In-class

11/04

$N = 200$

$K = 100$

$L_0 = 0.9$

No: of features = 3

① $M = 5.\sqrt{N} = 5.\sqrt{200}$

$= 50\sqrt{2} = 70.7$

$D = \text{round}(\sqrt{M})$

$= \text{round}(\sqrt{70.7}) = \text{round}(8.4)$

$= 8$

② Radius of map $\sigma_0 = D - 1 = 8 - 1 = 7$

$\sigma_0 = 7$

③ Sample = (0.1, 0.3, 0.4)

Weight = (0.2, 0.5, 0.6)

$$\text{Distance}^2 = \sum_{i=0}^{n} (\text{input}_i - \text{Weight}_i)^2$$

$n = 1$

$= (0.1 - 0.2)^2, (0.3 - 0.5)^2, (0.4 - 0.6)^2$

$= 0.01, 0.04, 0.04$

Distance = sqrt $(0.01 + 0.04 + 0.04)$

$= 0.3$

④ $\sigma(t) = \sigma_0 e^{-t/\lambda}$

$\lambda = K/\sigma_0$

$\lambda = 100/7$

$t = 9$

$\sigma(9) = 7 \times e^{-\frac{9\times7}{100}}$

$= 7 \times e^{-63/100}$

$= 7 \times 0.53$

$= 3.71$

⑤ $L(t) = L_0 e^{-t/\lambda}$

$= 0.9 \times 0.53$

$= 0.477$

⑥ BMU = (1, 1) ; neighbor = (2, 2)

$dist_{BMU} = sqrt\left(X_{BMU} - X_{nei}\right)^2 + \left(Y_{BMU} - Y_{nei}\right)^2$

$= sqrt\left((1-2)^2 + (1-2)^2\right)$

$= \sqrt{2} = 1.41$

⑦ $\theta(t) = e^{-dist_{BMU}^2 / 2\times[\sigma(t)]^2}$

$= e^{-1.41^2/2\times(3.71)^2}$

$= e$

$= 0.93$

(8) neighbor = (0.2, 0.5, 0.6)

input = (0.1, 0.3, 0.4)

Weight(t+1) = Weight(t) + $\Theta(t) L(t)$ [input(t) - Weight(t)]

= (0.2, 0.5, 0.6) + 0.93 × 0.477 [−0.1, −0.2, −0.2]

= (0.2, 0.5, 0.6) + (−0.044, −0.089, −0.089)

= (0.156, 0.411, 0.511)