2022oct21

Friday, October 21, 2022 12:37

$$D = \min_{I, J, T} \sum_{t=1}^{T} d\left(i(t-1), i(t), j(t-1), j(t)\right)$$

$$d\left(i(t-1), i(t), j(t-1), j(t)\right) = \begin{cases} C & \text{horizontal} \\ C & \text{vertical} \\ d_{i(t), j(t)} & \text{diagonal} \end{cases}$$

$d_{i,j}$ j

	0	1	2	3	4	5
i						
	1	$d_{1,1}$	d_{12}	d_{13}		
	2	d_{21}	d_{22}			
	3					

$$D \quad \begin{array}{c|ccc} & 0 & 1 & 2 \\ \hline 0 & 0 & 0 & 0 \\ i \;\; 1 & 0 & d_{11} & d_{12} \\ 2 & 0 & d_{21}+C2 & d_{11}+d_{22} \end{array} \qquad d_{12}+C2$$

$$C: \min_{I, J, T} \sum_t d(i, i, j, j)$$

GOAL

$$d_{11} + d_{22} < 2C + d_{22}$$

$$d_{11} + d_{22} < d_{12} + 2C$$

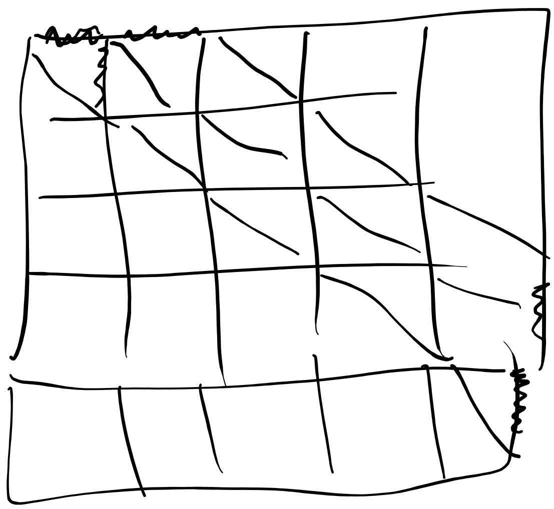
$$d_{11} + d_{22} < d_{21} + 2C$$

CHOOSING A PATH w/ N diagonal steps is best if $2C > \max_{i,j} d_{i,j}$

SINCE EVERY d_{ij} CAN BE

REPLACED BY $2C$;

$$C > \frac{1}{2} \max_{i,\bar{j}} d_{i,\bar{j}}$$



[2]

$$e[n] = d[n] - \beta_1 d[n-P+1] - \beta_2 d[n-P] - \beta_3 d[n-P-1]$$

MINIMIZE

$$\mathcal{E} = \sum_{n=0}^{N-1} e^2[n]$$

$$= \sum_{n=0}^{N-1} \left(d[n] - \sum \beta_m d[n-P+2-m]\right)^2$$

ORTHOGONALITY: SETTING

$$\frac{\partial \mathcal{E}}{\partial \beta_m} = 0 \qquad \text{WOULD YIELD}$$

$$\sum_{n=0} e[n]\, d[n-P+2-m] = 0$$

PLUGGING IN $e[n]$,

$$\sum d[n]\, d[n-P+2-m]$$

$$-\beta_1 \sum d[n-P+1]\, d[n-P+2-m]$$

$$-\beta_2 \sum d[n-P]\, d[n-P+2-m]$$

$$-\beta_3 \sum d[n-P-1]\, d[n-P+2-m]$$

$$= 0$$

$$\vec{c} - \Phi \beta = 0$$

$$\begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \end{bmatrix} = \Phi^{-1} \vec{c}$$

$$\Phi = \begin{bmatrix} \phi(1,1) & \phi(1,2) & \phi(1,3) \\ \vdots & \vdots & \vdots \\ \phi(3,1) & \phi(3,2) & \phi(3,3) \end{bmatrix}$$

FOR

$$\phi(i,j) = \sum_{n=0}^{N-1} d[n-P+2-i]\, d[n-P+2-j]$$

$$\vec{c} = \begin{bmatrix} c(1) \end{bmatrix}$$

$$\vec{c} = \begin{bmatrix} c(2) \\ c(3) \end{bmatrix}$$

$$c[m] = \sum_{n=0}^{N-1} d[n]\, d[n - P + 2 - m]$$