

A Robust Iris Recognition Systems with Fast Pupil Localization

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Abstract

In recent years there has been a rapid increase in the need for accurate and reliable personal identification so biometrics has received more and more attention. Iris recognition as a biometrics has a satisfying performance due to its high reliability and non-invasion. The iris recognition system consist of four process: image acquisition, preprocessing, feature extraction and matching. In an iris recognition system, preprocessing, especially iris localization plays a very important role. The speed and performance of an iris recognition system is crucial and it is limited by the results of iris localization to a great extent. This process depends on the pupil localizing. Many parameters affect on the pupil images and may occur some inaccuracy in simple and fast pupil localization methods. In this paper, we propose a new fast and robust pupil localization for finding the iris inner boundary based on wavelet transform and analytic geometry relations. Extensive experimental results show that the proposed algorithm in addition to higher speed and lower calculation cost and simplicity, has got an acceptable accuracy for internal boundary localization.

Key words — Biometric, iris recognition, pupil localization, pattern recognition, machine vision

1. Introduction

Biometrics are systems for identification and verification of people. Any individual and distinctive, robust and measurable physiological or behavioral characteristic which can be used for automatic identification or verification is called biometrics. [1, 2]

Among biometrics, iris scan systems are foolproof and have got very high confidence because of the iris pattern individuality, which can not be copied artificially and also iris stability specifications. [14] Iris is the colored part of the eye and lies in dorsal part of the cornea. [3] Iris structure starts forming in the 3rd month of fetal period. [5] This body organ is the single internal organ which normally can be seen from outside of the body. Each iris has got a complicated individual pattern that makes completely difference between left iris and right iris in one person. It is claimed that Iris scan systems are foolproof, because, it is impossible to copy iris artificially due to particulars and numbers of measurable specifications of it.

Generally, an Iris recognition system is divided into four parts. In first part, a sequel of eye images is captured, then in the second part, the localization is performed and in the third part, extraction of specification is done and iris code is gained and finally in fourth part the comparison and recognition are performed. [6]

First step of iris recognition is separating the iris image from other parts of the eye. [4] Accurate iris localization in iris recognition systems for verification and identification plays a very important role. Incorrect recognition of iris boundaries, tends to unpredictable results of the recognition process.