APPENDIX 1

BIOMETRIC DATASET

MULTIMODAL DS2 SAMPLES

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The multimodal DS2 samples illustrate the data of the BioSecure multimodal DS2.

These samples are available for free and contain data of two persons (male and female).

ABBREVIATION

All files have the same abbreviation:

ID_dataset_session_type_ext

ID:

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mfS: multimodal female sample

mms: multimodal male sample

dataset:

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ds2: Desktop dataset

session:

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s0001: session 1

s0002: session 2


type:

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fc: still face acquired with the CANON EOS 30D camera without flash

fcf: still face acquired with the CANON EOS 30D camera with flash

fo: fingerprint acquired with optical sensor

ft: fingerprint acquired with thermal sensor
   1&7: right thumb
   2&8: right index
   3&9: right middle
   4&10: left thumb
   5&11: left index
   6&12: left middle

fv: audio video acquired with a webcam
   1&2: 2 repetitions of a 4-digit PIN code in English
   3&4: 2 repetitions of a 4-digit PIN code in native language
   5: digits from 0 to 9 in English
   6&7: 2 different phonetically rich sentences in English
   8&9: 2 different phonetically rich sentences in native language

fw: still face acquired with a webcam

he: hand acquired with the CANON EOS 30D camera without flash

hef: hand acquired with the CANON EOS 30D camera with flash
   1&2: right hand
   3&4: left hand

ir: iris acquired with the LG EOU3000 sensor
   1&3: right iris
   2&4: left iris

sg: genuine signature

sf: skilled forgeries
The DS2 signatures are text files which are comprised of seven columns:

- the first column contains the x coordinates of each point
- the second column contains the y coordinates of each point
- the third column contains the acquisition time (in ms).
- the fourth column contains the pen tip information.
- the fifth and sixth columns contain the pen inclination angles: azimuth and altitude respectively.
- the last column contains the pen pressure at each point.
APPENDIX 2

DESCRIPTION OF ATVS-FFp DB

Two datasets of real and fake fingerprint images in .bmp format:

- **DATASET 1: DS_WithCooperation**

  The gummy fingers from which the fake fingerprint images were taken, were generated with the cooperation of the user according to the methodology described in [TS2010].

  It contains fingerprint samples of the index and and middle fingers of both hands of 17 users (17 × 4 = 68 different fingers).

  Four samples of each fingerprint (fake and real) were captured in one acquisition session with:

  1. The flat optical sensor Biometrika Fx2000 (512 dpi)
  2. The sweeping thermal sensor by Yubee with Atmel’s Fingercip (500 dpi)
  3. The flat capacitive sensor by Precise Biometrics model Precise 100 SC (500 dpi)

  This way the dataset comprises 68 fingers × 4 samples × 3 sensors = 816 real image samples and as many fake images.

- **DATASET 2: DS_WithoutCooperation**

  The gummy fingers from which the fake fingerprint images were taken, were generated without the cooperation of the user according to the methodology described in [TS2010].
It contains fingerprint samples of the index and middle fingers of both hands of 16 users (16 \( \times \) 4 = 64 different fingers).

Beware that user 14 is missing.

Four samples of each fingerprint (fake and real) were captured in one acquisition session with:

1. The flat optical sensor Biometrika Fx2000 (512 dpi)
2. The sweeping thermal sensor by Yubee with Atmel’s Fingerprint (500 dpi)
3. The flat capacitive sensor by Precise Biometrics model Precise 100 SC (500 dpi)

This way the dataset comprises 64 fingers \( \times \) 4 samples \( \times \) 3 sensors = 768 real image samples and as many fake images.

- **NOMENCLATURE**

The nomenclature followed in both datasets to name the image files is as follows: uXX_A_BB_CD_YY

XX: is the number of the user [01 02 03 ... 17]

A: it can take the values "o" or "f" for "original" or "fake"

BB: it can take the values "fc", "fo", or "ft", for "capacitive", "optical", or "thermal" depending on the sensor used to capture the image

C: it can take the values "r" or "l", for "right" or "left" hand

D: it can take the values "m" or "i", for "middle" or "index" finger

YY: is the number of the sample [01 02 03 04]
APPENDIX 3

CASIA-FINGERPRINTV5

CASIA Fingerprint Image Database Version 5.0 (or CASIA-FingerprintV5) contains 20,000 fingerprint images of 500 subjects. The fingerprint images of CASIA-FingerprintV5 were captured using URU4000 fingerprint sensor in one session. The volunteers of CASIA-FingerprintV5 include graduate students, workers, waiters, etc. Each volunteer contributed 40 fingerprint images of his eight fingers (left and right thumb/second/third/fourth finger), i.e., 5 images per finger. The volunteers were asked to rotate their fingers with various levels of pressure to generate significant intra-class variations. All fingerprint images are 8 bit gray-level BMP files and the image resolution is 328*356.

The images of CASIA-FingerprintV5 are stored as:

$\text{root path}/YYY/H/YYYY_HX_KKK.bmp

YYY: the unique identifier of the subject in the subset

H: "L" denotes left hand, "R" denotes right hand

X: "0" denotes thumb, "1" denotes second finger, "2" denotes third finger, "3" denotes fourth finger.

K: the index of fingerprint image in each class

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 as: “Portions of the research in this paper use the CASIA-FingerprintV5 collected by the Chinese Academy of Sciences' Institute of Automation (CASIA)” and a reference to “CASIA-FingerprintV5, http://biometrics.idealtest.org/” should be included.
APPENDIX 4

DRIVE: DIGITAL RETINAL IMAGES FOR VESSEL EXTRACTION

The DRIVE database has been established to enable comparative studies on segmentation of blood vessels in retinal images. The research community is invited to test their algorithms on this database and share the results with other researchers through this web site. On this page, instructions can be found on downloading the database and uploading results, and the results of various methods can be inspected.

The data included in this database can be used, free of charge, for research and educational purposes. Copying, redistribution, and any unauthorized commercial use is prohibited. The use of this database is restricted to those individuals or organizations that obtained the database directly from this website. Any researcher reporting results which use this database must acknowledge the DRIVE database.

The photographs for the DRIVE database were obtained from a diabetic retinopathy screening program in The Netherlans. The screening population consisted of 400 diabetic subjects between 25-90 years of age. Forty photographs have been randomly selected, 33 do not show any sign of diabetic retinopathy and 7 show signs of mild early diabetic retinopathy. Each image has been JPEG compressed.

The images were acquired using a Canon CR5 non-mydriatic 3CCD camera with a 45 degree field of view (FOV). Each image was captured using 8 bits per color plane at 768 by 584 pixels. The FOV of each image is circular with a diameter of approximately 540 pixels. For this
database, the images have been cropped around the FOV. For each image, a mask image is provided that delineates the FOV.

The set of 40 images has been divided into a training and a test set, both containing 20 images. For the training images, a single manual segmentation of the vasculature is available. For the test cases, two manual segmentations are available, one is used as gold standard, the other one can be used to compare computer generated segmentations with those of an independent human observer. All human observers that manually segmented the vasculature were instructed and trained by an experienced ophthalmologist. They were asked to mark all pixels for which they were for at least 70% certain that they were vessel.

All of the images contained in the database were actually used for making clinical diagnoses. To ensure the utmost protection of patient privacy, information that might allow the identity of a patient to be reconstructed has been removed, and we have no actual knowledge that the images could be used alone or in combination to identify any subject. To minimize any further risk of breach of privacy, the use of this database is restricted to those individuals or organizations that obtained the database directly from this website.