ABSTRACT

· AN APPROACH TO FINGERPRINT ANALYSIS, FEATURE EXTRACTION AND PATTERN MATCHING

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In today's society, biometric systems; in particular fingerprint systems; offer an attractive advantage to solving many security problems involving the identification and authentication of individuals. Several complex structures, algorithms and techniques have been developed to provide solutions that have been successfully implemented in fingerprint systems. One of the most important steps in performing fingerprint matching and recognition is the enhancement of the fingerprint image.

This research highlights some of the common techniques used as necessary steps in the process of fingerprint image enhancement before feature extraction, pattern recognition and matching of fingerprints can successfully be performed. This research, in part, demonstrates an application written in the Java platform that is used as a basis for the design, implementation and experimentation of the algorithms and methods used in a fingerprint system. There are many methods used in the development of fingerprint image enhancement. This research explains the scientific literature behind the development of the fundamental algorithms, their implementation and integration into a software design. The algorithms implemented are *normalization, segmentation, convolution (sobel masks), binarization, ridge thinning* and *Fourier transformations*.

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