

Note on CASIA-IrisV3

1. Introduction

With fast development of iris image acquisition technology, iris recognition is expected to become a fundamental component of modern society, with wide application areas in national ID card, banking, e-commerce, welfare distribution, biometric passport, and forensics, etc. Since 1990s, research on iris image processing and analysis has achieved great progress.

However, performance of iris recognition systems in unconstrained environments is still far from perfect. Iris localization, nonlinear normalization, occlusion segmentation, liveness detection, large-scale identification and many other research issues all need further investigation. The success of investigations into such issues often depends on the availability of carefully designed iris image databases of sufficient size. Such publicly available datasets are however very limited. Therefore we are pleased to release to the public domain CASIA Iris Image Database V3.0 (or CASIA-IrisV3 for short) in order to further promote research and progress on iris recognition.

2. Brief Descriptions and Statistics of the Database

CASIA-IrisV3 includes three subsets which are labeled as CASIA-Iris-Interval, CASIA-Iris-Lamp, CASIA-Iris-Twins. CASIA-IrisV3 contains a total of 22,034 iris images from more than 700 subjects. All iris images are 8 bit gray-level JPEG files, collected under near infrared illumination. Some statistics and features of each subset are summarized in Table 1. Almost all subjects are Chinese except a few in CASIA-Iris-Interval. Because the three data sets were collected in different times, only CASIA-Iris-Interval and CASIA-Iris-Lamp have a small overlap in subjects.

2.1 CASIA-Iris-Interval

Iris images of CASIA-Iris-Interval were captured with our self-developed close-up iris camera (Fig.1). The most compelling feature of our iris camera is that we have designed a circular NIR LED array, with suitable luminous flux for iris imaging. Because of this novel design, our iris camera can capture very clear iris images (see

Fig.2). CASIA-Iris-Interval is well-suited to study the detailed texture features of iris images.

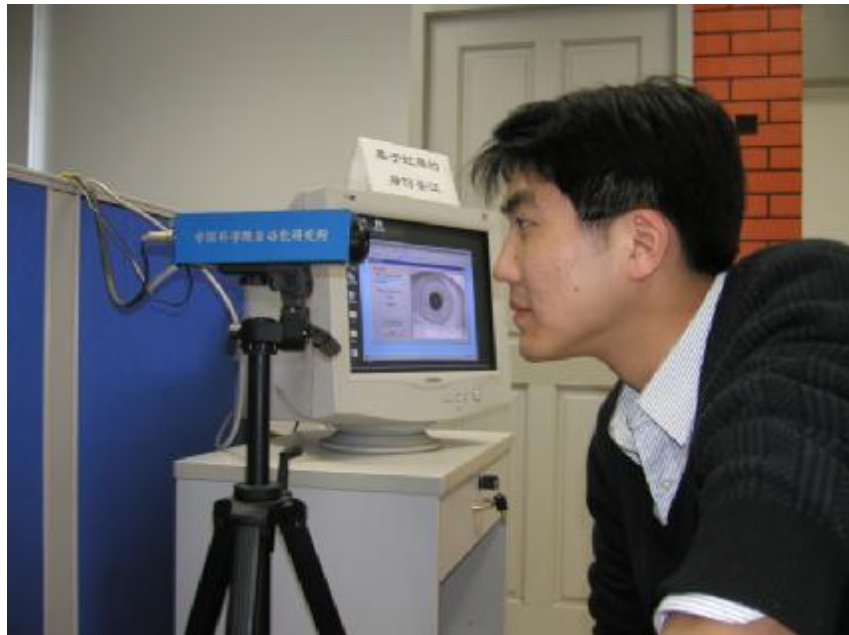


Fig.1 The self-developed iris camera used for collection of CASIA-Iris-Interval

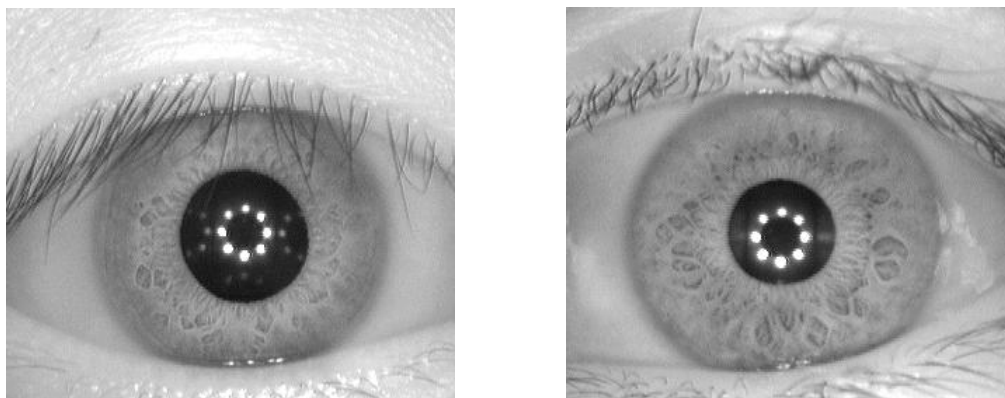


Fig.2 Example iris images in CASIA-Iris-Interval

2.2 CASIA-Iris-Lamp

CASIA-Iris-Lamp was collected using a hand-held iris sensor produced by OKI (Fig.3). A lamp was turned on/off close to the subject to introduce more intra-class variations when we collected CASIA-Iris-Lamp. Elastic deformation of iris texture (Fig.4) due to pupil expansion and contraction under different illumination conditions

is one of the most common and challenging issues in iris recognition. So CASIA-Iris-Lamp is good for studying problems of non-linear iris normalization and robust iris feature representation.



Fig.3 The hand-held iris camera used for collection of CASIA-Iris-Lamp

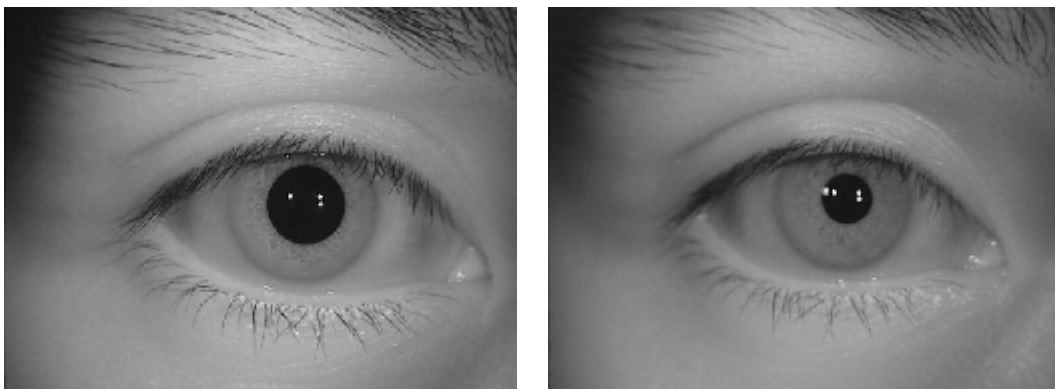


Fig.4 Example iris images in CASIA-Iris-Lamp

2.3 CASIA-Iris-Twins

CASIA-Iris-Twins contains iris images of 100 pairs of twins, which were collected during Annual Twins Festival in Beijing using OKI's IRISPASS-h camera (Fig.5). Although iris is usually regarded as a kind of phenotypic biometric characteristics and even twins have their unique iris patterns, it is interesting to study the dissimilarity and similarity between iris images of twins.

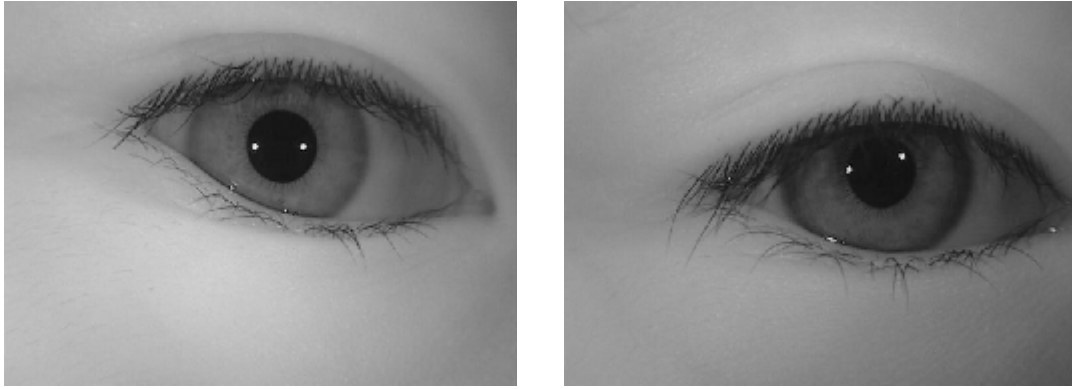


Fig.5 Example iris images in CASIA-Iris-Twins

Table 1 Statistics of CASIA-IrisV3

Subset \ Characteristics	CASIA-Iris -Interval	CASIA-Iris -Lamp	CASIA-Iris -Twins
Sensor	CASIA close-up iris camera	OKI IRISPASS-h	OKI IRISPASS-h
Environment	Indoor	Indoor with lamp on/off	Outdoor
Session	Two sessions for most iris images	one	one
Attributes of subjects	Most are graduate students of CASIA	Most are graduate students of CASIA	Most are children participating Beijing Twins Festival
No. of subjects	249	411	200
No. of classes	395	819	400
No. of images	2,639	16,212	3,183
Resolution	320*280	640*480	640*480
Features	Cross-session iris images with extremely clear iris texture details	Nonlinear deformation due to variations of visible illumination	The first publicly available iris image dataset of twins
Total	A total of 22,034 iris images from more than 700 subjects and 1500 eyes.		

3. Database Organization

The file name of each image in CASIA-IrisV3 is unique to each other and denotes some useful properties associated with the image such as subset category, left/right/double, subject ID, class ID, image ID etc. The file naming rules of all Three subsets are listed as follows:

- I The images of CASIA-Iris-Interval are stored as:
\$root path\$/CASIA-Iris-Interval/YYY/S1YYYENN.jpg
YYY: the unique identifier of the subject in the subset
E: 'L' denotes left eye and 'R' denotes right eye
NN: the index of the image in the class
- I The images of CASIA-Iris-Lamp are stored as:
\$root path\$/CASIA-Iris-Lamp/YYY/E/S2YYYENN.jpg
YYY: the unique identifier of the subject in the subset
E: 'L' denotes left eye and 'R' denotes right eye
NN: the index of the image in the class
- I The images of CASIA-Iris-Twins are stored as:
\$root path\$/CASIA-Iris-Twins\XX\YE\S3XXYENN.jpg
XX: the index of family
Y: the identifier to one of the twins
E: 'L' denotes left eye and 'R' denotes right eye
NN: the index of the image in the class

4. Copyright Note and Contacts

The database is released for research and educational purposes. We hold no liability for any undesirable consequences of using the database. All rights of the CASIA database are reserved. Any person or organization is not permitted to distribute, publish, copy, or disseminate this database. In all documents and papers that report experimental results based on this database, our efforts in constructing the database should be acknowledged such as “Portions of the research in this paper use the CASIA-IrisV3 collected by the Chinese Academy of Sciences' Institute of Automation (CASIA)” and a reference to “CASIA Iris Image Database, <http://biometrics.idealtest.org/>” should be included. A copy of all reports and papers that are for public or general release that use the CASIA-IrisV3 should be forwarded upon release or publication to:

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