Inotes2_Exercises

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차 례

Markorv Process p.3 Mars rover 그림 마코프체인 문제 다이어그램, 메트릭스를 작성하고 이때까지 배운것 적용해보기

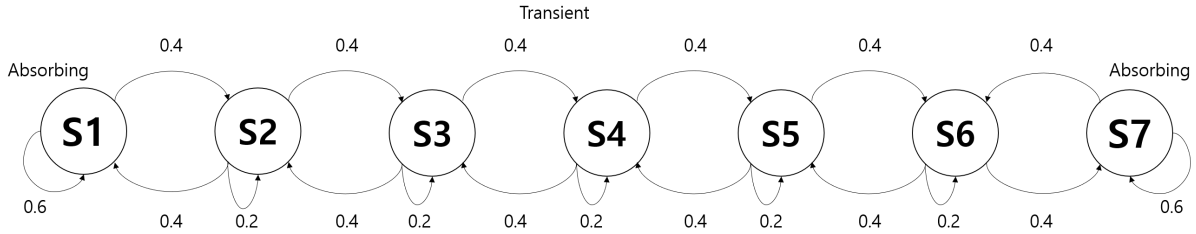

그림 1: Diagram

$$P = \begin{pmatrix} 0.6 & 0.4 & 0 & 0 & 0 & 0 & 0 \\ 0.4 & 0.2 & 0.4 & 0 & 0 & 0 & 0 \\ 0 & 0.4 & 0.2 & 0.4 & 0 & 0 & 0 \\ 0 & 0 & 0.4 & 0.2 & 0.4 & 0 & 0 \\ 0 & 0 & 0 & 0.4 & 0.2 & 0.4 & 0 \\ 0 & 0 & 0 & 0 & 0.4 & 0.2 & 0.4 \\ 0 & 0 & 0 & 0 & 0 & 0.4 & 0.6 \end{pmatrix}$$

Mars Rover Markov Process MC로 파이썬 구현해서 reward 계산하기 (Time Horizon 10일이라 가정, S4에서 시작)

```
import numpy as np
MC_N = 100000
H=10
def mars_simul(state):
    n=np.random.rand()


    if(state==0 and n<=0.6):
        state=0
    elif(state==0 and n>0.6):
        state+=1
    elif(state>=1 and state<=8):
        if(n<=0.4):
            state-=1
        elif(n>0.4 and n<=0.8):
            state+=1
    if(state==H-1 and n<=0.6):
        state=H-1
    elif(state==H-1 and n>0.6):
        state-=1

    return state


def reward_eval(path):
    reward = path.count(0)*1 + path.count(9)*10
    return reward

reward = np.array([])
result = []
start_state = 4
for i in range(MC_N):
    state = start_state
    for t in range(H):
        result.append(state)
        state = mars_simul(state)
    reward=np.append(reward, reward_eval(result))
    result=[]
```

```
print(np.mean(reward))
```

```
## 1.04876
```

```
import numpy as np
P = np.array([[0.6,0.4,0,0,0,0,0,0,0,0],[0.4,0.2,0.4,0,0,0,0,0,0,0],[0,0.4,0.2,0.4,0,0,0,0,0,0],
[0,0,0.4,0.2,0.4,0,0,0,0,0],[0,0,0,0.4,0.2,0.4,0,0,0,0],[0,0,0,0,0.4,0.2,0.4,0,0,0],
[0,0,0,0,0,0.4,0.2,0.4,0,0],[0,0,0,0,0,0,0.4,0.2,0.4,0],[0,0,0,0,0,0,0,0.4,0.2,0.4],
[0,0,0,0,0,0,0,0,0.4,0.6]])
R = np.array([1,0,0,0,0,0,0,0,0,10]).reshape(10,1)
H=10
v_t1 = np.array([0,0,0,0,0,0,0,0,0,0]).reshape(10,1)
t=H-1

while(t>=0):
    v_t = R + np.dot(P,v_t1)
    t=t-1
    v_t1 = v_t
print(v_t)
```

```
## [[ 4.55105331]
##  [ 2.74013082]
##  [ 1.59748096]
##  [ 1.1463639 ]
##  [ 1.57961421]
##  [ 3.38123162]
##  [ 7.42157517]
##  [14.90427904]
##  [27.19369011]
##  [45.48458086]]
```

thus, 1.1463639

```
"C3_Exercises"
```