

e.g. $S = \{ \text{Rainy, Sunny, Cloudy, Windy} \}$

$$E = \begin{pmatrix} 0.2 & 0.4 & 0.4 \\ 0.3 & 0.25 & 0.45 \\ 0.2 & 0.4 & 0.4 \\ 0.4 & 0.25 & 0.35 \end{pmatrix}$$

$$= \{ \text{Walk, Shop, Clean} \}$$

$$P = \begin{pmatrix} 0.2 & 0.3 & 0.34 & 0.1 \\ 0.4 & 0.2 & 0.1 & 0.3 \\ 0.2 & 0.1 & 0.3 & 0.4 \\ 0.25 & 0.15 & 0.4 & 0.2 \end{pmatrix}$$

$$\text{path}_{K,2} = \underset{S \in S}{\operatorname{argmax}} \{ e_{R_1 P_{K,2} V_{d,2}} \}$$

S_2 has maximized $V_{1,2}$ &
Set $V_{1,2}$ to 0.0084

S_1 has maximized $V_{3,2}$ &
Set $V_{3,2}$ to 0.0117.

Actual Obs: $\hat{y} = \{ 0_2, 0_1, 0_3 \} = \{ \text{Shop, Walk, Clean} \}$

$$V_{R,1} = e_{Rm} \pi_R$$

$$\forall R = 1, 2, 3, 4$$

$$\text{path}_{R,1} = \{ 0 ; R=1, 0 ; R=2, 0 ; R=3, 0 ; R=4 \}$$

$$(S_4) \quad V_{4,1} = 0.02$$

$$(S_3) \quad V_{3,1} = 0.0280$$

$$(S_2) \quad V_{2,1} = 0.1050$$

$$(S_1) \quad V_{1,1} = 0.1720$$

$$V_{R,2} = \max_{S \in S} \{ e_{R_1 P_{K,2} V_{d,2}} \}$$

$$\text{path}_{R,2} = \{ 2, K=1, 2, K=2, 1, K=3, 2, K=4 \}$$

$$(S_4) \quad V_{4,2} = 0.0126$$

$$(S_3) \quad V_{3,2} = 0.0117$$

$$(S_2) \quad V_{2,2} = 0.0155$$

$$(S_1) \quad V_{1,2} = 0.0084$$

$$V_{R,3} = \max_{S \in S} \{ e_{R_3 P_{K,3} V_{d,3}} \} \quad \forall R = 1, 2, 3, 4$$

$$\text{path}_{R,3} = \begin{cases} 2 ; R=1 \\ 2 ; R=2 \\ 4 ; R=3 \\ 3 ; R=4 \end{cases}$$

$$V_{4,3} = 0.0016$$

$$V_{3,3} = 0.002$$

$$V_{2,3} = 0.0014$$

$$\text{path} = \begin{pmatrix} 0 & 2 & 2 \\ 0 & 1 & 2 \\ 0 & 1 & 4 \\ 0 & 2 & 3 \end{pmatrix}$$

$$Z_T = \underset{S \in S}{\operatorname{argmax}} \{ V_{d,T} \}$$

$$\{ V_{d,T} \}$$

$$\Rightarrow Z_T = 1$$

$$X_T = S_1$$

$$\Rightarrow X_3 = S_1$$

Log of most probable likely
States = $\{ x_1, x_2, x_3 \} = \{ S_1, S_2, S_3 \}$
 $x_1 = \{ 0_2, 0_1, 0_3 \} = \{ \text{Rainy, Sunny, Windy} \}$
 $x_2 = \{ 0_2, 0_1, 0_3 \} = \{ \text{Walk, Shop, Clean} \}$
 $x_3 = \{ 0_2, 0_1, 0_3 \} = \{ \text{Walk, Shop, Clean} \}$

i.e. \leftarrow States

$Z_{2,1} = Z_1 = \text{path } z_{2,1} = 1$

$Z_{3,1} = Z_2 = \text{path } z_{3,1} = 1$

$\Rightarrow X_2 = S_2 = \text{path } z_{1,2} = 2$

$\Rightarrow X_3 = S_1 = \text{path } z_{1,3} = 2$