

ABSTRACT

Gunawan Sugianto (08220030001)

FINGERPRINT IMAGE RECOGNITION USING PRINCIPAL COMPONENT ANALYSIS AND HAMMING DISTANCE

(xi + 51 pages, 5 tables, 21 pictures)

Each person has a unique fingerprint and it can be used to certify the person's identity. Nowadays, the application of fingerprint matching is used almost in every system to control access to physical locations, computer/network resources. There are many methods that can be used to recognize fingerprint. One of those is Hamming distance. However, due to high dimension of fingerprint image, Principal Component Analysis (PCA) is needed to solve this problem.

PCA aims at reducing a large set of variables to a small set while retainings as much as possible of the variation in the large set. There are six steps in PCA. First, collect the fingerprint images (50 fingerprints from five people) and each image was stored in form of matrix $[1 \times N]$. Second, calculate the mean value of all matrices. Third, find the subtract matrices. Forth, calculate the covariance matrix and its eigenvectors and eigenvalues. Finally, derive a new data set. Hamming Distance is used to match data set resulted from PCA process with the testing data.

By combining Principal Component Analysis and Hamming Distance, this system has recognized human fingerprint correctly with $[50 \times 50]$ reference data for 66%, $[50 \times 40]$ reference data for 80%, and $[50 \times 30]$ reference data for 74%.

Reference: 15(2003-2007)