A PRE-PROCESS IMAGE ENHANCEMENT ALGORITHM USING WIENER AND GABOR FILTER TO OVERCOME FINGERPRINT IMAGE ACQUISITION PROBLEMS

UNDERGRADUATE THESIS

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FACULTY OF ENGINEERING AND COMPUTER SCIENCE

BAKRIE UNIVERSITY

JAKARTA

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Submitted as one of requirements to obtain bachelor degree (S1)

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STATEMENT OF ORIGINALITY

The material in this Undergraduate Thesis is the result of my own work, and all sources are quoted and cited properly.

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Finally, I truly hope that this Undergraduate Thesis can be used as reference in the future and brings benefit to the other parties who need.

Jakarta, August 21st 2017

Pearly Adi Negoro

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A PRE-PROCESS IMAGE ENHANCEMENT ALGORITHM USING WIENER AND GABOR FILTER TO OVERCOME FINGERPRINT IMAGE ACQUISITION PROBLEMS

Pearly Adi Negoro[1]

ABSTRACT

The use of fingerprint as a biometric on security system has been largely used because it has more advantages than any other access control methods.. Nevertheless, this system still have problems; the acquired fingerprint image is not always giving its best quality because of certain factors. Hence, this study is conducted using spatial and frequency method to develop a better method on fingerprint image enhancement due to image acquisition problems which frequently arise. In this study, I proposed an enhancenment method which includes segmentation, Wiener filter, normalization, ridge orientation estimation, ridge frequency estimation, Gabor filter, and Binarization. Afterwards, the evaluation is conducted by comparing the proposed algorithm with 4 other algorithms; algorithm which only used Gabor filter, algorithm which only used Wiener filter, STFT analysis, and anisotropic filter. To represent the problems which usually appear on fingerprint image acquisition, I used artificial noise which consists of gaussian noise, salt & pepper noise, speckle noise, and motion blur to test the performance of proposed algorithm. The evaluation method used in this study are Mean Square Error (MSE), Peak Signal to Noise Ratio (PSNR), Mean Structural Similarity Index (MSSIM), minutiae detection, and match score. Simulation results showed that the proposed method is the best method which is supported by lower MSE, higher PSNR, higher MSSIM, lower delta minutiae, and higher match score compare to the other methods.

Keywords: Biometric, fingerprint enhancement, Wiener filter, Gabor filter

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