TOWARDS A UNIQUE BIOMETRIC CRITERION FOR AN INTEGRATED FACE AND FINGERPRINT IDENTIFICATION

By

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ABSTRACT

This thesis investigates methods of integrating biometric information, specifically face and fingerprint images, for the purpose of identification. Analytic rules are developed that allow the comparison of different integration approaches; the results of these rules are compared with empirical results from a real data set obtained from the Troy Police Department. An approach is found which has a lower False Match Rate (FMR) than using either biometric mode by itself, and the empirical results support conclusions reached from the analytic rules. This approach is also faster than using the face and fingerprints individually and later merging their results, as well as having less storage requirements.

The nature of the Troy Police data is explored; both in terms of its distribution and the correlation between face and fingerprint images from the same person. A slight positive correlation between wavelet coefficients from the face and fingerprint images of the same person, a significant finding as it contradicts assumptions made in the literature.

A model is developed which helps explain the effect of a second class of subjects with poorer quality images into a system. This may motivate greater care when acquiring biometric images for later use in identification, and also explain differences between results in real-world applications and manufacturers' claims.