

eg.  $S = \{ \text{Raining, sunny, cloudy, humid} \}$   
 $s_1 \quad s_2 \quad s_3 \quad s_4$

$$E = \begin{pmatrix} 0.2 & 0.4 & 0.4 \\ 0.3 & 0.25 & 0.45 \\ 0.2 & 0.4 & 0.4 \\ 0.4 & 0.25 & 0.35 \end{pmatrix} = \{ \text{walk, shop, clean} \}$$

$$R = \begin{pmatrix} 0.2 & 0.3 & 0.34 & 0.16 \\ 0.4 & 0.2 & 0.1 & 0.3 \\ 0.2 & 0.1 & 0.3 & 0.4 \\ 0.25 & 0.15 & 0.4 & 0.2 \end{pmatrix} = \{ \text{shop, walk, clean} \}$$

path<sub>k,2</sub> = argmax<sub>des</sub> { e<sub>k1</sub> P<sub>kR</sub> V<sub>k,1</sub> }  
 $s_2$  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:  $\vec{y} = \{ o_2, o_1, o_3 \} = \{ \text{shop, walk, clean} \}$

$$V_{k,1} = e_{k1} P_{kR} T_{kR} \quad \forall R=1,2,3,4$$

$$\text{path}_{k,1} = \begin{cases} 0; & R=1 \\ 0; & R=2 \\ 0; & R=3 \\ 0; & R=4 \end{cases}$$

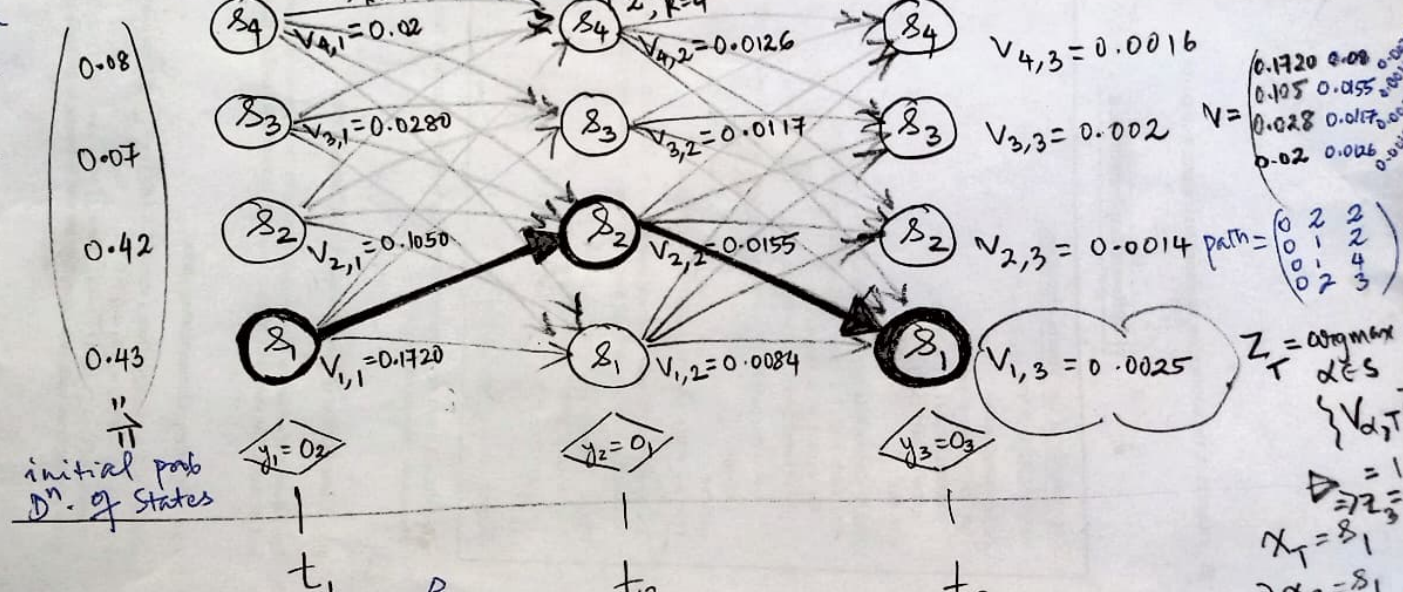
$$V_{k,2} = \max_{des} \{ e_{k1} P_{kR} V_{k,1} \}$$

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

$$V_{k,3} = \max_{des} \{ e_{k3} P_{kR} V_{k,2} \} \quad \forall R=1,2,3,4$$

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

Seq. of most probable/likely States =  $\{ x_1, x_2, x_3 \} = \{ s_1, s_2, s_1 \}$   
 $= \{ \text{Raining, Sunny, Rainy} \}$   
 given  $\vec{y} = \{ o_2, o_1, o_3 \} = \{ \text{S, W, C} \}$



$\leftarrow$  States

$\leftarrow$  observations  $y_i = o_i$

Backtrack  $Z_{2,1} = z_1 = \text{path}_{z_2,2}$   
 $x_1 = s_1, z_2 = 1$

Backtrack  $Z_{3,1} = z_2 = \text{path}_{z_3,3}$   
 $x_2 = s_2, z_3 = 2$

Backtrack  $(T=3)$   
 $x_3 = s_1, z_3 = 1$