_callback], verbose=2)
#dqn.fit(env, nb_steps=nb_steps, visualize=False, callbacks=[tb_callback], verbose=2)
#dqn.fit(env, nb_steps=nb_steps, visualize=False, callbacks=[checkpoint], verbose=2)
train_history = dqn.fit(env, nb_steps=nb_steps, visualize=False, verbose=2)


dqn.save_weights(weights_filename, overwrite=True)
print("Pesos guardados en:",weights_filename)

#nb_episodes = 3
#dqn.test(env, nb_episodes=nb_episodes, visualize=False)

grafica_entrenamiento(train_history)

calcula_media_test(dqn)

# colab 397.328 segundos
# local 754.133 segundos
```

```
r 2500000 steps ...
)0000: episode: 1, duration: 4.708s, episode steps: 1250, steps per second: 265, episode reward: -17.000, mean reward: -0.0
)0000: episode: 2, duration: 2.425s, episode steps: 843, steps per second: 348, episode reward: -21.000, mean reward: -0.02
)0000: episode: 3, duration: 2.776s, episode steps: 949, steps per second: 342, episode reward: -20.000, mean reward: -0.02
)0000: episode: 4, duration: 2.637s, episode steps: 913, steps per second: 346, episode reward: -21.000, mean reward: -0.02
)0000: episode: 5, duration: 2.402s, episode steps: 842, steps per second: 351, episode reward: -20.000, mean reward: -0.02
)0000: episode: 6, duration: 2.550s, episode steps: 893, steps per second: 350, episode reward: -20.000, mean reward: -0.02
)0000: episode: 7, duration: 3.160s, episode steps: 1081, steps per second: 342, episode reward: -21.000, mean reward: -0.0
)0000: episode: 8, duration: 2.531s, episode steps: 873, steps per second: 345, episode reward: -21.000, mean reward: -0.02
)0000: episode: 9, duration: 2.702s, episode steps: 943, steps per second: 349, episode reward: -20.000, mean reward: -0.02
)0000: episode: 10, duration: 2.428s, episode steps: 852, steps per second: 351, episode reward: -21.000, mean reward: -0.0
)0000: episode: 11, duration: 5.955s, episode steps: 842, steps per second: 141, episode reward: -20.000, mean reward: -0.0
)0000: episode: 12, duration: 5.475s, episode steps: 821, steps per second: 150, episode reward: -21.000, mean reward: -0.0
)0000: episode: 13, duration: 5.542s, episode steps: 842, steps per second: 152, episode reward: -20.000, mean reward: -0.0
)0000: episode: 14, duration: 6.507s, episode steps: 974, steps per second: 150, episode reward: -20.000, mean reward: -0.0
)0000: episode: 15, duration: 5.114s, episode steps: 764, steps per second: 149, episode reward: -21.000, mean reward: -0.0
)0000: episode: 16, duration: 6.677s, episode steps: 997, steps per second: 149, episode reward: -21.000, mean reward: -0.0
)0000: episode: 17, duration: 5.096s, episode steps: 764, steps per second: 150, episode reward: -21.000, mean reward: -0.0
)0000: episode: 18, duration: 6.150s, episode steps: 923, steps per second: 150, episode reward: -20.000, mean reward: -0.0
)0000: episode: 19, duration: 5.051s, episode steps: 764, steps per second: 151, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 22, duration: 6.637s, episode steps: 1005, steps per second: 151, episode reward: -21.000, mean reward: -0.
)0000: episode: 23, duration: 6.696s, episode steps: 1004, steps per second: 150, episode reward: -19.000, mean reward: -0.
)0000: episode: 24, duration: 5.405s, episode steps: 820, steps per second: 152, episode reward: -21.000, mean reward: -0.0
)0000: episode: 25, duration: 5.799s, episode steps: 871, steps per second: 150, episode reward: -21.000, mean reward: -0.0
)0000: episode: 26, duration: 5.985s, episode steps: 900, steps per second: 150, episode reward: -20.000, mean reward: -0.0
)0000: episode: 27, duration: 6.355s, episode steps: 958, steps per second: 151, episode reward: -20.000, mean reward: -0.0
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)0000: episode: 30, duration: 5.470s, episode steps: 820, steps per second: 150, episode reward: -21.000, mean reward: -0.0
)0000: episode: 31, duration: 5.904s, episode steps: 884, steps per second: 150, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 34, duration: 6.133s, episode steps: 924, steps per second: 151, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 47, duration: 5.576s, episode steps: 838, steps per second: 150, episode reward: -20.000, mean reward: -0.0
)0000: episode: 48, duration: 6.001s, episode steps: 910, steps per second: 152, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 51, duration: 6.706s, episode steps: 1010, steps per second: 151, episode reward: -19.000, mean reward: -0.
)0000: episode: 52, duration: 5.578s, episode steps: 845, steps per second: 151, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 54, duration: 5.774s, episode steps: 884, steps per second: 153, episode reward: -21.000, mean reward: -0.0
)0000: episode: 55, duration: 5.876s, episode steps: 885, steps per second: 151, episode reward: -21.000, mean reward: -0.0
)0000: episode: 56, duration: 5.460s, episode steps: 824, steps per second: 151, episode reward: -21.000, mean reward: -0.0
)0000: episode: 57, duration: 5.602s, episode steps: 838, steps per second: 150, episode reward: -20.000, mean reward: -0.0
)0000: episode: 58, duration: 6.245s, episode steps: 945, steps per second: 151, episode reward: -21.000, mean reward: -0.0
)0000: episode: 59, duration: 5.424s, episode steps: 824, steps per second: 152, episode reward: -21.000, mean reward: -0.0
)0000: episode: 60, duration: 5.945s, episode steps: 898, steps per second: 151, episode reward: -20.000, mean reward: -0.0
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)0000: episode: 63, duration: 5.449s, episode steps: 824, steps per second: 151, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 65, duration: 5.238s, episode steps: 792, steps per second: 151, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 69, duration: 5.491s, episode steps: 824, steps per second: 150, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 73, duration: 5.196s, episode steps: 792, steps per second: 152, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 77, duration: 5.521s, episode steps: 842, steps per second: 152, episode reward: -20.000, mean reward: -0.0
)0000: episode: 78, duration: 5.413s, episode steps: 824, steps per second: 152, episode reward: -21.000, mean reward: -0.0
)0000: episode: 79, duration: 5.837s, episode steps: 884, steps per second: 151, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 81, duration: 5.042s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.0
)0000: episode: 82, duration: 5.819s, episode steps: 886, steps per second: 152, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 84, duration: 5.126s, episode steps: 783, steps per second: 153, episode reward: -21.000, mean reward: -0.0
)0000: episode: 85, duration: 5.048s, episode steps: 764, steps per second: 151, episode reward: -21.000, mean reward: -0.0
)0000: episode: 86, duration: 5.357s, episode steps: 824, steps per second: 154, episode reward: -21.000, mean reward: -0.0
)0000: episode: 87, duration: 5.451s, episode steps: 824, steps per second: 151, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 89, duration: 5.234s, episode steps: 792, steps per second: 151, episode reward: -21.000, mean reward: -0.0
)0000: episode: 90, duration: 5.517s, episode steps: 842, steps per second: 153, episode reward: -20.000, mean reward: -0.0
)0000: episode: 91, duration: 5.854s, episode steps: 886, steps per second: 151, episode reward: -21.000, mean reward: -0.0
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)0000: episode: 93, duration: 5.526s, episode steps: 838, steps per second: 152, episode reward: -20.000, mean reward: -0.0
```

```
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0000: episode: 95, duration: 5.021s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.0
0000: episode: 96, duration: 5.400s, episode steps: 824, steps per second: 153, episode reward: -21.000, mean reward: -0.0
0000: episode: 97, duration: 5.479s, episode steps: 842, steps per second: 154, episode reward: -20.000, mean reward: -0.0
0000: episode: 98, duration: 5.634s, episode steps: 824, steps per second: 146, episode reward: -21.000, mean reward: -0.0
0000: episode: 99, duration: 5.991s, episode steps: 884, steps per second: 148, episode reward: -21.000, mean reward: -0.0
0000: episode: 100, duration: 5.756s, episode steps: 880, steps per second: 153, episode reward: -21.000, mean reward: -0.
0000: episode: 101, duration: 5.610s, episode steps: 840, steps per second: 150, episode reward: -21.000, mean reward: -0.
0000: episode: 102, duration: 5.080s, episode steps: 764, steps per second: 150, episode reward: -21.000, mean reward: -0.
0000: episode: 103, duration: 4.978s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
0000: episode: 104, duration: 5.505s, episode steps: 824, steps per second: 150, episode reward: -21.000, mean reward: -0.
0000: episode: 105, duration: 5.448s, episode steps: 826, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 106, duration: 5.054s, episode steps: 764, steps per second: 151, episode reward: -21.000, mean reward: -0.
0000: episode: 107, duration: 5.050s, episode steps: 764, steps per second: 151, episode reward: -21.000, mean reward: -0.
0000: episode: 108, duration: 5.014s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 109, duration: 5.229s, episode steps: 792, steps per second: 151, episode reward: -21.000, mean reward: -0.
0000: episode: 110, duration: 5.037s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 111, duration: 5.009s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
0000: episode: 112, duration: 5.428s, episode steps: 820, steps per second: 151, episode reward: -21.000, mean reward: -0.
0000: episode: 113, duration: 5.441s, episode steps: 824, steps per second: 151, episode reward: -21.000, mean reward: -0.
0000: episode: 114, duration: 5.051s, episode steps: 764, steps per second: 151, episode reward: -21.000, mean reward: -0.
0000: episode: 115, duration: 5.201s, episode steps: 792, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 116, duration: 4.990s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
0000: episode: 117, duration: 5.198s, episode steps: 792, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 118, duration: 5.061s, episode steps: 764, steps per second: 151, episode reward: -21.000, mean reward: -0.
0000: episode: 119, duration: 5.009s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
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0000: episode: 121, duration: 5.203s, episode steps: 793, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 122, duration: 5.070s, episode steps: 783, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 123, duration: 4.960s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 124, duration: 4.962s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 125, duration: 5.013s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 126, duration: 5.469s, episode steps: 852, steps per second: 156, episode reward: -21.000, mean reward: -0.
0000: episode: 127, duration: 5.839s, episode steps: 887, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 128, duration: 4.970s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 129, duration: 5.450s, episode steps: 842, steps per second: 154, episode reward: -20.000, mean reward: -0.
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0000: episode: 134, duration: 5.347s, episode steps: 822, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 135, duration: 5.323s, episode steps: 812, steps per second: 153, episode reward: -21.000, mean reward: -0.
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0000: episode: 137, duration: 5.007s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
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0000: episode: 141, duration: 5.403s, episode steps: 824, steps per second: 152, episode reward: -21.000, mean reward: -0.
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0000: episode: 144, duration: 5.098s, episode steps: 783, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 145, duration: 4.989s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
0000: episode: 146, duration: 7.738s, episode steps: 1146, steps per second: 148, episode reward: -20.000, mean reward: -0
0000: episode: 147, duration: 5.011s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 148, duration: 5.817s, episode steps: 884, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 149, duration: 4.909s, episode steps: 764, steps per second: 156, episode reward: -21.000, mean reward: -0.
0000: episode: 150, duration: 5.351s, episode steps: 824, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 151, duration: 5.328s, episode steps: 824, steps per second: 155, episode reward: -21.000, mean reward: -0.
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0000: episode: 153, duration: 5.110s, episode steps: 792, steps per second: 155, episode reward: -21.000, mean reward: -0.
0000: episode: 154, duration: 4.970s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 155, duration: 4.954s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 156, duration: 5.244s, episode steps: 792, steps per second: 151, episode reward: -21.000, mean reward: -0.
0000: episode: 157, duration: 5.494s, episode steps: 812, steps per second: 148, episode reward: -21.000, mean reward: -0.
0000: episode: 158, duration: 5.112s, episode steps: 764, steps per second: 149, episode reward: -21.000, mean reward: -0.
0000: episode: 159, duration: 4.934s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
0000: episode: 160, duration: 5.010s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 161, duration: 4.940s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
0000: episode: 162, duration: 5.226s, episode steps: 792, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 163, duration: 4.969s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 164, duration: 6.162s, episode steps: 946, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 165, duration: 4.928s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
0000: episode: 166, duration: 4.974s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 167, duration: 4.961s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 168, duration: 4.981s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
0000: episode: 169, duration: 5.391s, episode steps: 826, steps per second: 153, episode reward: -21.000, mean reward: -0.
0000: episode: 170, duration: 4.975s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 171, duration: 5.347s, episode steps: 824, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 172, duration: 4.934s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
0000: episode: 173, duration: 4.934s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
0000: episode: 174, duration: 4.939s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
0000: episode: 175, duration: 5.736s, episode steps: 884, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 176, duration: 6.124s, episode steps: 944, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 177, duration: 4.874s, episode steps: 764, steps per second: 157, episode reward: -21.000, mean reward: -0.
0000: episode: 178, duration: 4.939s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
0000: episode: 179, duration: 5.301s, episode steps: 824, steps per second: 155, episode reward: -21.000, mean reward: -0.
0000: episode: 180, duration: 4.981s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
0000: episode: 181, duration: 6.223s, episode steps: 944, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 182, duration: 5.017s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 183, duration: 5.041s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.
0000: episode: 184, duration: 5.388s, episode steps: 824, steps per second: 153, episode reward: -21.000, mean reward: -0.
0000: episode: 185, duration: 4.980s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
0000: episode: 186, duration: 5.070s, episode steps: 764, steps per second: 151, episode reward: -21.000, mean reward: -0.
0000: episode: 187, duration: 4.959s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
0000: episode: 188, duration: 5.029s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.
```

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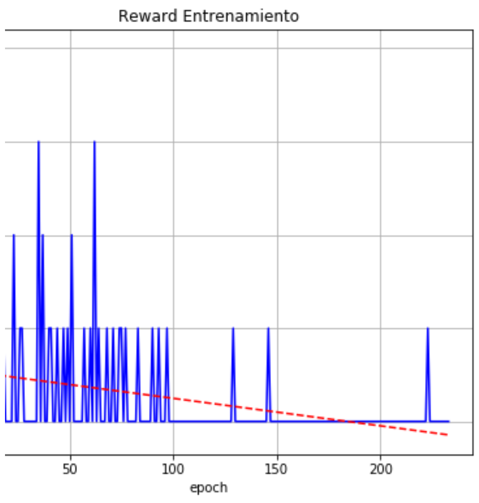
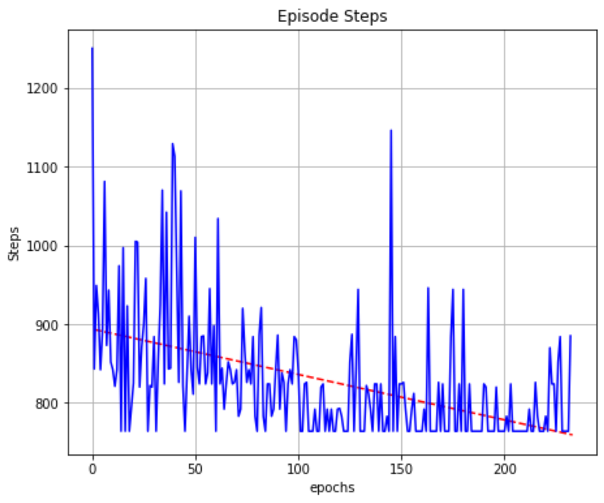
)0000: episode: 189, duration: 5.055s, episode steps: 764, steps per second: 151, episode reward: -21.000, mean reward: -0.
)0000: episode: 190, duration: 5.095s, episode steps: 764, steps per second: 150, episode reward: -21.000, mean reward: -0.
)0000: episode: 191, duration: 5.382s, episode steps: 824, steps per second: 153, episode reward: -21.000, mean reward: -0.
)0000: episode: 192, duration: 5.392s, episode steps: 820, steps per second: 152, episode reward: -21.000, mean reward: -0.
)0000: episode: 193, duration: 5.027s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.
)0000: episode: 194, duration: 4.958s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 195, duration: 4.952s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 196, duration: 4.936s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
)0000: episode: 197, duration: 5.354s, episode steps: 820, steps per second: 153, episode reward: -21.000, mean reward: -0.
)0000: episode: 198, duration: 4.958s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 199, duration: 4.956s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 200, duration: 4.948s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 201, duration: 4.964s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 202, duration: 5.066s, episode steps: 783, steps per second: 155, episode reward: -21.000, mean reward: -0.
)0000: episode: 203, duration: 4.999s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
)0000: episode: 204, duration: 5.419s, episode steps: 824, steps per second: 152, episode reward: -21.000, mean reward: -0.
)0000: episode: 205, duration: 5.154s, episode steps: 764, steps per second: 148, episode reward: -21.000, mean reward: -0.
)0000: episode: 206, duration: 4.914s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
)0000: episode: 207, duration: 4.932s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
)0000: episode: 208, duration: 4.942s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
)0000: episode: 209, duration: 4.917s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
)0000: episode: 210, duration: 4.915s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
)0000: episode: 211, duration: 4.963s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 212, duration: 4.925s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
)0000: episode: 213, duration: 5.129s, episode steps: 792, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 214, duration: 5.016s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.
)0000: episode: 215, duration: 4.975s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 216, duration: 5.364s, episode steps: 826, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 217, duration: 5.270s, episode steps: 783, steps per second: 149, episode reward: -21.000, mean reward: -0.
)0000: episode: 218, duration: 5.164s, episode steps: 764, steps per second: 148, episode reward: -21.000, mean reward: -0.
)0000: episode: 219, duration: 4.992s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
)0000: episode: 220, duration: 4.980s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
)0000: episode: 221, duration: 5.005s, episode steps: 783, steps per second: 156, episode reward: -21.000, mean reward: -0.
)0000: episode: 222, duration: 4.988s, episode steps: 764, steps per second: 153, episode reward: -21.000, mean reward: -0.
)0000: episode: 223, duration: 5.609s, episode steps: 870, steps per second: 155, episode reward: -20.000, mean reward: -0.
)0000: episode: 224, duration: 5.346s, episode steps: 824, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 225, duration: 5.341s, episode steps: 824, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 226, duration: 4.922s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
)0000: episode: 227, duration: 5.491s, episode steps: 852, steps per second: 155, episode reward: -21.000, mean reward: -0.
)0000: episode: 228, duration: 5.758s, episode steps: 884, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 229, duration: 4.919s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
)0000: episode: 230, duration: 5.035s, episode steps: 764, steps per second: 152, episode reward: -21.000, mean reward: -0.
)0000: episode: 231, duration: 4.915s, episode steps: 764, steps per second: 155, episode reward: -21.000, mean reward: -0.
)0000: episode: 232, duration: 4.967s, episode steps: 764, steps per second: 154, episode reward: -21.000, mean reward: -0.
)0000: episode: 233, duration: 5.706s, episode steps: 885, steps per second: 155, episode reward: -21.000, mean reward: -0.
1239.665 seconds
ados en: 202001122103_dqn_PongDeterministic-v0_weights.h5f
```





```
 10 episodes ...
reward: -21.000, steps: 764
reward: -21.000, steps: 764
reward: -21.000, steps: 764
reward: -21.000, steps: 764
reward: -21.000, steps: 764
reward: -21.000, steps: 764
reward: -21.000, steps: 764
reward: -21.000, steps: 764
reward: -21.000, steps: 764
 reward: -21.000, steps: 764
: -21.0
 764
)
```

```
#my_hist_reward2=[]
#my_hist_steps2=[]
type(my_hist_reward2)
```