

# pa2-dqn-acro-bot

March 29, 2023

```
[ ]: import math
import numpy as np
import random
import torch
import torch.nn as nn
import torch.nn.functional as F
from collections import namedtuple, deque
import torch.optim as optim
import datetime
import gym
from gym.wrappers.record_video import RecordVideo
import glob
import io
import base64
import matplotlib.pyplot as plt
from IPython.display import HTML
from pyvirtualdisplay import Display
import tensorflow as tf
from IPython import display as ipythondisplay
from PIL import Image
import tensorflow_probability as tfp
import warnings
warnings.filterwarnings("ignore")
```

```
[ ]: env = gym.make('Acrobot-v1')
env.seed(0)

state_shape = env.observation_space.shape[0]
no_of_actions = env.action_space.n

print(state_shape)
print(no_of_actions)
print(env.action_space.sample())
print("-----")

state = env.reset()
```

```

''' This returns the initial state (when environment is reset) '''

print(state)
print("----")

action = env.action_space.sample()
''' We take a random action now '''

print(action)
print("----")

next_state, reward, done, info = env.step(action)
''' env.step is used to calculate new state and obtain reward based on old_
↪state and action taken '''

print(next_state)
print(reward)
print(done)
print(info)
print("----")

```

```

6
3
2
----
[ 0.99962485  0.02738891  0.9989402 -0.04602639 -0.09180529 -0.09669447]
----
1
----
[ 0.9999849  0.00548956  0.9983176 -0.05798252 -0.12309824 -0.02443151]
-1.0
False
{}
----

```

```

[ ]: parameters_dict = {
    'NUM_NEURONS_EACH_LAYER' : {
        'values': [64,90,128]
    },
    'NUM_LAYERS' :{
        'values': [2,4,8,10]
    },
}
sweep_config['parameters'] = parameters_dict

```

```

[ ]: import math
parameters_dict.update({

```

```

'LR': {

    'distribution': 'uniform',
    'min': (0.00001),
    'max': (0.0001)
},
'BATCH_SIZE': {

    'distribution': 'q_log_uniform_values',
    'q' : 1,
    'min': (64),
    'max': (512),
},
'UPDATE_EVERY': {

    'distribution': 'q_log_uniform_values',
    'q' : 1,
    'min': (10),
    'max': (200),
},
'GAMMA': {

    'distribution': 'uniform',
    'min': 0.8,
    'max': 1,
},
'MAX_TRUNCATION': {

    'distribution': 'uniform',
    'min': (0.5),
    'max': (2),
},
'EPS_DECAY': {

    'distribution': 'uniform',
    'min': 0.9,
    'max': 0.995,
},
'a_TUNE': {

    'distribution': 'uniform',
    'min': 0,
    'max': 1,
}

})

```

```
[ ]: import pprint
```

```
pprint.pprint(sweep_config)
```

```
{'method': 'random',  
 'metric': {'goal': 'minimize', 'name': 'num_episodes_tosolve_env'},  
 'parameters': {'BATCH_SIZE': {'distribution': 'q_log_uniform_values',  
                                'max': 512,  
                                'min': 64,  
                                'q': 1},  
                 'EPS_DECAY': {'distribution': 'uniform',  
                               'max': 0.995,  
                               'min': 0.9},  
                 'GAMMA': {'distribution': 'uniform', 'max': 1, 'min': 0.8},  
                 'LR': {'distribution': 'uniform', 'max': 0.0001, 'min': 1e-05},  
                 'MAX_TRUNCATION': {'distribution': 'uniform',  
                                    'max': 2,  
                                    'min': 0.5},  
                 'NUM_LAYERS': {'values': [2, 4, 8, 10]},  
                 'NUM_NEURONS_EACH_LAYER': {'values': [64, 90, 128]},  
                 'UPDATE_EVERY': {'distribution': 'q_log_uniform_values',  
                                  'max': 200,  
                                  'min': 10,  
                                  'q': 1},  
                 'a_TUNE': {'distribution': 'uniform', 'max': 1, 'min': 0}}}
```

```
[ ]: sweep_id = wandb.sweep(sweep_config, project="Hyper parameter tuning Acrobot -v1")
```

Failed to detect the name of this notebook, you can set it manually with the WANDB\_NOTEBOOK\_NAME environment variable to enable code saving.

Create sweep with ID: pbokhaz2

Sweep URL: <https://wandb.ai/me19b190/Hyper%20parameter%20tuning%20Acrobot%20-%20v1/sweeps/pbokhaz2>

```
[ ]: import torch
```

```
import torch.nn as nn
```

```
import torch.nn.functional as F
```

```
class QNetwork1(nn.Module): #take state s and outputs Q(s,a)
```

```
    def __init__(self, seed, state_size, action_size,  
↳ num_layers, neurons_each_layer): #num_layers = number of hidden  
↳ layers, neurons_each_layer = number of neurons in hidden layers  
        super(QNetwork1, self).__init__()  
        self.seed = torch.manual_seed(seed)
```

```

self.input_size = state_size
self.output_size = action_size
self.num_layers = num_layers
self.neurons_each_layer = neurons_each_layer
self.linears = nn.ModuleList([nn.Linear(self.input_size, self.
↪neurons_each_layer[0])])
    self.linears.extend([nn.Linear(self.neurons_each_layer[i-1], self.
↪neurons_each_layer[i]) for i in range(1, self.num_layers)])
    self.linears.append(nn.Linear(self.neurons_each_layer[-1], self.
↪output_size))

def forward(self, state):
    h=None
    for i in range(self.num_layers+1):
        if i == 0:
            h = F.relu(self.linears[0](state))
        elif i<(self.num_layers):
            h = F.relu(self.linears[i](h))
        else:
            return self.linears[self.num_layers](h)

```

```

[ ]: import random
import torch
import numpy as np
from collections import deque, namedtuple

device = torch.device("cuda:0" if torch.cuda.is_available() else "cpu")

class ReplayBuffer:
    """Fixed-size buffer to store experience tuples."""

    def __init__(self, action_size, buffer_size, batch_size, seed):
        """Initialize a ReplayBuffer object.

        Params
        =====
        action_size (int): dimension of each action
        buffer_size (int): maximum size of buffer
        batch_size (int): size of each training batch
        seed (int): random seed
        """

        self.action_size = action_size
        self.memory = deque(maxlen=buffer_size)
        self.batch_size = batch_size
        self.experience = namedtuple("Experience", field_names=["state",
↪"action", "reward", "next_state", "done"])
        self.seed = random.seed(seed)

```

```

def add(self, state, action, reward, next_state, done): #added TD
    """Add a new experience to memory."""
    e = self.experience(state, action, reward, next_state, done)
    self.memory.append(e)

def sample(self, batch_size=None, a=1.0):
    """Randomly sample a batch of experiences from memory."""
    experiences = random.sample(self.memory, k=self.batch_size)

    states = torch.from_numpy(np.vstack([e.state for e in experiences if e
↪is not None])).float().to(device)
    actions = torch.from_numpy(np.vstack([e.action for e in experiences if
↪e is not None])).long().to(device)
    rewards = torch.from_numpy(np.vstack([e.reward for e in experiences if
↪e is not None])).float().to(device)
    next_states = torch.from_numpy(np.vstack([e.next_state for e in
↪experiences if e is not None])).float().to(device)
    dones = torch.from_numpy(np.vstack([e.done for e in experiences if e is
↪not None]).astype(np.uint8)).float().to(device)

    return (states, actions, rewards, next_states, dones)

def __len__(self):
    """Return the current size of internal memory."""
    return len(self.memory)

```

```

[ ]: class TutorialAgent():

    def __init__(self, state_size, action_size,
↪seed, num_layers, neurons_each_layer, lr, gamma, update_every, batch_size, max_tRUNCATION):
    ↪

        ''' Agent Environment Interaction '''
        self.state_size = state_size
        self.action_size = action_size
        self.seed = random.seed(seed)
        self.batch_size = batch_size
        self.gamma = gamma
        self.MAX_TRUNCATION = max_tRUNCATION
        self.update_every = update_every
        ''' Q-Network '''
        self.qnetwork_local = QNetwork1(seed=seed, state_size= state_size,
↪action_size=action_size,
↪num_layers=num_layers, neurons_each_layer=neurons_each_layer).to(device)

```

```

        self.qnetwork_target = QNetwork1(seed=seed, state_size= state_size,
↪action_size=action_size
↪,num_layers=num_layers,neurons_each_layer=neurons_each_layer).to(device)
        self.optimizer = optim.Adam(self.qnetwork_local.parameters(), lr=lr)

        ''' Replay memory '''
        self.memory = ReplayBuffer(action_size, int(1e5), self.batch_size,
↪seed=seed)

        ''' Initialize time step (for updating every UPDATE_EVERY steps)
↪ -Needed for Q Targets '''
        self.t_step = 0

    def step(self, state, action, reward, next_state, done,a):

        ''' Save experience in replay memory '''
        self.memory.add(state, action, reward, next_state, done)

        ''' If enough samples are available in memory, get random subset and
↪learn '''
        if len(self.memory) >= self.batch_size:
            experiences = self.memory.sample(a=a)
            self.learn(experiences, self.gamma)

        """ +Q TARGETS PRESENT """
        ''' Updating the Network every 'UPDATE_EVERY' steps taken '''
        self.t_step = (self.t_step + 1) % self.update_every
        if self.t_step == 0:

            self.qnetwork_target.load_state_dict(self.qnetwork_local.
↪state_dict())

    def act(self, state, eps=0.):
        self.eps = eps
        state = torch.from_numpy(state).float().unsqueeze(0).to(device)
        self.qnetwork_local.eval()
        with torch.no_grad():
            action_values = self.qnetwork_local(state)
        self.qnetwork_local.train()

        ''' Epsilon-greedy action selection (Already Present) '''
        if random.random() > eps:
            return np.argmax(action_values.cpu().data.numpy())
        else:
            return random.choice(np.arange(self.action_size))

    def learn(self, experiences, gamma):

```

```

""" +E EXPERIENCE REPLAY PRESENT """
(states, actions, rewards, next_states, dones) = experiences

''' Get max predicted Q values (for next states) from target model'''
Q_targets_next = self.qnetwork_target(next_states).detach().max(1)[0].
↳unsqueeze(1)

''' Compute Q targets for current states '''
Q_targets = rewards + (gamma * Q_targets_next * (1 - dones))

''' Get expected Q values from local model '''
Q_expected = self.qnetwork_local(states).gather(1, actions)
#print("Type of TD error: ",type(TD_error),TD_error.size())
loss = F.mse_loss(Q_expected, Q_targets)
#print("Type of imp wei:",
↳type(importance_weights),len(importance_weights))
''' Compute loss '''

''' Minimize the loss '''
self.optimizer.zero_grad()
loss.backward()

''' Gradient Clipping '''
""" +T TRUNCATION PRESENT """
'''for param in self.qnetwork_local.parameters():
    param.grad.data.clamp_(-1, 1)'''
torch.nn.utils.clip_grad_norm_(self.qnetwork_local.parameters(), self.
↳MAX_TRUNCATION)

self.optimizer.step()

```

```

[ ]: def calculate_mean(array):
    lens = [len(i) for i in array]
    arr = np.ma.empty((np.max(lens),len(array)))
    arr.mask = True
    for idx, l in enumerate(array):
        arr[:len(l),idx] = l
    return arr.mean(axis = -1), arr.std(axis=-1)

```

```

[ ]: ''' Defining DQN Algorithm '''

state_shape = env.observation_space.shape[0]
action_shape = env.action_space.n

def dqn(agent,n_episodes=5000, max_t=500, eps_start=1.0, eps_end=0.01,
↳eps_decay=0.999,a = 0.7):

```



```

scores = []
''' list containing scores from each episode '''
steps = []
scores_window_printing = deque(maxlen=10)
''' For printing in the graph '''
scores_window = deque(maxlen=100)
''' last 100 scores for checking if the avg is more than 195 '''
scores_exit_bad_params = deque(maxlen=200)
eps = eps_start
''' initialize epsilon '''

for i_episode in range(1, n_episodes+1):
    state = env.reset()
    score = 0
    step = 0
    for t in range(max_t):
        action = agent.act(state, eps)
        next_state, reward, done, _ = env.step(action)
        agent.step(state, action, reward, next_state, done, a = a)
        state = next_state
        score += reward
        step += 1
        if done:
            break
    steps.append(step)
    scores_window.append(score)
    scores_window_printing.append(score)
    scores_exit_bad_params.append(score)

    ''' save most recent score '''

    eps = max(eps_end, eps_decay*eps)
    ''' decrease epsilon '''

    print('\rEpisode {} \tAverage Score: {:.2f}'.format(i_episode, np.
↪mean(scores_window)), end="")
    if i_episode>500 and np.mean(scores_exit_bad_params)<-450 or_
↪(i_episode>500 and (np.std(scores_exit_bad_params)*100/np.
↪mean(scores_exit_bad_params))<=1):
        print("\nExperiment ended because of bad results, no significant_
↪improvement of the agent performance")
        return [np.array(steps), np.array(scores), i_episode, True]
    if i_episode % 10 == 0:
        scores.append(np.mean(scores_window_printing))
    if i_episode % 100 == 0:
        print('\rEpisode {} \tAverage Score: {:.2f}'.format(i_episode, np.
↪mean(scores_window)))

```

```

        if np.mean(scores_window)>=-100.0:
            print('\nEnvironment solved in {:d} episodes!\tAverage Score: {:.
↪2f}'.format(i_episode-100, np.mean(scores_window)))
            break
        return [np.array(steps),np.array(scores),i_episode,False]

''' Trial run to check if algorithm runs and saves the data '''
BATCH_SIZE= 64
EPS_DECAY= 0.995
GAMMA= 0.99
LR= 5e-4
MAX_TRUNCATION= 1
NUM_LAYERS= 2
NUM_NEURONS_EACH_LAYER= 64
UPDATE_EVERY= 20
a_TUNE= 0

agent_l = None
steps_over_10_runs = []
rewards_over_10_runs = []
episodes = []
min_len = np.inf
for run in range(1):
    print("Run: ",run+1,"_
↪-----")
    env = gym.make('Acrobot-v1')
    seed = run
    env.seed(seed)
    state_shape = env.observation_space.shape[0]
    action_shape = env.action_space.n

    begin_time = datetime.datetime.now()
    neurons_each_layer_ = [NUM_NEURONS_EACH_LAYER]*NUM_LAYERS
    agent = TutorialAgent(state_size= state_shape, action_size=action_shape,
↪seed=seed,num_layers=NUM_LAYERS,neurons_each_layer=neurons_each_layer_
↪,lr=LR,gamma=GAMMA,update_every=UPDATE_EVERY,batch_size=BATCH_SIZE,max_tRUNCATION=MAX_TRUNC
    steps_eps_greedy,reward_eps_greedy, episodes_eps_greedy,agent_l =
↪dqn(agent,eps_decay = EPS_DECAY, a = a_TUNE)
    steps_over_10_runs.append(steps_eps_greedy)
    rewards_over_10_runs.append(reward_eps_greedy)
    episodes.append(episodes_eps_greedy)
    if len(reward_eps_greedy) < min_len:
        min_len = len(reward_eps_greedy)
    time_taken = datetime.datetime.now() - begin_time

    print(time_taken)

```

```

rewards = np.array(rewards_over_10_runs)
avg_episodes = int(np.array(episodes).mean())
steps = np.array(steps_over_10_runs)

y, error = calculate_mean(steps)

```

```
[ ]: pprint.pprint(sweep_config)
```

```

{'method': 'random',
 'metric': {'goal': 'minimize', 'name': 'num_episodes_to_solve_env'},
 'parameters': {'BATCH_SIZE': {'distribution': 'q_log_uniform_values',
                                'max': 512,
                                'min': 64,
                                'q': 1},
                 'EPS_DECAY': {'distribution': 'uniform',
                                'max': 0.995,
                                'min': 0.9},
                 'GAMMA': {'distribution': 'uniform', 'max': 1, 'min': 0.8},
                 'LR': {'distribution': 'uniform', 'max': 0.0001, 'min': 1e-05},
                 'MAX_TRUNCATION': {'distribution': 'uniform',
                                    'max': 2,
                                    'min': 0.5},
                 'NUM_LAYERS': {'values': [2, 4, 8, 10]},
                 'NUM_NEURONS_EACH_LAYER': {'values': [64, 90, 128]},
                 'UPDATE_EVERY': {'distribution': 'q_log_uniform_values',
                                   'max': 200,
                                   'min': 10,
                                   'q': 1},
                 'a_TUNE': {'distribution': 'uniform', 'max': 1, 'min': 0}}

```

```

[ ]: def train(config = None):
    with wandb.init(config = config):
        config = wandb.config
        BUFFER_SIZE = int(1e5) # replay buffer size
        BATCH_SIZE = config.BATCH_SIZE ## minibatch size
        GAMMA = config.GAMMA          ## discount factor
        LR = config.LR                ## learning rate
        UPDATE_EVERY = config.UPDATE_EVERY ## how often to update the network
        ↪ (When Q target is present)
        NUM_NEURONS_EACH_LAYER = config.NUM_NEURONS_EACH_LAYER ##number of
        ↪ neurons in each hidden layer
        NUM_LAYERS = config.NUM_LAYERS ##number of layers for the
        ↪ neural network
        MAX_TRUNCATION = config.MAX_TRUNCATION ##max number of
        ↪ steps in each episode (needed only for cartpole, acrobot and mountain car
        ↪ these are already defined)

```

```

    EPS_DECAY =          config.EPS_DECAY                ##epsilon decay for
↪epsilon exploration
    a_TUNE   =          config.a_TUNE
    steps_over_10_runs = []
    rewards_over_10_runs = []
    episodes = []
    min_len = np.inf
    bad = False
    for run in range(10):
        print("Run: ",run+1,"
↪-----")

        env = gym.make('Acrobot-v1')

        seed = run
        env.seed(seed)
        state_shape = env.observation_space.shape[0]
        action_shape = env.action_space.n

        begin_time = datetime.datetime.now()
        agent = TutorialAgent(state_size=state_shape,action_size =
↪action_shape,seed =
↪seed,num_layers=NUM_LAYERS,neurons_each_layer=[NUM_NEURONS_EACH_LAYER]*NUM_LAYERS,lr
↪= LR,gamma= GAMMA,update_every=UPDATE EVERY,batch_size =
↪BATCH_SIZE,max_trUNCATION = MAX_TRUNCATION)
        steps_eps_greedy,reward_eps_greedy, episodes_eps_greedy,bad =
↪dqn(agent,eps_decay = EPS_DECAY, a = a_TUNE)
        steps_over_10_runs.append(steps_eps_greedy)
        rewards_over_10_runs.append(reward_eps_greedy)
        episodes.append(episodes_eps_greedy)
        if len(reward_eps_greedy) < min_len:
            min_len = len(reward_eps_greedy)
        time_taken = datetime.datetime.now() - begin_time

        print(time_taken)

    rewards = np.array(rewards_over_10_runs)
    avg_episodes = int(np.array(episodes).mean())
    steps = np.array(steps_over_10_runs)

    y, error = calculate_mean(rewards)
    plt.figure(figsize = (15,10))
    plt.subplot(121)
    plt.plot(np.arange(len(y))+1, y, color='darkblue',label='average')
    plt.fill_between(np.arange(len(y))+1, y-error, y+error,color =
↪'lightskyblue',label = 'standard deviation')
    plt.title("Episodes vs rewards")
    plt.xlabel("Number of episodes(x10)")

```

```

plt.ylabel("Reward per episode")
plt.legend()
plt.subplot(122)
y, error = calculate_mean(steps)
plt.plot(np.arange(len(y))+1, y, color='darkblue',label='average')
plt.fill_between(np.arange(len(y))+1, y-error, y+error,color = '
↳ 'lightskyblue',label = 'standard deviation')
plt.title("Episodes vs steps ")
plt.xlabel("Number of episodes")
plt.ylabel("Steps taken per episode")
plt.legend()
plt.savefig('run-hyp'+str(LR)+'.jpg', dpi = 250)
plt.show()

for i in range(avg_episodes):
    print("Episode: ",i+1, 'Number of steps: ',round(y[i]))
    if bad == False:
        wandb.log({"num_episodes_to_solve_env":avg_episodes-100})
    else:
        wandb.log({"num_episodes_to_solve_env":5000})

```

```
[ ]: wandb.agent(sweep_id, train, count=12)
```

wandb: Agent Starting Run: iq1l582e with config:

wandb: BATCH\_SIZE: 388

wandb: EPS\_DECAY: 0.9075031992719798

wandb: GAMMA: 0.9984859956300742

wandb: LR: 9.773930288182236e-05

wandb: MAX\_TRUNCATION: 0.7158217342638222

wandb: NUM\_LAYERS: 8

wandb: NUM\_NEURONS\_EACH\_LAYER: 90

wandb: UPDATE\_EVERY: 14

wandb: a\_TUNE: 0.21189352510607284

Failed to detect the name of this notebook, you can set it manually with the WANDB\_NOTEBOOK\_NAME environment variable to enable code saving.

wandb: Currently logged in as: me19b190. Use `wandb

login --relogin` to force relogin

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

```

Run: 1 -----
Episode 100      Average Score: -390.76
Episode 200      Average Score: -120.53
Episode 236      Average Score: -99.982
Environment solved in 136 episodes!      Average Score: -99.98
0:09:48.878962
Run: 2 -----
Episode 100      Average Score: -373.07
Episode 200      Average Score: -121.21
Episode 237      Average Score: -99.573
Environment solved in 137 episodes!      Average Score: -99.57
0:09:23.407114
Run: 3 -----
Episode 100      Average Score: -269.74
Episode 200      Average Score: -100.50
Episode 209      Average Score: -98.506
Environment solved in 109 episodes!      Average Score: -98.50
0:06:22.304254
Run: 4 -----
Episode 100      Average Score: -311.88
Episode 200      Average Score: -102.88
Episode 204      Average Score: -99.997
Environment solved in 104 episodes!      Average Score: -99.99
0:06:39.384156
Run: 5 -----
Episode 100      Average Score: -375.81
Episode 200      Average Score: -144.28
Episode 300      Average Score: -106.25
Episode 334      Average Score: -100.00
Environment solved in 234 episodes!      Average Score: -100.00
0:10:41.226444
Run: 6 -----
Episode 100      Average Score: -291.47
Episode 187      Average Score: -99.537
Environment solved in 87 episodes!      Average Score: -99.53
0:06:09.536175
Run: 7 -----
Episode 100      Average Score: -373.48
Episode 200      Average Score: -100.64
Episode 201      Average Score: -99.80
Environment solved in 101 episodes!      Average Score: -99.80
0:07:07.419433
Run: 8 -----
Episode 100      Average Score: -412.31
Episode 200      Average Score: -130.89
Episode 300      Average Score: -105.49
Episode 375      Average Score: -99.383
Environment solved in 275 episodes!      Average Score: -99.38

```

0:11:00.520085

Run: 9 -----

Episode 100      Average Score: -406.24

Episode 200      Average Score: -141.64

Episode 300      Average Score: -105.16

Episode 319      Average Score: -98.601

Environment solved in 219 episodes!      Average Score: -98.60

0:09:39.337708

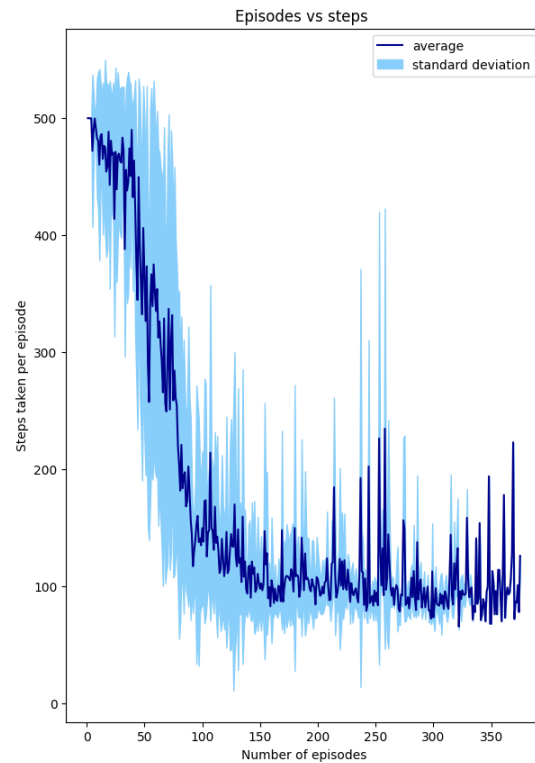
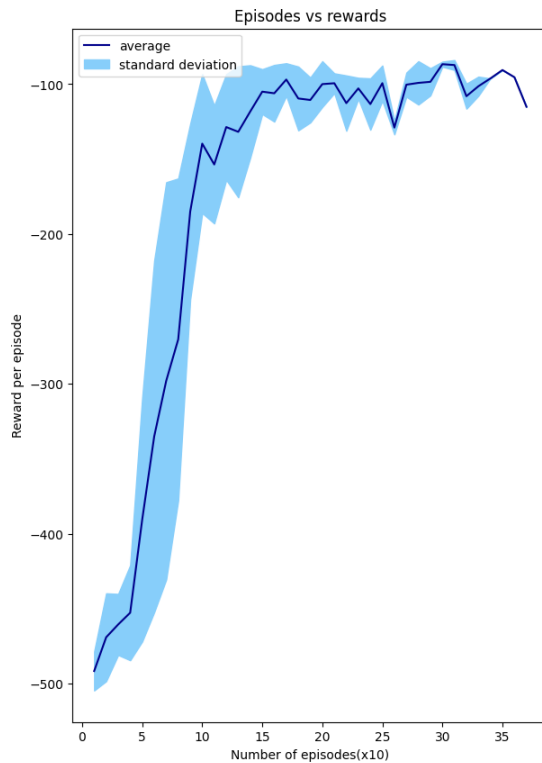
Run: 10 -----

Episode 100      Average Score: -287.23

Episode 200      Average Score: -99.577

Environment solved in 100 episodes!      Average Score: -99.57

0:05:15.925278



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Episode: 4 Number of steps: 500

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Episode: 6 Number of steps: 490

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wandb: Agent Starting Run: qgk52z1n with config:

wandb: BATCH\_SIZE: 241

wandb: EPS\_DECAY: 0.9052805013001712

wandb: GAMMA: 0.8912424502665621

wandb: LR: 9.90039793637383e-05

wandb: MAX\_TRUNCATION: 1.6653802057405689

wandb: NUM\_LAYERS: 4

wandb: NUM\_NEURONS\_EACH\_LAYER: 64

wandb: UPDATE\_EVERY: 104

wandb: a\_TUNE: 0.4031355618855549

Failed to detect the name of this notebook, you can set it manually with the  
WANDB\_NOTEBOOK\_NAME environment variable to enable code saving.

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Run: 1 -----

Episode 100 Average Score: -344.61

Episode 200 Average Score: -240.78

Episode 300 Average Score: -177.88

Episode 400 Average Score: -167.98

Episode 500 Average Score: -200.54

Episode 501 Average Score: -202.34

Experiment ended because of bad results, no significant improvement of the agent  
performance

0:12:23.490573

Run: 2 -----

Episode 100 Average Score: -420.91

Episode 200 Average Score: -266.78

Episode 300 Average Score: -208.42

Episode 400 Average Score: -165.43

Episode 500 Average Score: -180.93

Episode 501 Average Score: -182.14

Experiment ended because of bad results, no significant improvement of the agent

performance

0:12:08.463354

Run: 3 -----

Episode 100 Average Score: -349.89

Episode 200 Average Score: -287.70

Episode 300 Average Score: -451.98

Episode 400 Average Score: -406.19

Episode 500 Average Score: -342.84

Episode 501 Average Score: -339.71

Experiment ended because of bad results, no significant improvement of the agent

performance

0:18:09.756962

Run: 4 -----

Episode 100 Average Score: -500.00

Episode 200 Average Score: -376.36

Episode 300 Average Score: -290.70

Episode 400 Average Score: -220.91

Episode 500 Average Score: -335.81

Episode 501 Average Score: -337.79

Experiment ended because of bad results, no significant improvement of the agent

performance

0:18:58.474949

Run: 5 -----

Episode 100 Average Score: -259.02

Episode 200 Average Score: -298.15

Episode 300 Average Score: -206.20

Episode 400 Average Score: -382.01

Episode 500 Average Score: -359.37

Episode 501 Average Score: -357.36

Experiment ended because of bad results, no significant improvement of the agent

performance

0:16:08.891238

Run: 6 -----

Episode 100 Average Score: -301.69

Episode 200 Average Score: -355.10

Episode 300 Average Score: -269.92

Episode 400 Average Score: -274.44

Episode 500 Average Score: -222.75

Episode 501 Average Score: -222.36

Experiment ended because of bad results, no significant improvement of the agent

performance

0:14:44.953078

Run: 7 -----

Episode 100 Average Score: -396.44

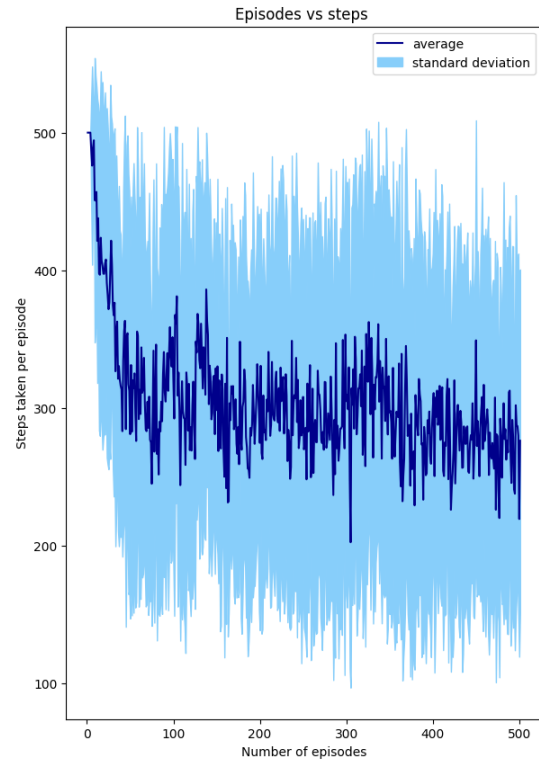
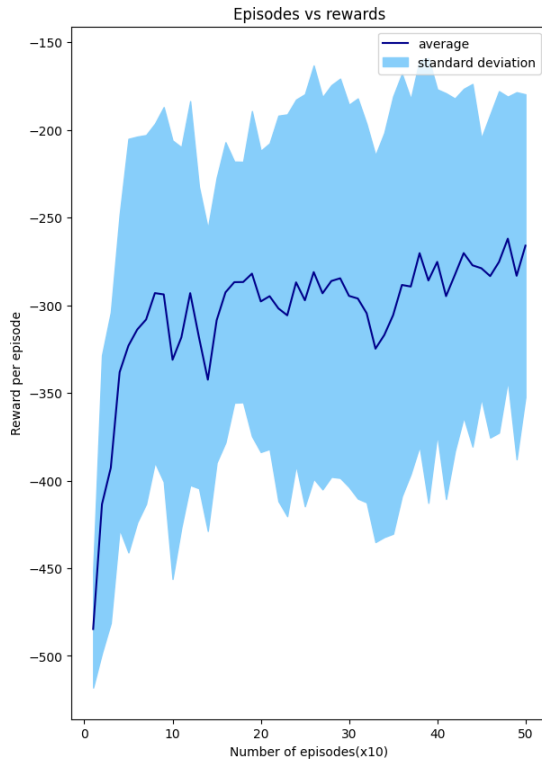
Episode 200 Average Score: -225.74

Episode 300 Average Score: -321.98

Episode 400 Average Score: -250.70

Episode 500 Average Score: -261.80

Episode 501      Average Score: -261.26  
 Experiment ended because of bad results, no significant improvement of the agent  
 performance  
 0:15:28.586434  
 Run: 8 -----  
 Episode 100      Average Score: -199.57  
 Episode 200      Average Score: -286.55  
 Episode 300      Average Score: -499.24  
 Episode 400      Average Score: -489.33  
 Episode 500      Average Score: -442.13  
 Episode 501      Average Score: -441.63  
 Experiment ended because of bad results, no significant improvement of the agent  
 performance  
 0:20:57.425560  
 Run: 9 -----  
 Episode 100      Average Score: -322.78  
 Episode 200      Average Score: -286.05  
 Episode 300      Average Score: -217.35  
 Episode 400      Average Score: -370.86  
 Episode 500      Average Score: -248.57  
 Episode 501      Average Score: -247.35  
 Experiment ended because of bad results, no significant improvement of the agent  
 performance  
 0:16:07.230690  
 Run: 10 -----  
 Episode 100      Average Score: -397.24  
 Episode 200      Average Score: -403.82  
 Episode 300      Average Score: -282.74  
 Episode 400      Average Score: -229.62  
 Episode 500      Average Score: -179.20  
 Episode 501      Average Score: -178.53  
 Experiment ended because of bad results, no significant improvement of the agent  
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 0:16:29.429603



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wandb: Agent Starting Run: jb5azeg3 with config:
wandb:   BATCH_SIZE: 141
wandb:   EPS_DECAY: 0.9267574592695064
wandb:   GAMMA: 0.9827014814656908
wandb:   LR: 2.165713334068911e-05
wandb:   MAX_TRUNCATION: 0.8757895326472167
wandb:   NUM_LAYERS: 2
wandb:   NUM_NEURONS_EACH_LAYER: 90
wandb:   UPDATE_EVERY: 46
wandb:   a_TUNE: 0.35732259618380335
Failed to detect the name of this notebook, you can set it manually with the
WANDB_NOTEBOOK_NAME environment variable to enable code saving.

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Run:  1  -----
Episode 100      Average Score: -203.42
Episode 200      Average Score: -152.02
Episode 300      Average Score: -118.96
Episode 400      Average Score: -114.25
Episode 500      Average Score: -106.06
Episode 501      Average Score: -106.33
Experiment ended because of bad results, no significant improvement of the agent
performance
0:05:36.579300
Run:  2  -----
Episode 100      Average Score: -164.34
Episode 118      Average Score: -99.898
Environment solved in 18 episodes!      Average Score: -99.89
0:01:23.863921
Run:  3  -----
Episode 100      Average Score: -196.36
Episode 200      Average Score: -117.99
Episode 300      Average Score: -150.22
Episode 400      Average Score: -124.81
Episode 500      Average Score: -114.64
Episode 501      Average Score: -114.27

```

Experiment ended because of bad results, no significant improvement of the agent performance

0:05:42.381905

Run: 4 -----

Episode 100 Average Score: -171.31

Episode 118 Average Score: -97.357

Environment solved in 18 episodes! Average Score: -97.35

0:01:25.240232

Run: 5 -----

Episode 100 Average Score: -173.33

Episode 119 Average Score: -98.993

Environment solved in 19 episodes! Average Score: -98.99

0:01:28.872051

Run: 6 -----

Episode 100 Average Score: -241.28

Episode 200 Average Score: -248.31

Episode 300 Average Score: -140.68

Episode 400 Average Score: -118.16

Episode 500 Average Score: -106.83

Episode 501 Average Score: -106.47

Experiment ended because of bad results, no significant improvement of the agent performance

0:06:53.585544

Run: 7 -----

Episode 100 Average Score: -186.88

Episode 200 Average Score: -126.47

Episode 300 Average Score: -115.80

Episode 373 Average Score: -99.943

Environment solved in 273 episodes! Average Score: -99.94

0:03:57.744639

Run: 8 -----

Episode 100 Average Score: -192.47

Episode 126 Average Score: -98.280

Environment solved in 26 episodes! Average Score: -98.28

0:01:49.997484

Run: 9 -----

Episode 100 Average Score: -188.73

Episode 200 Average Score: -144.26

Episode 300 Average Score: -150.27

Episode 400 Average Score: -117.22

Episode 465 Average Score: -99.374

Environment solved in 365 episodes! Average Score: -99.37

0:05:23.232957

Run: 10 -----

Episode 100 Average Score: -199.03

Episode 200 Average Score: -131.30

Episode 300 Average Score: -117.41

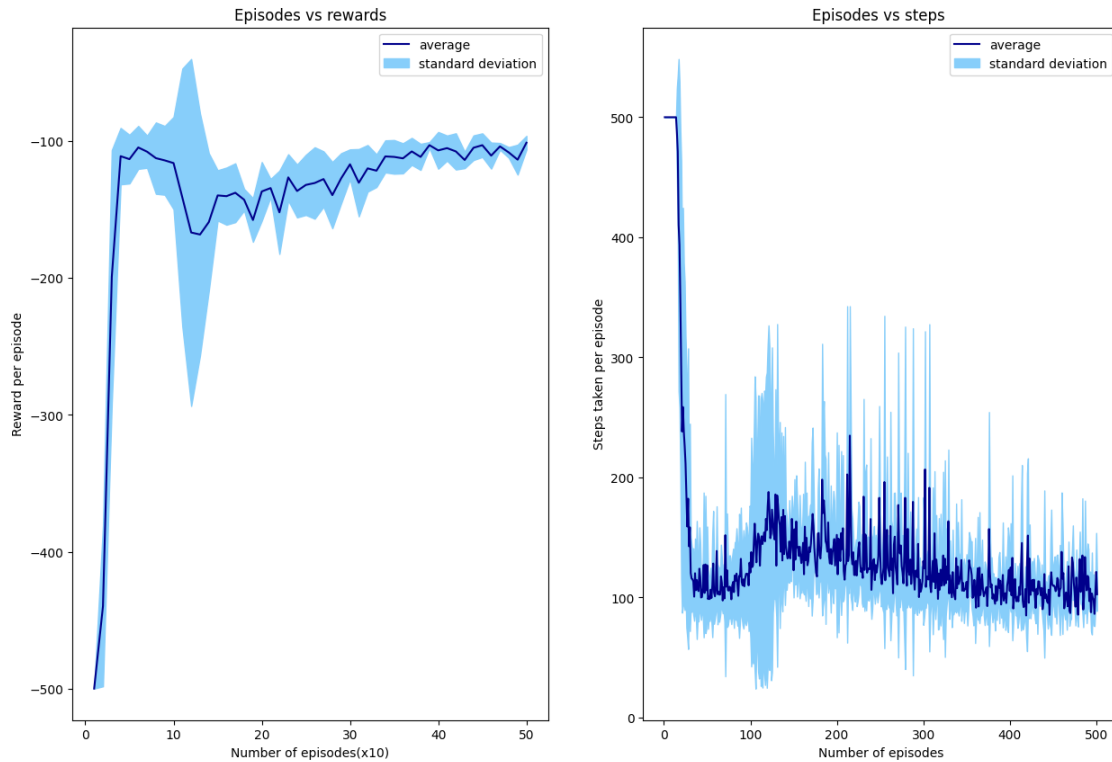
Episode 400 Average Score: -104.85

Episode 429      Average Score: -99.246

Environment solved in 329 episodes!

Average Score: -99.24

0:04:38.256286



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wandb: Sweep Agent: Waiting for job.

wandb: Job received.

wandb: Agent Starting Run: tt23pxlv with config:

wandb: BATCH\_SIZE: 350

wandb: EPS\_DECAY: 0.993282797245706

wandb: GAMMA: 0.8597187535725886

wandb: LR: 6.696939860766036e-05

wandb: MAX\_TRUNCATION: 1.9266143477676312

wandb: NUM\_LAYERS: 4

wandb: NUM\_NEURONS\_EACH\_LAYER: 128

wandb: UPDATE\_EVERY: 191

wandb: a\_TUNE: 0.945639425385108

Failed to detect the name of this notebook, you can set it manually with the  
WANDB\_NOTEBOOK\_NAME environment variable to enable code saving.

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Run: 1 -----
Episode 100      Average Score: -459.91
Episode 200      Average Score: -364.48
Episode 300      Average Score: -276.97
Episode 400      Average Score: -275.85
Episode 500      Average Score: -284.41
Episode 501      Average Score: -284.57
Experiment ended because of bad results, no significant improvement of the agent
performance
0:21:40.639026
Run: 2 -----
Episode 100      Average Score: -481.52
Episode 200      Average Score: -363.46
Episode 300      Average Score: -311.86
Episode 400      Average Score: -284.88
Episode 500      Average Score: -252.63
Episode 501      Average Score: -251.28
Experiment ended because of bad results, no significant improvement of the agent
performance
0:22:10.864284
Run: 3 -----
Episode 100      Average Score: -455.77
Episode 200      Average Score: -357.71
Episode 300      Average Score: -299.31
Episode 400      Average Score: -227.17
Episode 500      Average Score: -216.72
Episode 501      Average Score: -214.46
Experiment ended because of bad results, no significant improvement of the agent
performance
0:20:19.842995
Run: 4 -----
Episode 100      Average Score: -454.89
Episode 200      Average Score: -327.27
Episode 300      Average Score: -289.98
Episode 400      Average Score: -316.83
Episode 500      Average Score: -231.78
Episode 501      Average Score: -230.80
Experiment ended because of bad results, no significant improvement of the agent
performance
0:21:04.730489
Run: 5 -----
Episode 100      Average Score: -469.34
Episode 200      Average Score: -380.83
Episode 300      Average Score: -299.42
Episode 400      Average Score: -338.93
Episode 500      Average Score: -280.56
Episode 501      Average Score: -279.11
Experiment ended because of bad results, no significant improvement of the agent

```

performance

0:23:05.613355

Run: 6 -----

Episode 100 Average Score: -442.38

Episode 200 Average Score: -290.17

Episode 300 Average Score: -280.44

Episode 400 Average Score: -243.82

Episode 500 Average Score: -263.62

Episode 501 Average Score: -263.89

Experiment ended because of bad results, no significant improvement of the agent

performance

0:19:47.245435

Run: 7 -----

Episode 100 Average Score: -464.50

Episode 200 Average Score: -376.22

Episode 300 Average Score: -279.18

Episode 400 Average Score: -250.22

Episode 500 Average Score: -274.18

Episode 501 Average Score: -274.16

Experiment ended because of bad results, no significant improvement of the agent

performance

0:20:19.767000

Run: 8 -----

Episode 100 Average Score: -443.28

Episode 200 Average Score: -314.95

Episode 300 Average Score: -318.10

Episode 400 Average Score: -430.74

Episode 500 Average Score: -436.86

Episode 501 Average Score: -438.10

Experiment ended because of bad results, no significant improvement of the agent

performance

0:25:20.750822

Run: 9 -----

Episode 100 Average Score: -454.59

Episode 200 Average Score: -346.22

Episode 300 Average Score: -270.63

Episode 400 Average Score: -262.66

Episode 500 Average Score: -272.82

Episode 501 Average Score: -275.87

Experiment ended because of bad results, no significant improvement of the agent

performance

0:21:01.031569

Run: 10 -----

Episode 100 Average Score: -452.45

Episode 200 Average Score: -318.61

Episode 300 Average Score: -327.18

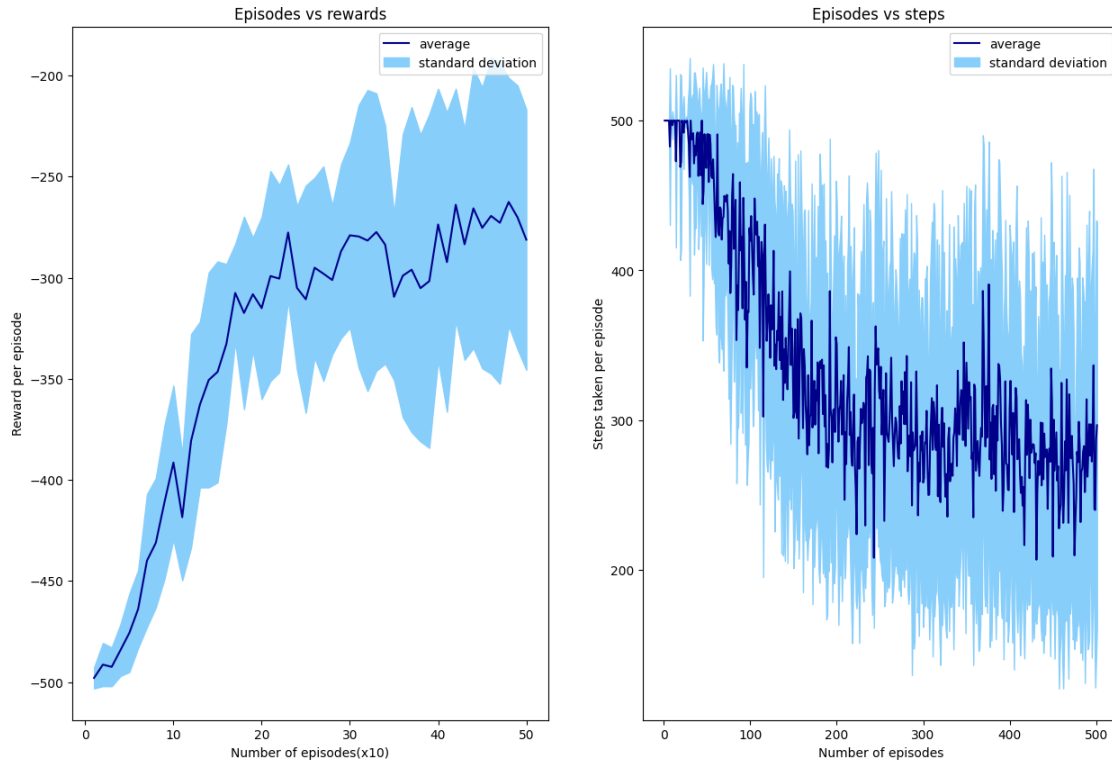
Episode 400 Average Score: -276.16

Episode 500 Average Score: -223.22

Episode 501      Average Score: -221.61

Experiment ended because of bad results, no significant improvement of the agent performance

0:20:31.877189



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wandb: Agent Starting Run: 1yllrqd with config:

wandb: BATCH\_SIZE: 102

wandb: EPS\_DECAY: 0.9424872838793752

wandb: GAMMA: 0.9301573373446202

wandb: LR: 6.113264781306483e-05

wandb: MAX\_TRUNCATION: 0.6279127280060699

wandb: NUM\_LAYERS: 10

wandb: NUM\_NEURONS\_EACH\_LAYER: 128

wandb: UPDATE\_EVERY: 140

wandb: a\_TUNE: 0.28667494135594473

Failed to detect the name of this notebook, you can set it manually with the  
WANDB\_NOTEBOOK\_NAME environment variable to enable code saving.

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Run: 1 -----

Episode 100 Average Score: -438.44

Episode 200 Average Score: -433.52

Episode 300 Average Score: -440.03

Episode 400 Average Score: -410.83

Episode 500 Average Score: -271.29

Episode 501 Average Score: -271.59

Experiment ended because of bad results, no significant improvement of the agent  
performance

0:23:40.170411

Run: 2 -----

Episode 100 Average Score: -435.02

Episode 200 Average Score: -420.20

Episode 300 Average Score: -305.21

Episode 400 Average Score: -165.82

Episode 500 Average Score: -159.48

Episode 501 Average Score: -160.15

Experiment ended because of bad results, no significant improvement of the agent performance

0:16:40.873814

Run: 3 -----

Episode 100	Average Score: -449.75
Episode 200	Average Score: -438.46
Episode 300	Average Score: -346.88
Episode 400	Average Score: -255.99
Episode 500	Average Score: -222.99
Episode 501	Average Score: -222.21

Experiment ended because of bad results, no significant improvement of the agent performance

0:20:13.302273

Run: 4 -----

Episode 100	Average Score: -440.05
Episode 200	Average Score: -425.17
Episode 300	Average Score: -427.26
Episode 400	Average Score: -382.52
Episode 500	Average Score: -402.21
Episode 501	Average Score: -402.15

Experiment ended because of bad results, no significant improvement of the agent performance

0:25:01.231554

Run: 5 -----

Episode 100	Average Score: -457.89
Episode 200	Average Score: -452.86
Episode 300	Average Score: -440.70
Episode 400	Average Score: -370.02
Episode 500	Average Score: -260.57
Episode 501	Average Score: -257.73

Experiment ended because of bad results, no significant improvement of the agent performance

0:23:57.415878

Run: 6 -----

Episode 100	Average Score: -454.66
Episode 200	Average Score: -432.82
Episode 300	Average Score: -276.86
Episode 400	Average Score: -149.82
Episode 500	Average Score: -169.53
Episode 501	Average Score: -170.40

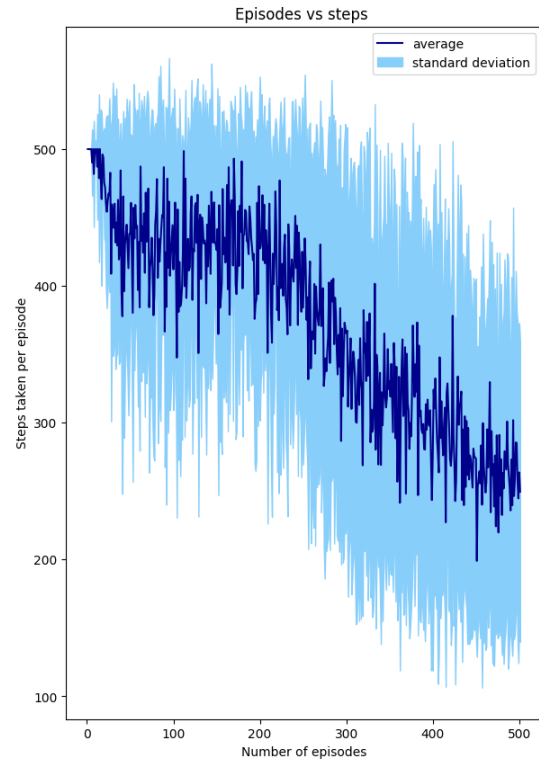
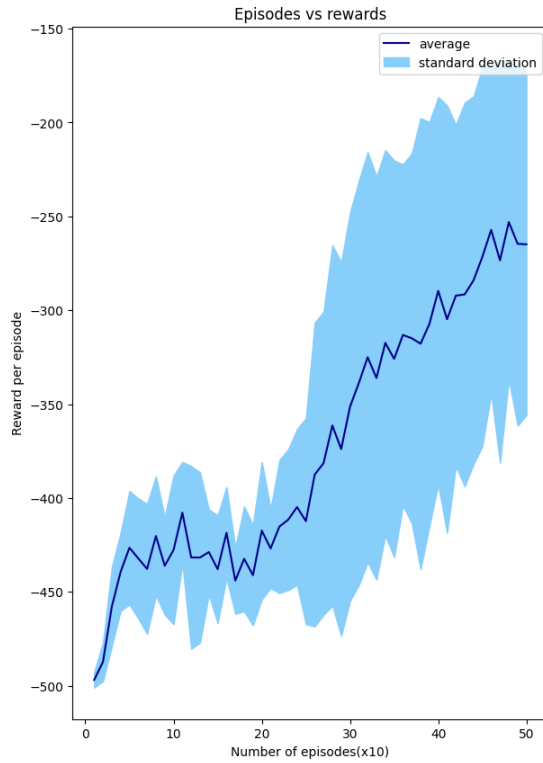
Experiment ended because of bad results, no significant improvement of the agent performance

0:17:54.576442

Run: 7 -----

Episode 100	Average Score: -436.00
Episode 200	Average Score: -397.07
Episode 300	Average Score: -411.84
Episode 400	Average Score: -418.21

Episode 500      Average Score: -394.75  
Episode 501      Average Score: -394.75  
Experiment ended because of bad results, no significant improvement of the agent  
performance  
0:25:01.404804  
Run: 8 -----  
Episode 100      Average Score: -451.15  
Episode 200      Average Score: -420.89  
Episode 300      Average Score: -435.62  
Episode 400      Average Score: -426.98  
Episode 500      Average Score: -411.42  
Episode 501      Average Score: -408.80  
Experiment ended because of bad results, no significant improvement of the agent  
performance  
0:24:45.879394  
Run: 9 -----  
Episode 100      Average Score: -444.91  
Episode 200      Average Score: -438.20  
Episode 300      Average Score: -417.14  
Episode 400      Average Score: -231.35  
Episode 500      Average Score: -181.25  
Episode 501      Average Score: -181.56  
Experiment ended because of bad results, no significant improvement of the agent  
performance  
0:19:06.267379  
Run: 10 -----  
Episode 100      Average Score: -453.55  
Episode 200      Average Score: -431.68  
Episode 300      Average Score: -424.67  
Episode 400      Average Score: -374.09  
Episode 500      Average Score: -283.63  
Episode 501      Average Score: -280.31  
Experiment ended because of bad results, no significant improvement of the agent  
performance  
0:22:02.008915



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Episode: 1 Number of steps: 500
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<IPython.core.display.HTML object>

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<IPython.core.display.HTML object>
<IPython.core.display.HTML object>
<IPython.core.display.HTML object>
wandb: Agent Starting Run: iy2mq63o with config:
wandb:   BATCH_SIZE: 293
wandb:   EPS_DECAY: 0.9619679995459268
wandb:   GAMMA: 0.8127181467649989
wandb:   LR: 8.473334576266545e-05
wandb:   MAX_TRUNCATION: 0.9556717269630692
wandb:   NUM_LAYERS: 8
wandb:   NUM_NEURONS_EACH_LAYER: 128
wandb:   UPDATE_EVERY: 86
wandb:   a_TUNE: 0.42067345390090927
Failed to detect the name of this notebook, you can set it manually with the
WANDB_NOTEBOOK_NAME environment variable to enable code saving.

<IPython.core.display.HTML object>
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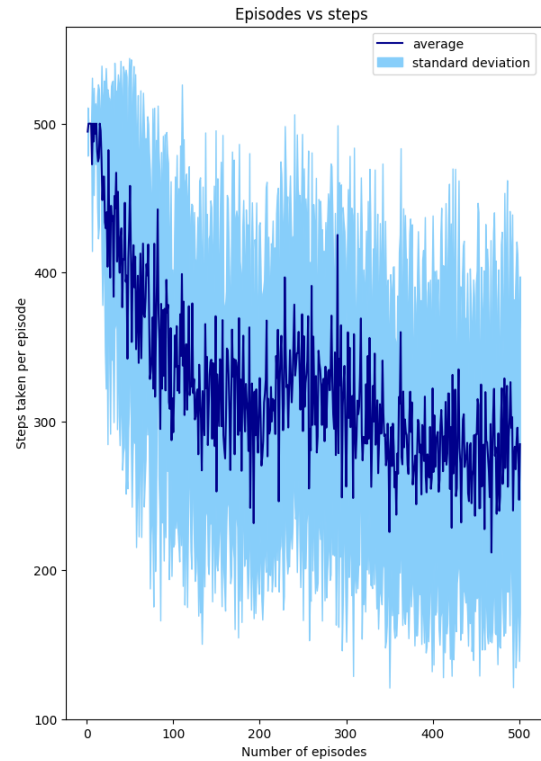
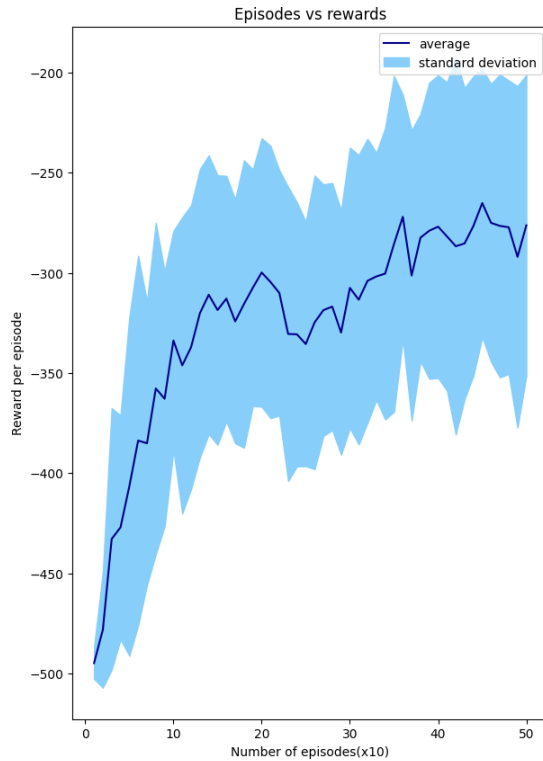
Run:  1  -----
Episode 100      Average Score: -423.17
Episode 200      Average Score: -334.41
Episode 300      Average Score: -337.06
Episode 400      Average Score: -359.09
Episode 500      Average Score: -365.49
Episode 501      Average Score: -362.65
Experiment ended because of bad results, no significant improvement of the agent
performance
0:24:09.275880
Run:  2  -----
Episode 100      Average Score: -401.15
Episode 200      Average Score: -302.01
Episode 300      Average Score: -362.69
Episode 400      Average Score: -254.25
Episode 500      Average Score: -246.06
Episode 501      Average Score: -247.71
Experiment ended because of bad results, no significant improvement of the agent
performance
0:20:50.329134
Run:  3  -----
Episode 100      Average Score: -436.87

```



Episode 200      Average Score: -309.86  
 Episode 300      Average Score: -333.02  
 Episode 400      Average Score: -283.75  
 Episode 500      Average Score: -215.35  
 Episode 501      Average Score: -214.13  
 Experiment ended because of bad results, no significant improvement of the agent  
 performance  
 0:20:56.263675  
 Run: 4 -----  
 Episode 100      Average Score: -452.70  
 Episode 200      Average Score: -360.45  
 Episode 300      Average Score: -330.00  
 Episode 400      Average Score: -247.96  
 Episode 500      Average Score: -229.44  
 Episode 501      Average Score: -229.77  
 Experiment ended because of bad results, no significant improvement of the agent  
 performance  
 0:22:11.378296  
 Run: 5 -----  
 Episode 100      Average Score: -458.20  
 Episode 200      Average Score: -430.47  
 Episode 300      Average Score: -458.27  
 Episode 400      Average Score: -453.81  
 Episode 500      Average Score: -449.35  
 Episode 501      Average Score: -447.10  
 Experiment ended because of bad results, no significant improvement of the agent  
 performance  
 0:30:43.318805  
 Run: 6 -----  
 Episode 100      Average Score: -464.23  
 Episode 200      Average Score: -392.77  
 Episode 300      Average Score: -267.38  
 Episode 400      Average Score: -254.82  
 Episode 500      Average Score: -270.09  
 Episode 501      Average Score: -270.42  
 Experiment ended because of bad results, no significant improvement of the agent  
 performance  
 0:21:59.446416  
 Run: 7 -----  
 Episode 100      Average Score: -303.62  
 Episode 200      Average Score: -211.15  
 Episode 300      Average Score: -228.62  
 Episode 400      Average Score: -294.96  
 Episode 500      Average Score: -278.87  
 Episode 501      Average Score: -280.48  
 Experiment ended because of bad results, no significant improvement of the agent  
 performance  
 0:17:18.798370

```
Run:  8  -----
Episode 100      Average Score: -403.63
Episode 200      Average Score: -260.92
Episode 300      Average Score: -287.40
Episode 400      Average Score: -286.20
Episode 500      Average Score: -273.55
Episode 501      Average Score: -275.11
Experiment ended because of bad results, no significant improvement of the agent
performance
0:20:08.238105
Run:  9  -----
Episode 100      Average Score: -307.93
Episode 200      Average Score: -267.08
Episode 300      Average Score: -291.08
Episode 400      Average Score: -220.73
Episode 500      Average Score: -204.98
Episode 501      Average Score: -207.85
Experiment ended because of bad results, no significant improvement of the agent
performance
0:17:11.392699
Run: 10  -----
Episode 100      Average Score: -411.02
Episode 200      Average Score: -323.92
Episode 300      Average Score: -313.57
Episode 400      Average Score: -261.56
Episode 500      Average Score: -259.93
Episode 501      Average Score: -259.76
Experiment ended because of bad results, no significant improvement of the agent
performance
0:21:10.390148
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Episode: 1 Number of steps: 495
Episode: 2 Number of steps: 500
Episode: 3 Number of steps: 500
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Episode: 5 Number of steps: 500
Episode: 6 Number of steps: 473
Episode: 7 Number of steps: 500
Episode: 8 Number of steps: 488
Episode: 9 Number of steps: 500
Episode: 10 Number of steps: 493
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Episode: 14 Number of steps: 477
Episode: 15 Number of steps: 500
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Episode: 24 Number of steps: 404  
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<IPython.core.display.HTML object>

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<IPython.core.display.HTML object>
<IPython.core.display.HTML object>
<IPython.core.display.HTML object>
wandb: Sweep Agent: Waiting for job.
wandb: Job received.
wandb: Agent Starting Run: vxhm0p1l with config:
wandb:   BATCH_SIZE: 450
wandb:   EPS_DECAY: 0.949669131145169
wandb:   GAMMA: 0.9300741926730316
wandb:   LR: 4.4901194019768936e-05
wandb:   MAX_TRUNCATION: 1.011958205810783
wandb:   NUM_LAYERS: 10
wandb:   NUM_NEURONS_EACH_LAYER: 64
wandb:   UPDATE_EVERY: 140
wandb:   a_TUNE: 0.9064139760653244
Failed to detect the name of this notebook, you can set it manually with the
WANDB_NOTEBOOK_NAME environment variable to enable code saving.

<IPython.core.display.HTML object>
<IPython.core.display.HTML object>
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<IPython.core.display.HTML object>

Run:  1  -----
Episode 100      Average Score: -491.46
Episode 200      Average Score: -472.85
Episode 300      Average Score: -460.41
Episode 400      Average Score: -449.96
Episode 500      Average Score: -444.82
Episode 501      Average Score: -446.00
Experiment ended because of bad results, no significant improvement of the agent
performance
0:39:38.435406
Run:  2  -----
Episode 100      Average Score: -480.34
Episode 200      Average Score: -418.71
Episode 300      Average Score: -283.30
Episode 400      Average Score: -172.02
Episode 500      Average Score: -251.59
Episode 501      Average Score: -251.62
Experiment ended because of bad results, no significant improvement of the agent
performance
0:26:30.423827

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Run: 3 -----
Episode 100      Average Score: -411.07
Episode 200      Average Score: -391.29
Episode 300      Average Score: -388.46
Episode 400      Average Score: -432.09
Episode 500      Average Score: -418.34
Episode 501      Average Score: -420.25
Experiment ended because of bad results, no significant improvement of the agent
performance
0:35:10.634036
Run: 4 -----
Episode 100      Average Score: -485.51
Episode 200      Average Score: -453.50
Episode 300      Average Score: -439.56
Episode 400      Average Score: -443.52
Episode 500      Average Score: -431.15
Episode 501      Average Score: -430.24
Experiment ended because of bad results, no significant improvement of the agent
performance
0:38:53.123285
Run: 5 -----
Episode 100      Average Score: -442.07
Episode 200      Average Score: -414.75
Episode 300      Average Score: -415.02
Episode 400      Average Score: -420.32
Episode 500      Average Score: -394.73
Episode 501      Average Score: -395.61
Experiment ended because of bad results, no significant improvement of the agent
performance
0:37:29.008944
Run: 6 -----
Episode 100      Average Score: -460.90
Episode 200      Average Score: -441.53
Episode 300      Average Score: -423.86
Episode 400      Average Score: -424.82
Episode 500      Average Score: -400.56
Episode 501      Average Score: -400.56
Experiment ended because of bad results, no significant improvement of the agent
performance
0:39:25.756573
Run: 7 -----
Episode 100      Average Score: -451.19
Episode 200      Average Score: -400.60
Episode 300      Average Score: -390.01
Episode 400      Average Score: -390.80
Episode 500      Average Score: -411.89
Episode 501      Average Score: -413.63
Experiment ended because of bad results, no significant improvement of the agent

```

performance

0:37:44.809259

Run: 8 -----

Episode 100 Average Score: -451.01

Episode 200 Average Score: -421.13

Episode 300 Average Score: -400.19

Episode 400 Average Score: -391.37

Episode 500 Average Score: -388.35

Episode 501 Average Score: -388.35

Experiment ended because of bad results, no significant improvement of the agent

performance

0:36:19.069526

Run: 9 -----

Episode 100 Average Score: -461.50

Episode 200 Average Score: -439.62

Episode 300 Average Score: -414.92

Episode 400 Average Score: -456.39

Episode 500 Average Score: -416.75

Episode 501 Average Score: -417.65

Experiment ended because of bad results, no significant improvement of the agent

performance

0:35:32.564667

Run: 10 -----

Episode 100 Average Score: -478.61

Episode 200 Average Score: -433.63

Episode 300 Average Score: -419.81

Episode 400 Average Score: -420.20

Episode 500 Average Score: -409.67

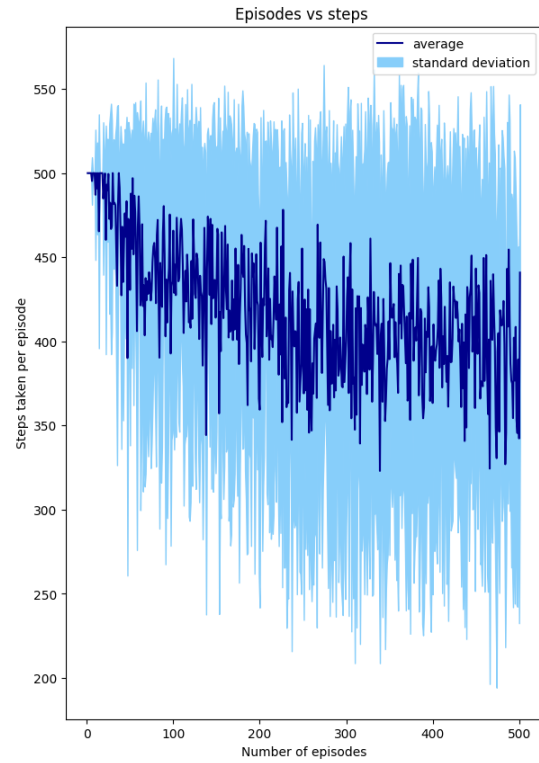
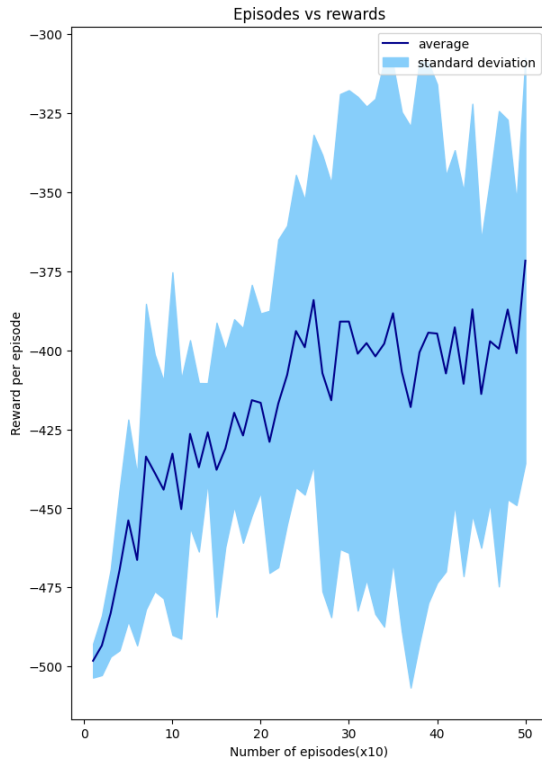
Episode 501 Average Score: -407.06

Experiment ended because of bad results, no significant improvement of the agent

performance

0:38:36.463230





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Episode: 1 Number of steps: 500
Episode: 2 Number of steps: 500
Episode: 3 Number of steps: 500
Episode: 4 Number of steps: 500
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Episode: 12 Number of steps: 491
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wandb: Agent Starting Run: 8bvoy6tz with config:
wandb:   BATCH_SIZE: 301
wandb:   EPS_DECAY: 0.9771764005327028
wandb:   GAMMA: 0.9060099113200456
wandb:   LR: 5.210569270852514e-05
wandb:   MAX_TRUNCATION: 1.465349474835784
wandb:   NUM_LAYERS: 4
wandb:   NUM_NEURONS_EACH_LAYER: 64
wandb:   UPDATE_EVERY: 164
wandb:   a_TUNE: 0.4603350643255758
Failed to detect the name of this notebook, you can set it manually with the
WANDB_NOTEBOOK_NAME environment variable to enable code saving.

<IPython.core.display.HTML object>
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Run:  1  -----
Episode 100      Average Score: -327.15
Episode 200      Average Score: -353.43
Episode 300      Average Score: -490.76
Episode 400      Average Score: -359.89
Episode 500      Average Score: -353.00
Episode 501      Average Score: -356.19
Experiment ended because of bad results, no significant improvement of the agent
performance
0:26:30.581921
Run:  2  -----
Episode 100      Average Score: -314.52
Episode 200      Average Score: -243.84
Episode 300      Average Score: -178.23
Episode 400      Average Score: -195.85
Episode 500      Average Score: -328.57
Episode 501      Average Score: -327.04
Experiment ended because of bad results, no significant improvement of the agent
performance
0:18:12.227557
Run:  3  -----
Episode 100      Average Score: -298.42

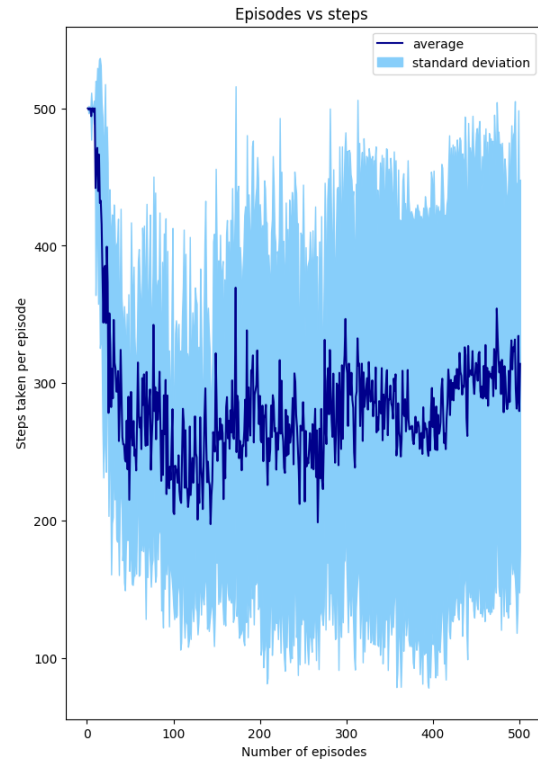
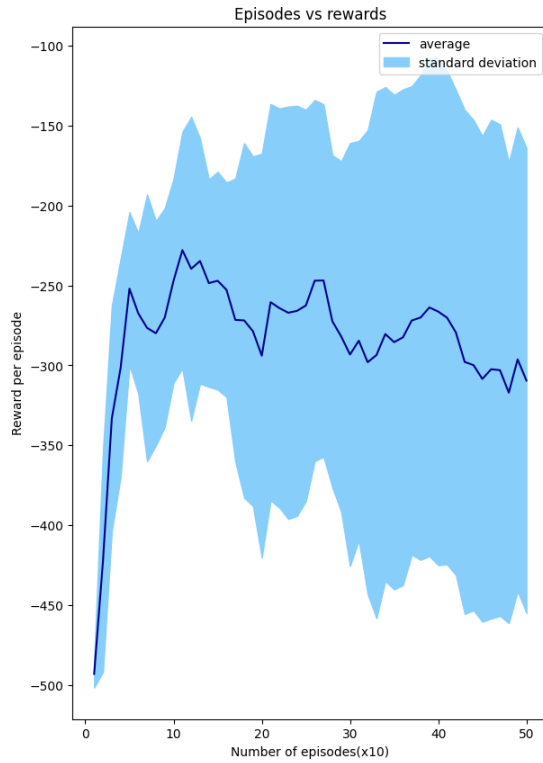
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Episode 200      Average Score: -202.90  
 Episode 300      Average Score: -245.35  
 Episode 400      Average Score: -488.90  
 Episode 500      Average Score: -497.92  
 Episode 501      Average Score: -496.32  
 Experiment ended because of bad results, no significant improvement of the agent performance  
 0:32:43.030020  
 Run: 4 -----  
 Episode 100      Average Score: -300.23  
 Episode 200      Average Score: -287.18  
 Episode 300      Average Score: -346.83  
 Episode 400      Average Score: -465.10  
 Episode 500      Average Score: -500.00  
 Episode 501      Average Score: -500.00  
 Experiment ended because of bad results, no significant improvement of the agent performance  
 0:36:55.029175  
 Run: 5 -----  
 Episode 100      Average Score: -326.46  
 Episode 200      Average Score: -280.06  
 Episode 300      Average Score: -272.58  
 Episode 400      Average Score: -177.28  
 Episode 500      Average Score: -175.44  
 Episode 501      Average Score: -176.30  
 Experiment ended because of bad results, no significant improvement of the agent performance  
 0:23:05.137734  
 Run: 6 -----  
 Episode 100      Average Score: -305.95  
 Episode 200      Average Score: -180.18  
 Episode 300      Average Score: -158.18  
 Episode 400      Average Score: -166.56  
 Episode 500      Average Score: -193.37  
 Episode 501      Average Score: -192.63  
 Experiment ended because of bad results, no significant improvement of the agent performance  
 0:19:14.225658  
 Run: 7 -----  
 Episode 100      Average Score: -275.24  
 Episode 200      Average Score: -387.99  
 Episode 300      Average Score: -172.89  
 Episode 400      Average Score: -146.30  
 Episode 500      Average Score: -135.22  
 Episode 501      Average Score: -135.21  
 Experiment ended because of bad results, no significant improvement of the agent performance  
 0:21:52.950540

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Run:  8 -----
Episode 100      Average Score: -348.92
Episode 200      Average Score: -234.07
Episode 300      Average Score: -412.57
Episode 400      Average Score: -168.98
Episode 500      Average Score: -152.31
Episode 501      Average Score: -154.33
Experiment ended because of bad results, no significant improvement of the agent
performance
0:26:15.928172
Run:  9 -----
Episode 100      Average Score: -332.92
Episode 200      Average Score: -193.13
Episode 300      Average Score: -215.15
Episode 400      Average Score: -484.08
Episode 500      Average Score: -500.00
Episode 501      Average Score: -500.00
Experiment ended because of bad results, no significant improvement of the agent
performance
0:26:47.578279
Run: 10 -----
Episode 100      Average Score: -313.54
Episode 200      Average Score: -203.30
Episode 300      Average Score: -168.66
Episode 400      Average Score: -143.38
Episode 500      Average Score: -148.06
Episode 501      Average Score: -148.35
Experiment ended because of bad results, no significant improvement of the agent
performance
0:13:56.959158

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<IPython.core.display.HTML object>
wandb: Sweep Agent: Waiting for job.
wandb: Job received.
wandb: Agent Starting Run: iewlk6qn with config:
wandb:   BATCH_SIZE: 78
wandb:   EPS_DECAY: 0.926953739784783
wandb:   GAMMA: 0.9933056586619043
wandb:   LR: 9.428417248094144e-05
wandb:   MAX_TRUNCATION: 0.6335367301001955
wandb:   NUM_LAYERS: 8
wandb:   NUM_NEURONS_EACH_LAYER: 90
wandb:   UPDATE_EVERY: 34
wandb:   a_TUNE: 0.4533718237009434
Failed to detect the name of this notebook, you can set it manually with the
WANDB_NOTEBOOK_NAME environment variable to enable code saving.

<IPython.core.display.HTML object>
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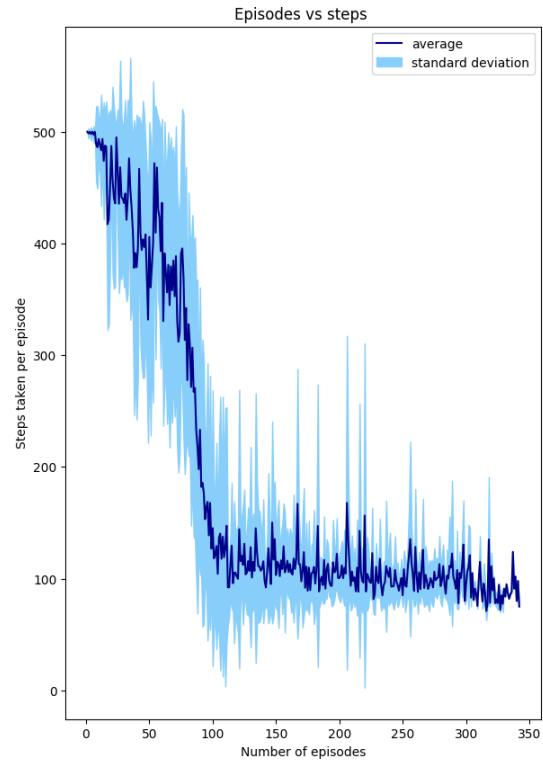
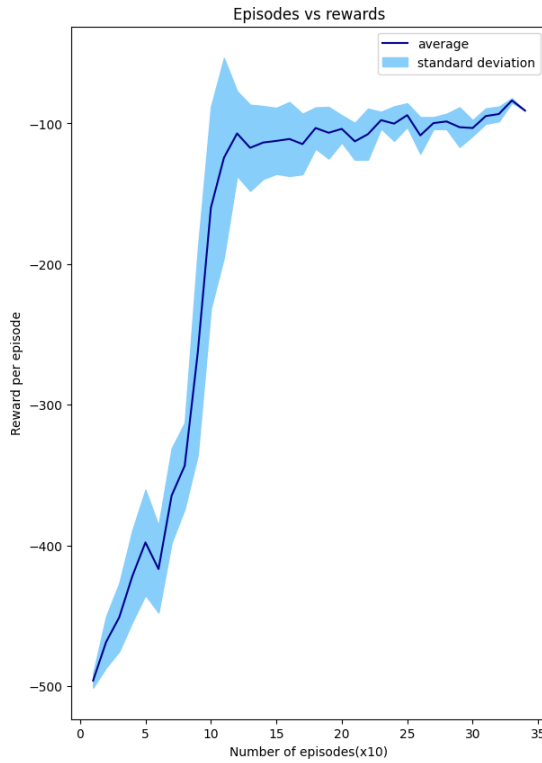
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Episode 100      Average Score: -361.89
Episode 190      Average Score: -99.351
Environment solved in 90 episodes!      Average Score: -99.35
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Run:  2  -----
Episode 100      Average Score: -402.84
Episode 200      Average Score: -146.29
Episode 291      Average Score: -99.934
Environment solved in 191 episodes!      Average Score: -99.93
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Run:  3  -----
Episode 100      Average Score: -374.65
Episode 200      Average Score: -108.71
Episode 244      Average Score: -98.677
Environment solved in 144 episodes!      Average Score: -98.67
0:06:31.326290
Run:  4  -----
Episode 100      Average Score: -412.18
Episode 200      Average Score: -115.73

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Episode 300      Average Score: -107.25
Episode 330      Average Score: -99.842
Environment solved in 230 episodes!      Average Score: -99.84
0:09:59.300580
Run:  5  -----
Episode 100      Average Score: -379.76
Episode 184      Average Score: -98.501
Environment solved in 84 episodes!      Average Score: -98.50
0:07:41.066031
Run:  6  -----
Episode 100      Average Score: -376.31
Episode 200      Average Score: -118.85
Episode 283      Average Score: -98.819
Environment solved in 183 episodes!      Average Score: -98.81
0:09:50.624013
Run:  7  -----
Episode 100      Average Score: -353.28
Episode 200      Average Score: -100.43
Episode 205      Average Score: -99.680
Environment solved in 105 episodes!      Average Score: -99.68
0:07:48.939249
Run:  8  -----
Episode 100      Average Score: -367.62
Episode 187      Average Score: -99.007
Environment solved in 87 episodes!      Average Score: -99.00
0:07:12.311413
Run:  9  -----
Episode 100      Average Score: -369.65
Episode 200      Average Score: -120.79
Episode 300      Average Score: -110.41
Episode 342      Average Score: -99.966
Environment solved in 242 episodes!      Average Score: -99.96
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Run: 10  -----
Episode 100      Average Score: -385.34
Episode 200      Average Score: -115.15
Episode 295      Average Score: -99.298
Environment solved in 195 episodes!      Average Score: -99.29
0:09:21.492330

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[wandb](#): Agent Starting Run: xi8w2cnj with config:

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wandb:    BATCH_SIZE: 420
wandb:    EPS_DECAY: 0.9616024272996044
wandb:    GAMMA: 0.851277896970229
wandb:    LR: 5.565054761690095e-05
wandb:    MAX_TRUNCATION: 1.6100037640975235
wandb:    NUM_LAYERS: 10
wandb:    NUM_NEURONS_EACH_LAYER: 64
wandb:    UPDATE_EVERY: 186
wandb:    a_TUNE: 0.7416087008143881
```

Failed to detect the name of this notebook, you can set it manually with the WANDB\_NOTEBOOK\_NAME environment variable to enable code saving.

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Run: 1 -----

Episode 100	Average Score: -479.59
Episode 200	Average Score: -465.51
Episode 300	Average Score: -444.56
Episode 400	Average Score: -446.23
Episode 500	Average Score: -435.37
Episode 501	Average Score: -435.37

Experiment ended because of bad results, no significant improvement of the agent performance

0:59:00.965229

Run: 2 -----

Episode 100	Average Score: -469.17
Episode 200	Average Score: -414.48
Episode 300	Average Score: -372.47
Episode 400	Average Score: -417.64
Episode 500	Average Score: -461.43
Episode 501	Average Score: -461.43

Experiment ended because of bad results, no significant improvement of the agent performance

0:58:41.279853

Run: 3 -----

Episode 100	Average Score: -456.76
Episode 200	Average Score: -404.25
Episode 300	Average Score: -420.79
Episode 400	Average Score: -392.00
Episode 500	Average Score: -382.39
Episode 501	Average Score: -381.75

Experiment ended because of bad results, no significant improvement of the agent performance

0:35:39.327747

Run: 4 -----

Episode 100      Average Score: -487.90

Episode 200      Average Score: -462.87

Episode 300      Average Score: -454.89

Episode 400      Average Score: -447.11

Episode 500      Average Score: -420.31

Episode 501      Average Score: -419.50

Experiment ended because of bad results, no significant improvement of the agent performance

0:36:44.096148

Run: 5 -----

Episode 100      Average Score: -478.46

Episode 200      Average Score: -446.63

Episode 300      Average Score: -461.18

Episode 400      Average Score: -428.50

Episode 500      Average Score: -430.78

Episode 501      Average Score: -429.97

Experiment ended because of bad results, no significant improvement of the agent performance

0:38:37.797573

Run: 6 -----

Episode 100      Average Score: -452.37

Episode 200      Average Score: -437.55

Episode 300      Average Score: -369.99

Episode 400      Average Score: -360.98

Episode 500      Average Score: -326.04

Episode 501      Average Score: -327.15

Experiment ended because of bad results, no significant improvement of the agent performance

0:36:07.425897

Run: 7 -----

Episode 100      Average Score: -489.32

Episode 200      Average Score: -454.80

Episode 300      Average Score: -446.96

Episode 400      Average Score: -454.35

Episode 500      Average Score: -421.94

Episode 501      Average Score: -424.30

Experiment ended because of bad results, no significant improvement of the agent performance

0:42:32.677448

Run: 8 -----

Episode 100      Average Score: -463.13

Episode 200      Average Score: -469.82

Episode 300      Average Score: -482.69

Episode 400      Average Score: -427.68

Episode 500      Average Score: -389.84  
Episode 501      Average Score: -392.75  
Experiment ended because of bad results, no significant improvement of the agent performance  
0:37:46.114911

Run: 9 -----

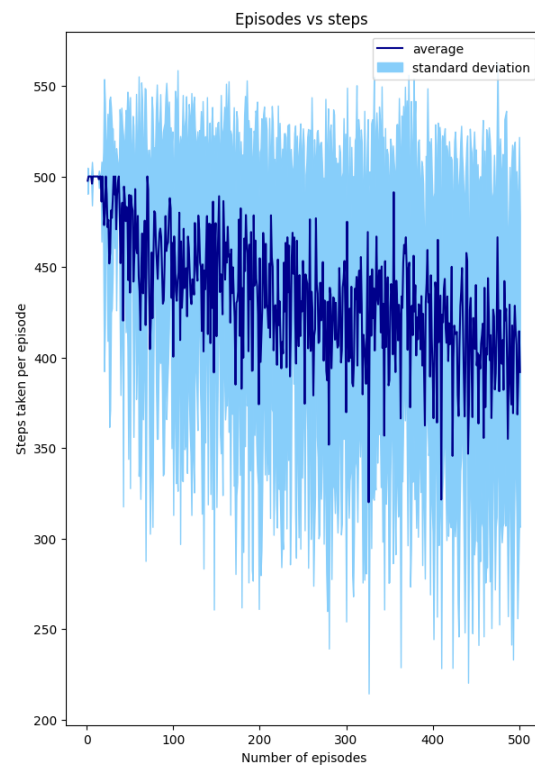
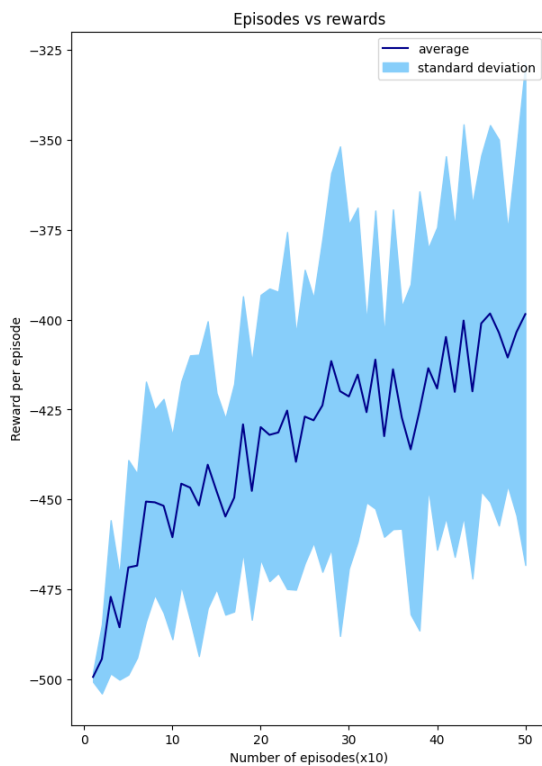
Episode 100      Average Score: -482.96  
Episode 200      Average Score: -443.64  
Episode 300      Average Score: -375.11  
Episode 400      Average Score: -443.83  
Episode 500      Average Score: -450.99  
Episode 501      Average Score: -451.14

Experiment ended because of bad results, no significant improvement of the agent performance  
0:36:26.315576

Run: 10 -----

Episode 100      Average Score: -447.58  
Episode 200      Average Score: -443.31  
Episode 300      Average Score: -431.17  
Episode 400      Average Score: -401.39  
Episode 500      Average Score: -341.42  
Episode 501      Average Score: -339.71

Experiment ended because of bad results, no significant improvement of the agent performance  
0:33:56.339938



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wandb: Agent Starting Run: be4dq3x3 with config:

wandb: BATCH\_SIZE: 263

wandb: EPS\_DECAY: 0.9199302836486072

wandb: GAMMA: 0.8088152991883967

wandb: LR: 2.372054651756627e-05

wandb: MAX\_TRUNCATION: 1.58041969823976

wandb: NUM\_LAYERS: 8

wandb: NUM\_NEURONS\_EACH\_LAYER: 128

wandb: UPDATE\_EVERY: 36

wandb: a\_TUNE: 0.8520842949316129

Failed to detect the name of this notebook, you can set it manually with the  
WANDB\_NOTEBOOK\_NAME environment variable to enable code saving.

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Run: 1 -----

Episode 100      Average Score: -387.53

Episode 200      Average Score: -220.42

Episode 300      Average Score: -190.47

Episode 400      Average Score: -212.91

Episode 500      Average Score: -204.10

Episode 501      Average Score: -203.73

Experiment ended because of bad results, no significant improvement of the agent performance

0:15:48.835083

Run: 2 -----

Episode 100      Average Score: -480.08

Episode 200      Average Score: -438.70

Episode 300      Average Score: -372.28

Episode 400      Average Score: -330.78

Episode 500      Average Score: -270.67

Episode 501      Average Score: -269.87

Experiment ended because of bad results, no significant improvement of the agent performance

0:24:56.320493

Run: 3 -----

Episode 100      Average Score: -387.27

Episode 179      Average Score: -266.86