Nanyang Technological University
School of Computer Science and Engineering
Database Release Agreement

A. Name of Database

Click the arrow to select a database

B. Description of Database

Please refer to **Annex B**.

C. Goal of Database

The goal of the Database is to develop new technologies, techniques, methods, algorithms and systems for automatic criminal and victim identification based on skin biometrics in forensic settings. As this is the first image of the described Database dedicated to criminal and victim identification, to speed up the technology development in this area, NTU would like to share the Database with other scientists who are interested in this area of research on a case-by-case basis.

The Database is made available to researchers online. There will be no charge for obtaining the Database.

D. How to receive a copy of the Database; Download instructions

All requests for copies of the Database will be forwarded to the following person-in-charge of the Database at Nanyang Technological University (NTU), Singapore:

Associate Professor Adams Kong
School of Computer Science and Engineering
Nanyang Technological University
Block N4, 50 Nanyang Avenue Singapore 639798
Email: forensics@ntu.edu.sg

All requests for the Database must be made by email, addressed to the email address of the person-in-charge named above. Applicants should **manually fill, sign, scan and attach the scanned copy** of this Agreement to the given email address. Upon receipt of an executed copy of the signed Agreement, access instructions will be given.

To receive a copy of the Database, researchers must sign this Agreement and thereby agree to observe the restrictions in this Agreement. Failure to observe any terms and conditions in this Agreement will result in immediate termination of any right of use granted herein, and access being denied for the balance of the Database, and being subject to civil liabilities in the case of publication of images that have not been approved for release, or a violation of clauses 2, 3 and 4 in the Terms and Conditions for Use of Database (Annex A).

E. Terms and Conditions for Use of the Database

This Database request is made by the undersigned. By signing on this Agreement, the Researcher(s) agree/s to comply with the restrictions on, and terms of use of, the Database, as set out in Annex A.

_____
(Signature of Researcher & Date)

Full Name: _____

Position: _____

Organization: _____

Address: _____

_____

Email: _____

ANNEX A

Terms and Conditions for Use of Database

1. To the extent permitted by law, the Database in whole will not be further distributed, published, copied, or further disseminated in any way or form whatsoever. This includes further distributing, copying or disseminating to a facility or organization unit in the requesting university, organization, or company.

2. **In respect of Databases 1, 2 and 3:** Images, including the original images in the Database and resultant images derived/inferred from this Database, which can appear in technical reports, papers, and other documents published or released, are those with the mark: "**Permission to display: Yes**". All other images shall not be published or released in any document of any form. Any image, including those in processed/modified forms, shall not be released on the Internet, in commercial materials, newspapers, talk, meetings, papers, or other forms of public media.

   In respect of Databases 4 to 9: Only specific images from the Database (but not the whole of the Database) may appear in technical reports, papers, and other documents published or released.

3. Images from the Database shall only be used for the purpose of academic or scientific research in forensic identification only. The Database, in whole or in part, shall not be used for any commercial purpose in any form. Commercial distribution or any act related to the commercial use of the Database is strictly prohibited.

4. The images in the Database do not and shall not be associated with any identifiable person or any identifiable person within a group of persons.

5. All documents and papers reporting research results obtained using the Database will acknowledge the use of the Database using the following statement:

   "**Portions of the research in this paper use the Nanyang Technological University (Insert the database name here). Credit is hereby given to the School of Computer Science and Engineering, Nanyang Technological University, Singapore for providing the Database.**"

   The documents and papers will also add citations to: Please refer to **Annex C** for the relevant citations for each Database.

6. A copy of all published papers, reports, and other documents that use the Database must be sent to the School of Computer Science and Engineering at NTU through email (forensics@ntu.edu.sg) for approval prior to release to the for public or publication. If researchers do not receive any written objection from the School of Computer Science and Engineering at NTU within thirty (30) days after submitting the email request for approval, approval is deemed to have been granted.

7. Subject to paragraphs 1 and 2 above, images in this Database and results of research derived from this Database will only be stored in the information technology ("**IT**") infrastructure/systems owned by the organization that the researchers work for. Images in this Database and results of research

derived from this Database shall not be stored in the IT infrastructure/systems owned by other organizations, including, but not limited to, iCloud, Google Drive and Dropbox.

8. While every effort has been made to ensure accuracy, the Database owners disclaim any responsibility for errors or omissions. The Database owners reserve the right to revise, amend, alter or delete the images contained in the Database provided herein at any time, but shall not be responsible for, or liable in respect of, any such revisions, amendments, alterations, or deletions.

9. The Database owners reserve the right to terminate the usage permission of the Database granted to the researcher(s) under this Agreement at any time. Once the researchers receive the notification of termination of usage permission, they must immediately delete the entire Database from their systems. Notwithstanding the termination of usage permission of the Database, any use of any images from this Database which are contained in the results of research derived from this Database shall continue to be subject to the terms of this Agreement.

ANNEX B
Description of Databases

1. **Back Image Database Version 1 (NTUBDB v1)**
   The images were collected from subjects of different ages and ethnic groups (e.g., Chinese, Malay, Indian, and Caucasian). The images were captured in indoor environments using different DSLR cameras. Majority of the images were captured in two different sessions with an interval ranging from one to two weeks. The subjects were not given strict pose instructions during the image collection process. Faces are blocked and images with tattoos are removed from the Database to protect the identity of the subjects. Numbers are used as filenames. To reduce downloading time, the background is also removed and images are segmented. The images are available in .jpg format; images will not be provided in any other format.

2. **Chest Image Database Version 1 (NTUCDB v1)**
   The images were collected from subjects of different ages and ethnic groups (e.g., Chinese, Malay, Indian, and Caucasian). The images were captured in indoor environments using different DSLR cameras. Majority of the images were captured in two different sessions with an interval ranging from one to two weeks. The subjects were not given strict pose instructions during the image collection process. Faces are blocked and images with tattoos are removed from the Database to protect the identity of the subjects. Numbers are used as filenames. To reduce downloading time, the background is also removed and images are segmented. The images are available in .jpg format; images will not be provided in any other format.

3. **Inner Forearm Image Database Version 1 (NTUIFDB v1)**
   The images were collected from subjects with different ages and ethnic groups (e.g., Chinese, Malay, Indian, and Caucasian). The images were captured in indoor environments using different DSLR cameras. The images were captured in two different sessions with an interval ranging around 1.5 weeks. The subjects were not given strict pose instructions during the image collection process. Images with tattoos are removed from the Database to protect the identity of the subjects. Numbers are used as filenames. To reduce downloading time, the raw images are rotated and copped and the background is also removed. The images are available in .bmp format; images will not be provided in any other format.

4. **Inner Forearm Database Version 2 (NTUIFDB v2)**
   Inner Forearm v2 dataset consists of 3 categories: Internet, IR and Standard. For each category, there are 2 sessions. The images are organized as following:
   (a) Internet: 213 images in ImgSeg_01, 640 images in ImgSeg_02.
   (b) IR: 656 images in ImgSeg_01, 656 images in ImgSeg_02
   (c) Standard: 656 images in ImgSeg_01, 656 images in ImgSeg_02
   The images are available in .png format; images will not be provided in any other format.

5. **Internet Images Dataset Version 1 (NTUIIS v1):**
   5.1 NTUIIS_1

Images in NTUIIS_1 were collected for visual effect evaluation. To generate original (uncompressed) images for comparisons, they were resized to remove the compression artifacts and referred to as references. Images were further downscaled to a low resolution so that blood vessels were clear in the original images and JPEG compression artifacts were observable in the compressed images with the compression factors of 50 and 75. There are 44 images and 40 images in NTUIIS_1 for testing JPEG compression factors of 50 and 75, respectively. The images are available in .jpg format; images will not be provided in any other format.

5.2 NTUIIS_2

Images in NTUIIS_2 were collected for objective evaluation based on blood vessel matching. For each image in NTUIIS_2, there is one corresponding image from the same body part of the same subject. The forearms were extracted and formed two datasets: a left forearm dataset and a right forearm dataset. Their sizes are 156 and 162 images from 78 and 81 subjects respectively. Their quality factors range from 50 to 90. The images are available in .jpg format; images will not be provided in any other format.

6. Lower Leg Dataset Version 1 (NTULLS v1)

The Database contains 100 images from 67 subjects in session 1 and 668 images from 479 subjects in session 2 (The left leg images were flipped and considered as right leg images from other subjects). The images are available in .png format; images will not be provided in any other format.

7. Tattoo Image Database Version 1 (NTUTDB v1)

The Database contains 20849 images that were collected from Flickr. The images are available in .jpg format; images will not be provided in any other format.

8. Inner Thigh Database Version 1 (NTUITDB v1)

The images were collected from subjects with different ages and ethnic groups (e.g., Chinese, Malay, Indian, and Caucasian). The images were captured in indoor environments using different DSLR cameras. The images were captured in two different sessions with an interval ranging around 1.5 weeks. The subjects were not given strict pose instructions during the image collection process. Images with tattoos are removed from the Database to protect the identity of the subjects. Numbers are used as filenames. To reduce downloading time, the raw images are rotated and copped and the background is also removed. The images are available in .bmp format; images will not be provided in any other format.

9. Inner Thigh Database Version 2 (NTUITDB v2)

Inner Thigh v2 Database consists of 3 categories: Internet, IR and Standard. For each category, there are 2 sessions. The images are organized as following:

(a) Internet: 229 images in ImgSeg_01, 504 images in ImgSeg_02
(b) IR: 524 images in ImgSeg_01, 524 images in ImgSeg_02
(c) Standard: 524 images in ImgSeg_01, 524 images in ImgSeg_02

The images are available in .png format; images will not be provided in any other format.

ANNEX C
Citations

1. **Back Image Database Version 1 (NTUBDB v1)**

[1] Arfika Nurhudatiana, Adams Kong, Lisa Altieri and Noah Craft, "Automated identification of relatively permanent pigmented or vascular skin marks (RPPVSM)", proc. of International Conference on Acoustics, Speech and Signal Processing, pp. 2984-2988, 2013.

[2] Arfika Nurhudatiana, Adams Kong, Keyan Matinpour, Deborah Chon, Lisa Altieri, Siu-Yeung Cho and #Noah Craft, "The individuality of relatively permanent pigmented or vascular skin marks (RPPVSM) in independently and uniformly distributed patterns", IEEE Transactions on Information Forensics and Security, vol. 8, no. 6, pp. 998-1012, 2013.

2. **Chest Image Database Version 1 (NTUCDB v1)**

[1] Arfika Nurhudatiana, and Adams Kong, "On Criminal Identification in Color Skin Images Using Skin Marks (RPPVSM) and Fusion with Vein Patterns", IEEE Transactions on Information Forensics and Security, DOI: 10.1109/TIFS.2014.2387575

[2] Arfika Nurhudatiana, Adams Kong, Keyan Matinpour, Deborah Chon, Lisa Altieri, Siu-Yeung Cho and #Noah Craft, "The individuality of relatively permanent pigmented or vascular skin marks (RPPVSM) in independently and uniformly distributed patterns", IEEE Transactions on Information Forensics and Security, vol. 8, no. 6, pp. 998-1012, 2013.

3. **Inner Forearm Image Database Version 1 (NTUIFDB v1)**

[1] Hengyi Zhang, Chaoying Tang, Adams Kong, and Noah Craft, "Matching vein patterns from color Images for forensic investigation", Proc. of IEEE International Conference on Biometrics: Theory, Applications and Systems, pp. 77-84, 2012.

[2] Chaoying Tang, Adams Kong and Noah Craft, "Uncovering vein patterns from color skin images for forensic analysis", Proc. of IEEE Computer Vision and Pattern Recognition, pp. 665-672, 2011.

4. **Inner Forearm Database Version 2 (NTUIFDB v2)**

[1]. H. Quang, X. Xu, A. Kong, S. Sathyan (2014): A preliminary report on a full-body imaging system for effectively collecting and processing biometric traits of prisoners. In: 2014 IEEE Symposium on Computational Intelligence in Biometrics and Identity Management, CIBIM, Orlando, Florida, USA, Dec 9-12, 2014, pp. 167-174, 2014.

[2]. Hengyi Zhang, Chaoying Tang, Adams Kong, and Noah Craft, "Matching vein patterns from color Images for forensic investigation", Proc. of IEEE International Conference on Biometrics: Theory, Applications and Systems, pp. 77-84, 2012.

[3]. Chaoying Tang, Adams Kong and Noah Craft, "Uncovering vein patterns from color skin images for forensic analysis", Proc. of IEEE Computer Vision and Pattern Recognition, pp. 665-672, 2011.

5. Internet Images Dataset Version 1 (NTUIIS v1)

[1]. Xiaojie Li and Adams Kong, “A Multi-model Restoration Algorithm for Recovering Blood Vessels in Skin Images”, Image and Vision Computing, vol. 61, pp. 40-53, 2017.

6. Lower Leg Dataset Version 1 (NTULLS v1)

[1]. Frodo Kin Sun Chan, Adams Wai Kin Kong, "A further study of low resolution androgenic hair patterns as a soft biometric trait", In Image and Vision Computing, 2017, ISSN 0262-8856.

7. Tattoo Image Database Version 1 (NTUTDB v1)

[1]. Q. Xu, S. Ghosh, X. Xu, H. Yi, A. Kong (2016): Tattoo Detection Based on CNN and Remarks on the NIST Database. International Conference on Biometrics, 2016.

[2]. H. Quang, X. Xu, A. Kong, S. Sathyan (2014): A preliminary report on a full-body imaging system for effectively collecting and processing biometric traits of prisoners. In: 2014 IEEE Symposium on Computational Intelligence in Biometrics and Identity Management, CIBIM, Orlando, Florida, USA, Dec 9-12, 2014, pp. 167-174, 2014.

8. Inner Thigh Database Version 1 (NTUITDB v1)

[1]. Hengyi Zhang, Chaoying Tang, Adams Kong, and Noah Craft, “Matching vein patterns from color Images for forensic investigation”, Proc. of IEEE International Conference on Biometrics: Theory, Applications and Systems, pp. 77-84, 2012.

[2]. Chaoying Tang, Adams Kong and Noah Craft, “Uncovering vein patterns from color skin images for forensic analysis”, Proc. of IEEE Computer Vision and Pattern Recognition, pp. 665-672, 2011.

9. Inner Thigh Database Version 2 (NTUITDB v2)

[1]. H. Quang, X. Xu, A. Kong, S. Sathyan (2014): A preliminary report on a full-body imaging system for effectively collecting and processing biometric traits of prisoners. In: 2014 IEEE Symposium on Computational Intelligence in Biometrics and Identity Management, CIBIM, Orlando, Florida, USA, Dec 9-12, 2014, pp. 167-174, 2014.

[2]. Hengyi Zhang, Chaoying Tang, Adams Kong, and Noah Craft, “Matching vein patterns from color Images for forensic investigation”, Proc. of IEEE International Conference on Biometrics: Theory, Applications and Systems, pp. 77-84, 2012.

[3]. Chaoying Tang, Adams Kong and Noah Craft, “Uncovering vein patterns from color skin images for forensic analysis”, Proc. of IEEE Computer Vision and Pattern Recognition, pp. 665-672, 2011.