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1. The Subject and Aims of Research

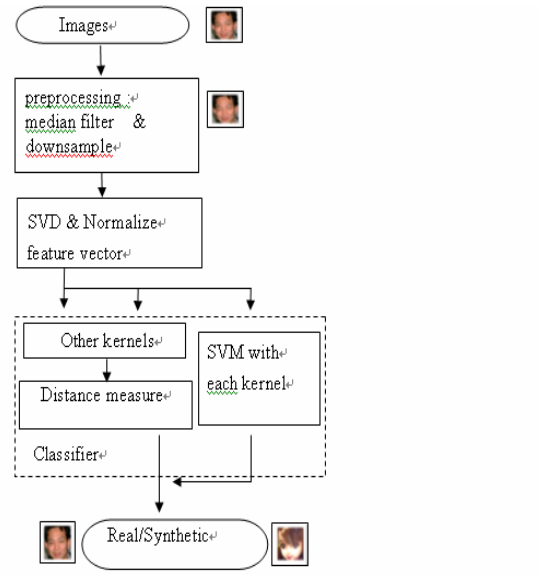
(1). real/synthesis human face recognition and noise analysis: Using RGB Color space or reflectance separating real human face form synthesis human face for real human identification.

(2). natural/artificial lights using linear model representation and estimation: Using existing CCD sensory for lighting estimation and for illuminating estimation on image processing/pattern recognition.

2. Related Recent Research Topics

The data base of real and synthesis human face is decomposed by SVD to obtain feature vectors, and these vectors is applied to nonlinear SVM to discriminate real/synthesis human shown in Fig.1.

An alternate is using the reflectance curve of real human face. It is due to the reflectance curve is confined in a certain area. It is obtained by PCA method to get three basis functions shown in Fig.2. Mahalanobis distance is then applied to discriminate real/Synthesis human face in various lights. Shown in Fig.3.



圖一:Block diagram of process for discrimination between real human and synthetic human faces using SVD with other kernels and SVMs.

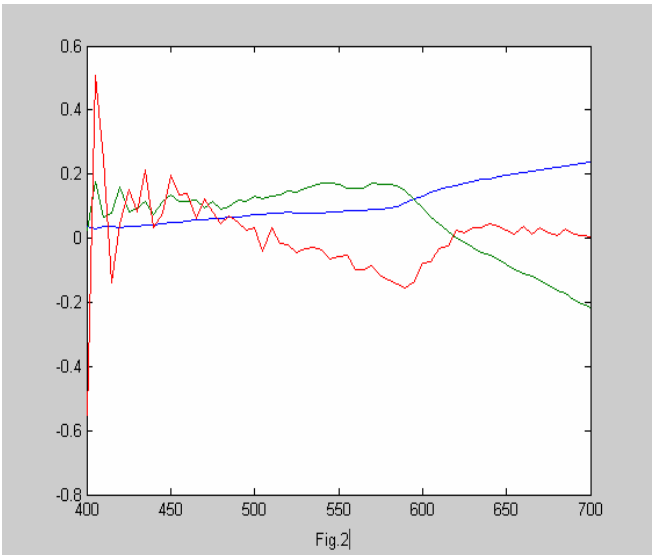


Fig.2.basis function of real human

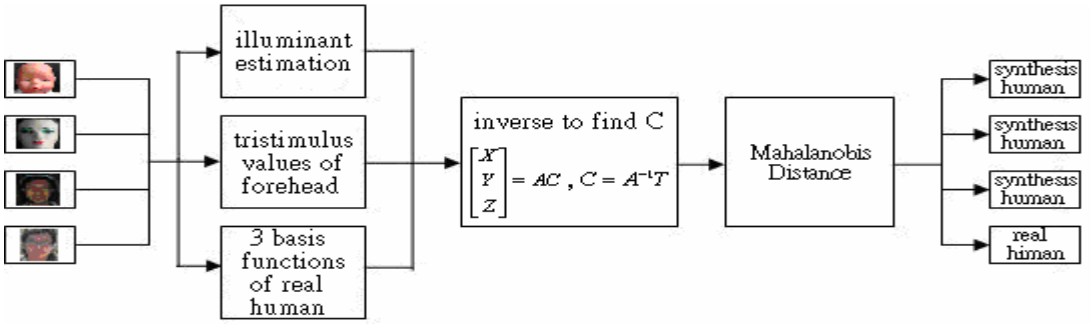


Fig.3

Other topic is using linear model to estimate illuminant. The flow chart is shown in Fig.4 and Fig.5.

(a) artificial illuminant basis function extraction

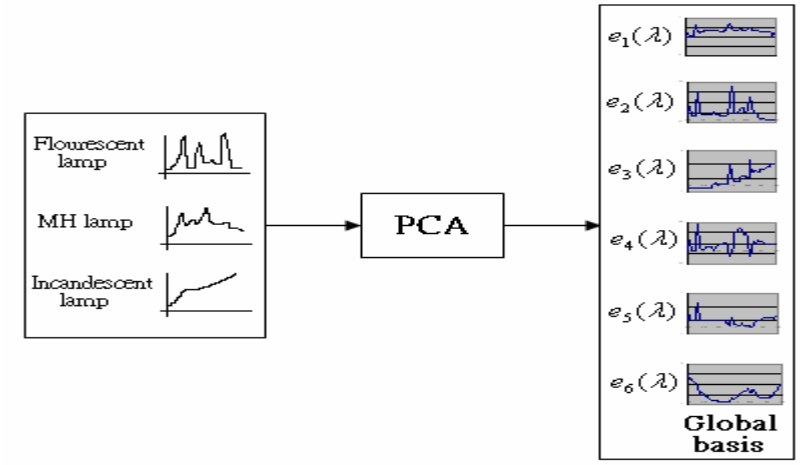


Fig.4

(b) illuminant estimation

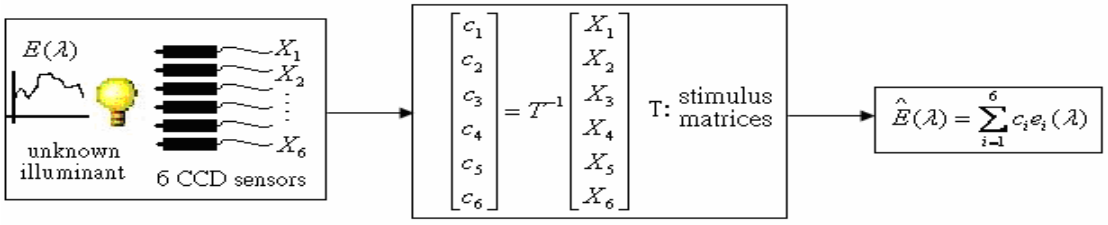


Fig.5

3. Selected Publications and Projects

Publications:

1. N.C.Hu, K.K.Yu and H.I. Chang, “Multiple – target recognition using the discrete rotational Fourier transform “Optical Engineering, Aug. 2001, pp. 1687-1698
2. H.I. Chang, C.Y. Huang, and .N.C.Hu, “Object center variation and estimation in noisy environment”, Vol. 45, No.2, in Optical Engineering, Feb, 2006
3. C.Y. Huang, and .N.C.Hu, “Face discrimination of real human and Synthesis human”, accepted for publication in Optical Engineering