RL EXPT 2 E0123030

import numpy as np

import matplotlib.pyplot as plt

n\_arms = 3

true\_rewards = [0.2, 0.5, 0.75]

n\_steps = 100

reward\_sums = np.zeros(n\_arms)

counts = np.zeros(n\_arms)

estimated\_rewards = np.zeros(n\_arms)

reward\_history = []

cumulative\_reward = []

for arm in range(n\_arms):

reward = int(np. random. rand() < true\_rewards [arm] )

reward\_sums [arm] += reward

counts [arm] += 1

estimated\_rewards [arm] = reward\_sums [arm] / counts [arm]

reward\_history.append(reward)

cumulative\_reward.append (sum(reward\_history) )

for step in range(n\_arms, n\_steps):

arm = np.argmax(estimated\_rewards)

reward = int (np. random. rand( ) < true\_rewards [arm] )

reward\_sums [arm] += reward

counts [arm] += 1

estimated\_rewards [arm] = reward\_sums [arm] / counts [arm]

reward\_history.append (reward)

cumulative\_reward. append (cumulative\_reward[-1] + reward)

print("\n === Final Results === ")

print("True Reward Probabilities: ", true\_rewards)

print("Estimated Reward Probabilities: ", np. round(estimated\_rewards, 2) )

print("Number of times each arm was selected:", counts)

print("Total Reward Earned: ", int(sum(reward\_history) ))

plt.figure(figsize=(10, 5))

plt.plot(cumulative\_reward, label="Cumulative Reward", color='blue' )

plt.xlabel("Steps")

plt.ylabel("Total Reward")

plt.title("Greedy Agent - Reward Over Time")

plt.grid(True)

plt. legend ( )

plt.tight\_layout ()

plt.show()

