U19CS012

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(Q3)

(GMM based modelling) $p(x/\theta) = \sum_{k=1}^{k} \pi_k N(x/\mu_k, \Sigma_k)$

(Gaussian mixture Model) - Density Based model)

(A) Different parameters to be estimated = D

distribution $N(x/\mu_k, \Sigma_k)$

⟹ parameters of a GMM → θ: ① of π_k, (mixture weights π_k)

② μ_k, (k means μ_k)

③ Σ_k (covariances) : $k = 1, \ldots k$

(B) Design strategy for deciding no. of mixture models for facial images

EM Algorithm → find parameter in GMM that gives maximum likelihood of observed data x

$$F(x) = \sum_{q=1}^{m} p\left(\frac{c_q}{x}\right) \left[\mu_q^{Y} \Sigma_q^{yx} \Sigma_q^{xx^{-1}} (x - \mu_q)^{x}\right]$$

where

$p(c_q/x)$ → conditional probability $\Sigma_q = \begin{bmatrix} \Sigma_q^{xx} & \Sigma_q^{xy} \\ \Sigma_q^{yx} & \Sigma_q^{yy} \end{bmatrix}$

m → GMM mixtures in facial conversion $\mu_q = \begin{bmatrix} \mu_q^{x} \\ \mu_q^{y} \end{bmatrix}$

(★) GMM → Joint density model is baseline for mapping source & target faces (Cepstrum based GMM) ✓

VISION