Voronoi partition

Manhalanobis distance

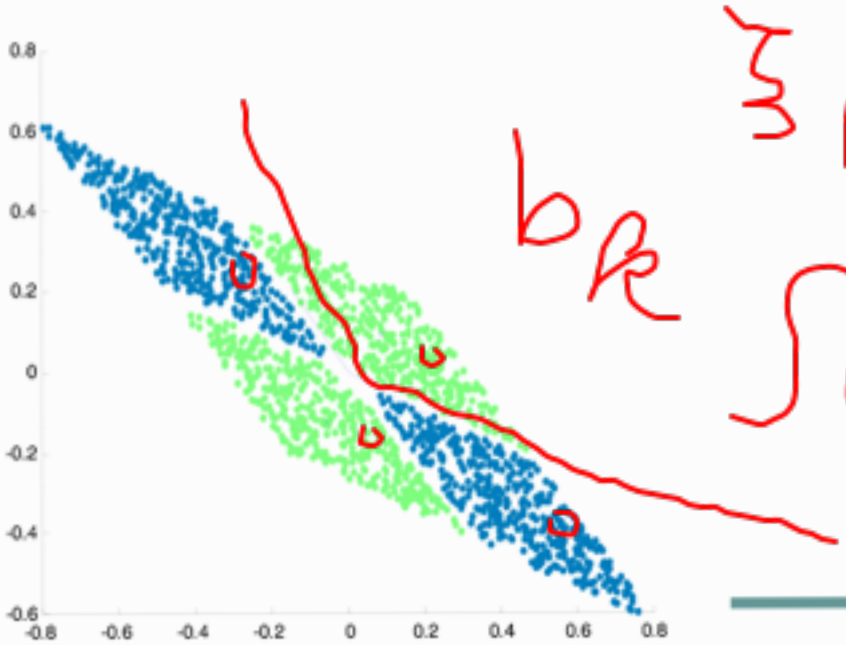
$$\|\mathbf{x}-\mathbf{y}\|_A = \sqrt{(\mathbf{x}-\mathbf{y})^T A(\mathbf{x}-\mathbf{y})}$$

Voronoi Partition defined by A and all $\mathbf{y}_i$ in θ

$$\Omega_k = \{x \mid k = \arg\min_j \| \boldsymbol{x} - \boldsymbol{y}_j \|_A\}$$

$$\Omega_1 = \{x \mid 1 = \arg\min_k \|x - b_k\|_A$$

- Four local means
- Non-overlapping distributions
- A common weight matrix for rotation



ξ_k

b_k Ω_k

$$\theta = \{A, b_1, b_2, b_3, b_4\}$$

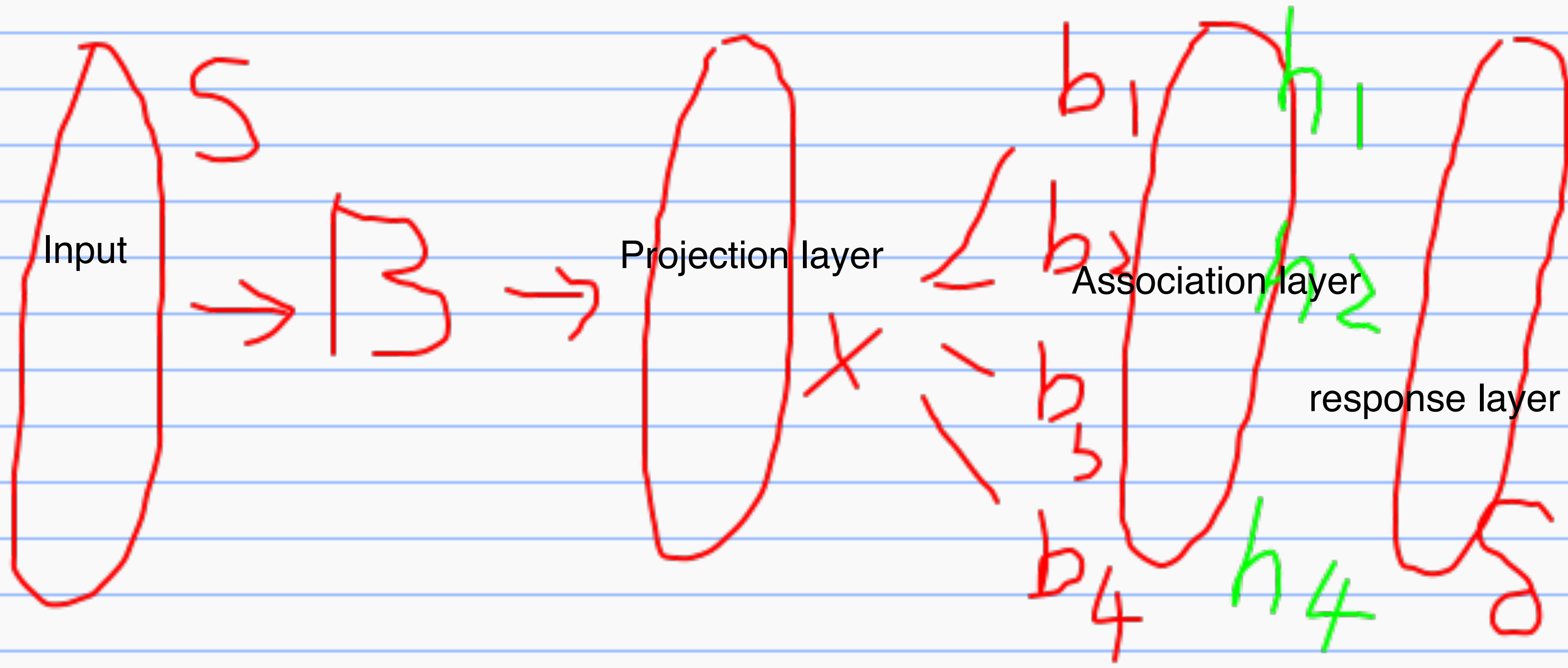
$$\xi_k \in \{e_1, e_2\}$$

$$k = 1, 2, 3, 4$$

$$\theta = \{A, b_1, b_2, b_3, b_4, \xi_1, \xi_2, \xi_3, \xi_4\}$$

$$S \to Bs \to x$$

a matrix-type feature extractor



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Microsoft PowerPoint - lecture-PottsNDA.ppt

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Memberships

- Unitary vectors for membership representations

$\mathbf{e}_k$ denotes a unitary vector with the kth bit one and others zeros

$\Xi_K = \{\mathbf{e}_k\}_{k=1}^{K}$ denotes collection of possible memberships

$\delta = e_k$ if $x \in \Omega_k$

membership of x

$$\|x-b_1\|_A^2 \gtreqless \|x-b_2\|_A^2$$

$$x^TAx - 2x^TAb_1 + b_1^TAb_1 \gtreqless x^TAx - 2x^TAb_1 + b_2^TAb_2$$

$$x^TAb_1 \gtreqless x^TAb_2$$

unitary vector assump.

① let B be a square matrix

② $h_k = x^T b_k$

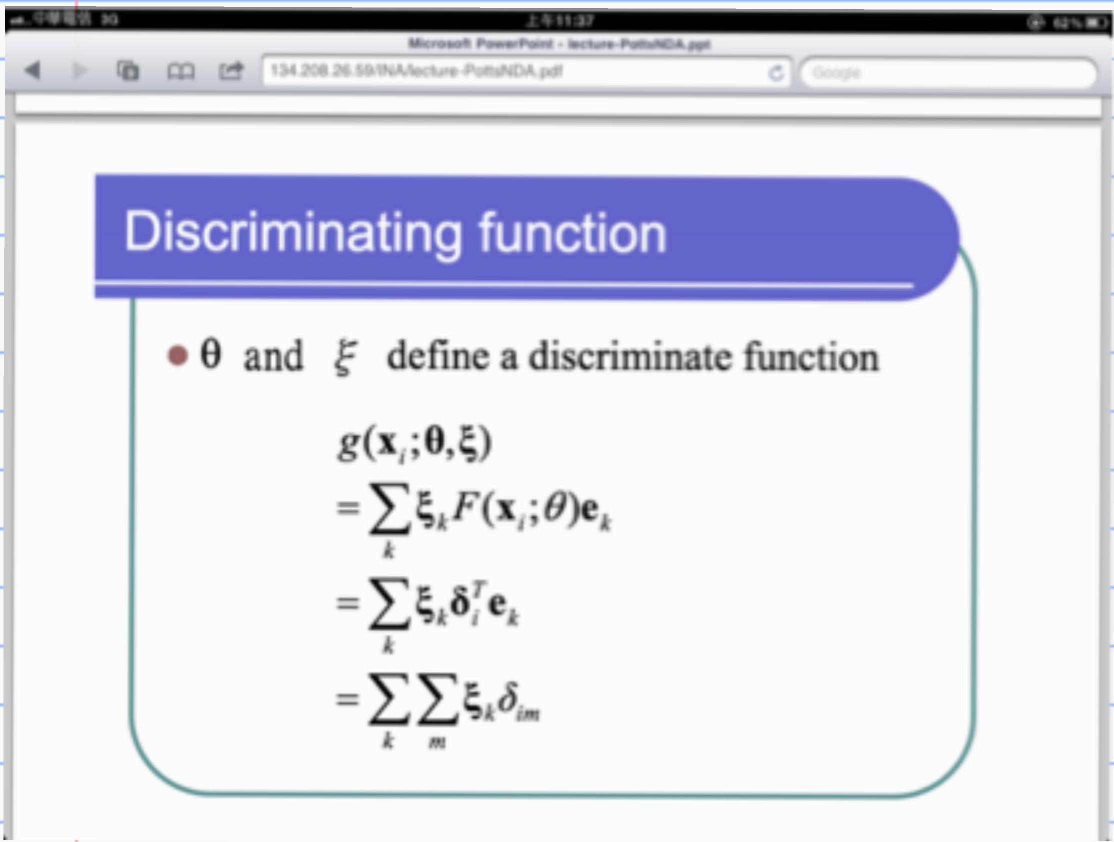
Ex Memb

③ $\delta = e_k$ if

$k = \arg\max_j h_j$

$$y = F(s;\theta)$$

$$= \sum_{k=1}^{4} \xi_k \delta^T e_k$$



Overlapping membership

$$\Pr(\delta = e_{k}) \propto \exp(\beta h_k)$$

$$v_k = \frac{\exp(\beta h_k)}{\sum_{\ell} \exp(\beta h_\ell)}$$

$\beta \uparrow \rightarrow$ Ex Mem.