

Level Three Synthetic Fingerprint Generation

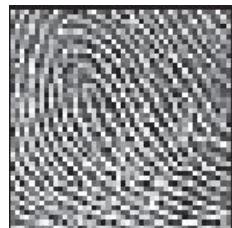
Wyzykowski, Andre;
Pamplona Segundo, Mauricio;
Lemes, Rubisley

Paper ID 2551



Introduction

- Discontinuity: PolyU HRF database
- Hinders the evolution of algorithms



Level 1



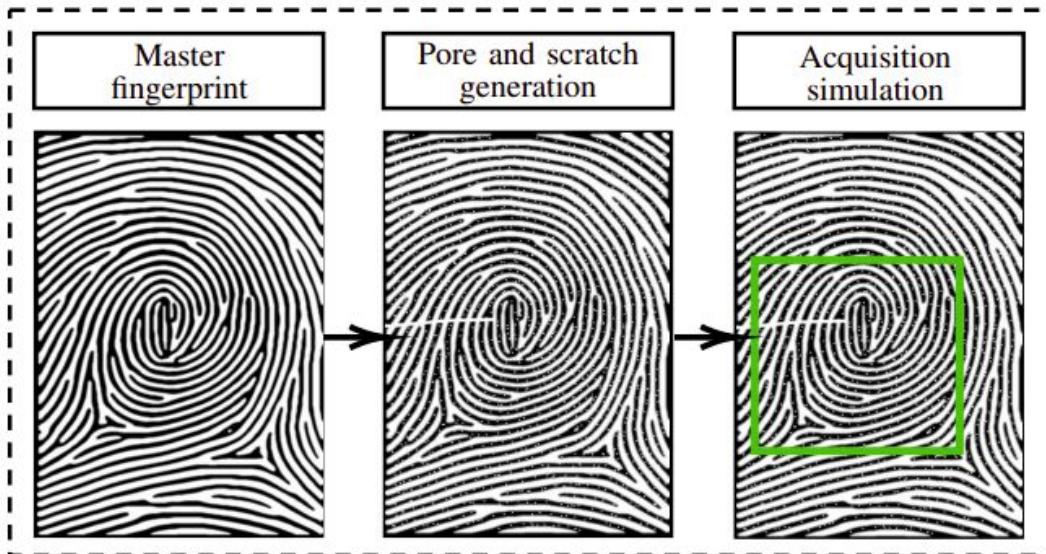
Level 2



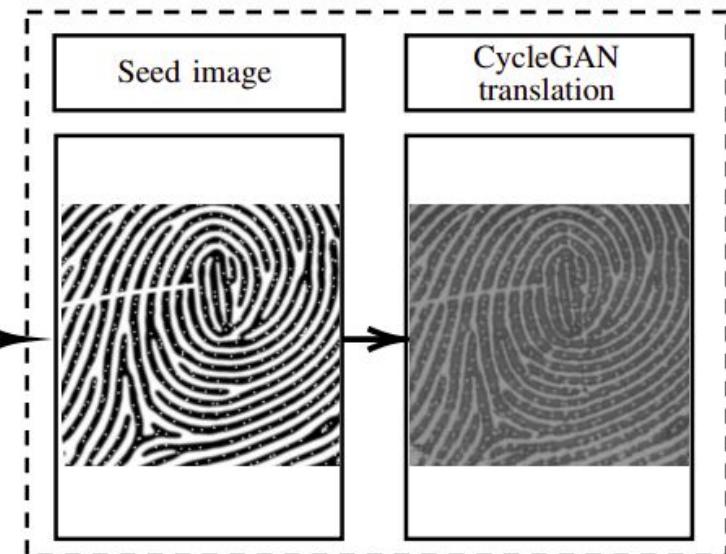
Level 3

L3-SF

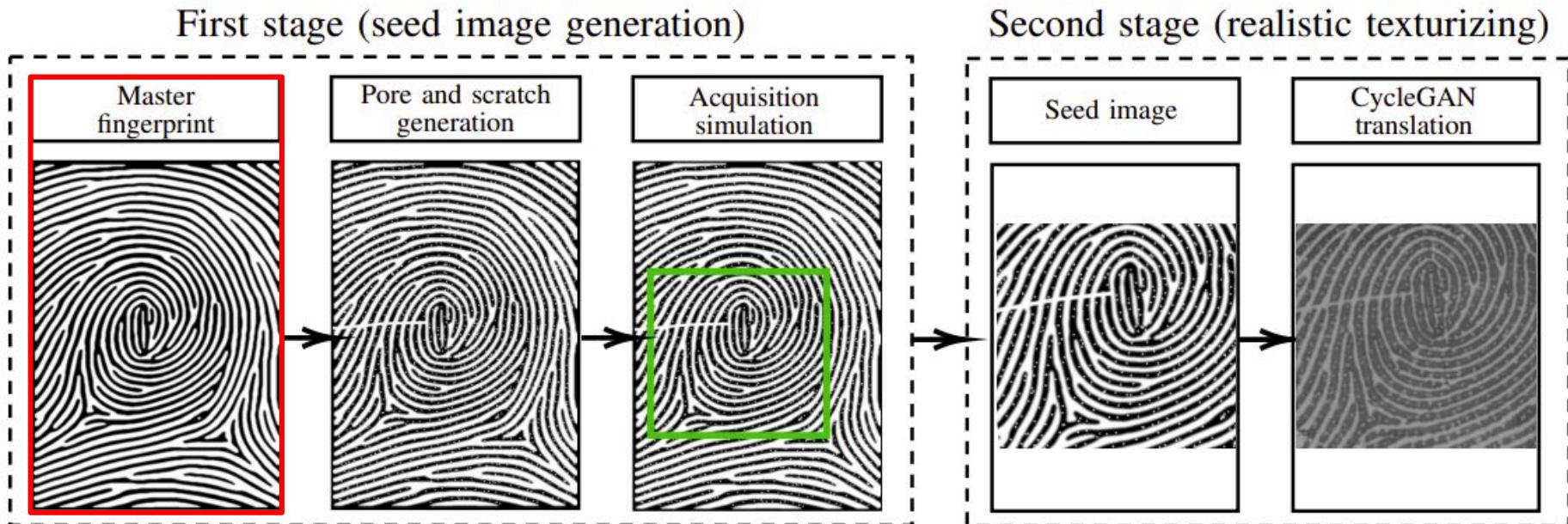
First stage (seed image generation)



Second stage (realistic texturizing)



Master fingerprint



Master fingerprint



(a) Anguli output



(b) Master fingerprint

Master fingerprint

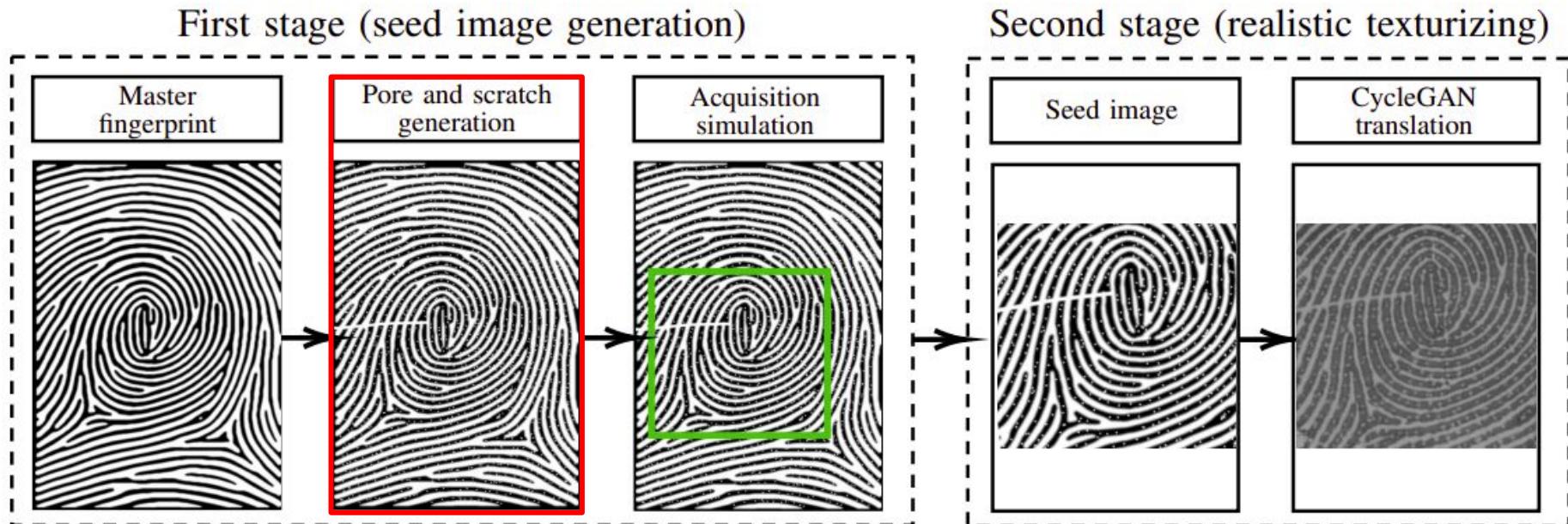


(a) Anguli output

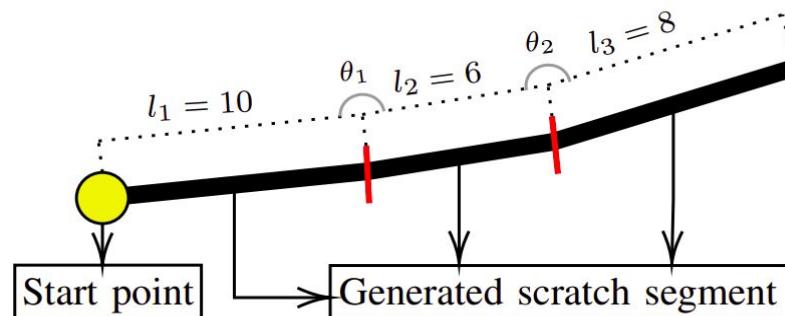
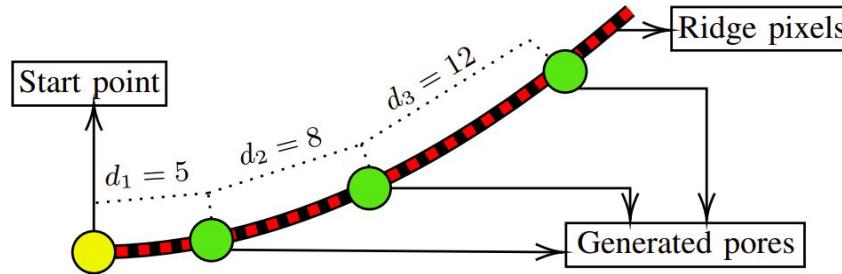


(b) Master fingerprint

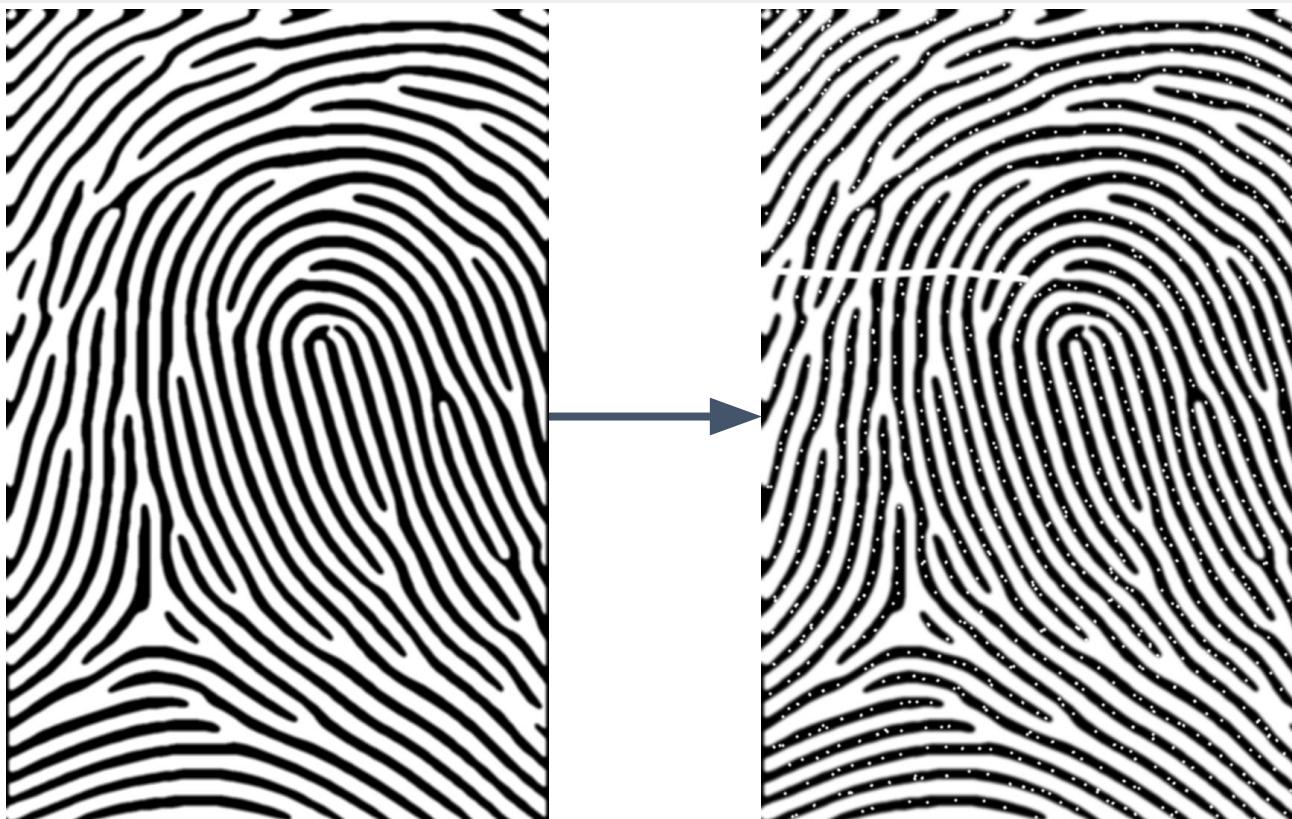
Pore and scratch generation



Pore and scratch generation



Pore and scratch generation

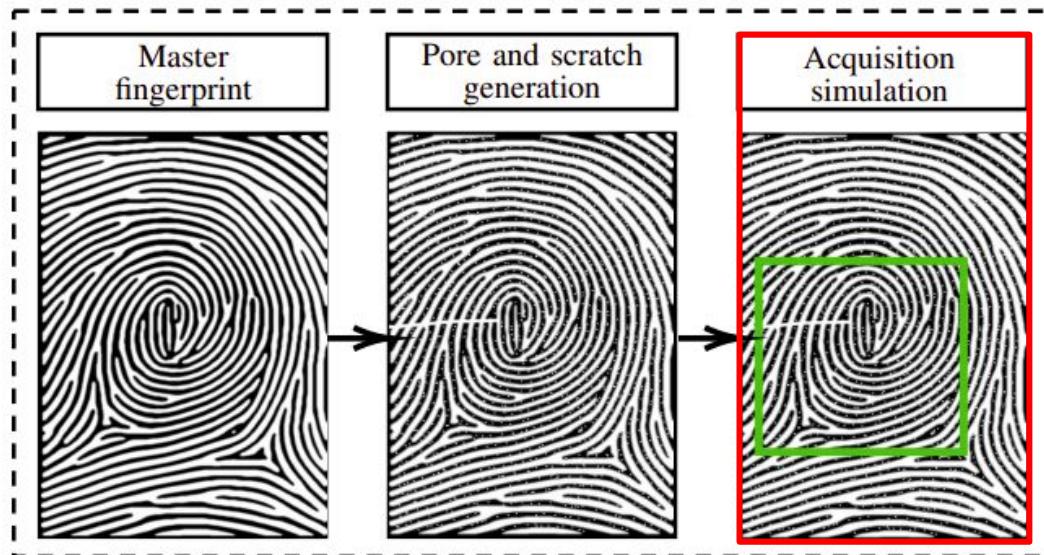


Pore and scratch generation

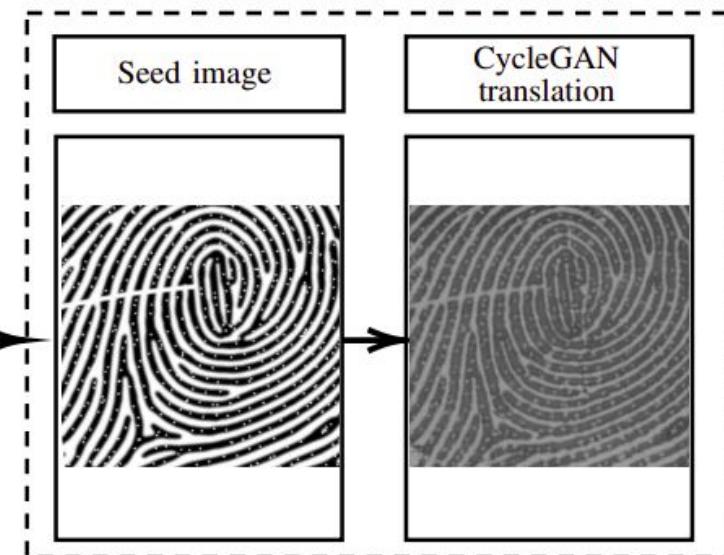


Acquisition simulation

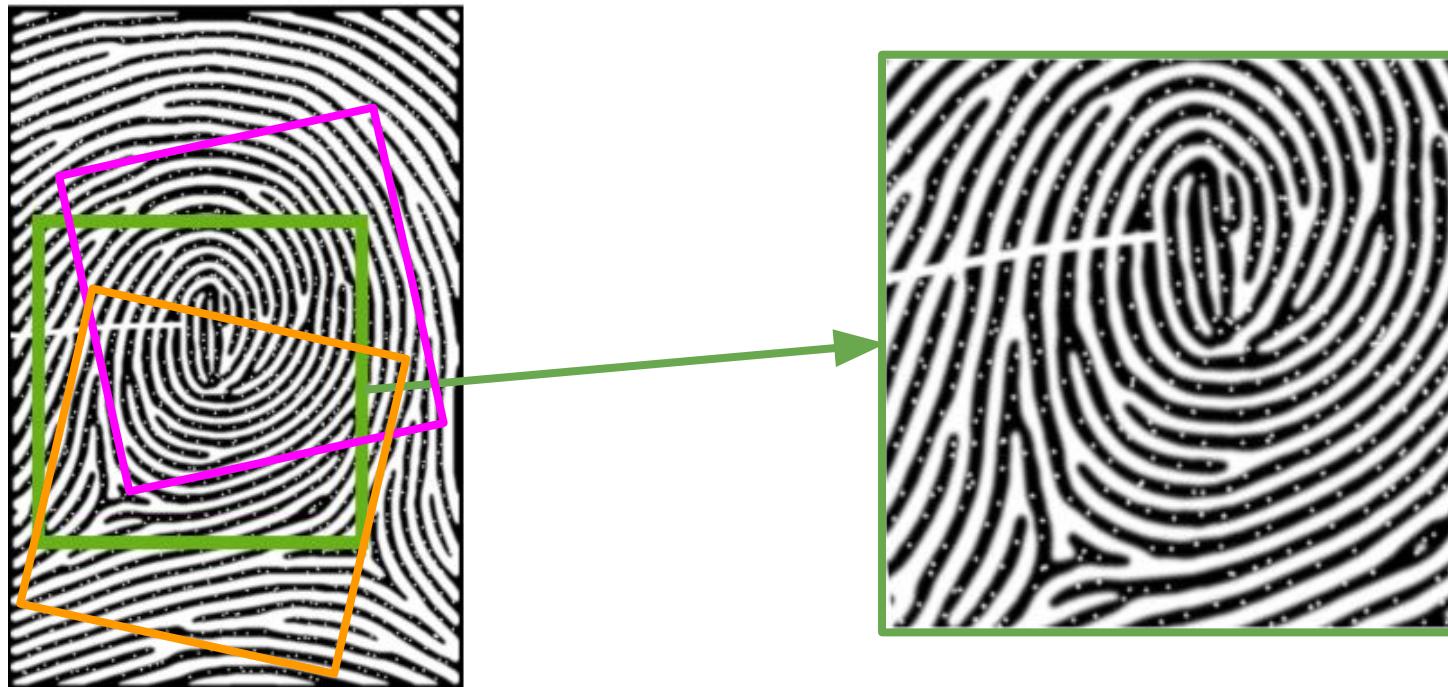
First stage (seed image generation)



Second stage (realistic texturizing)



Acquisition simulation



Acquisition simulation



(a)

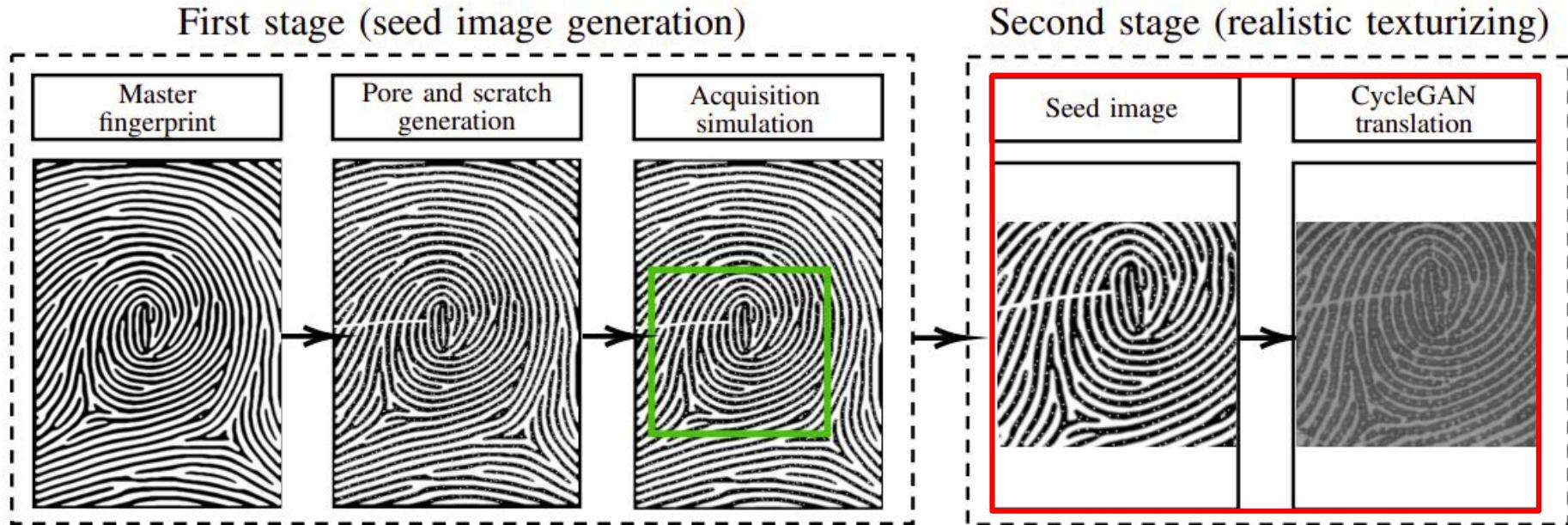


(b)

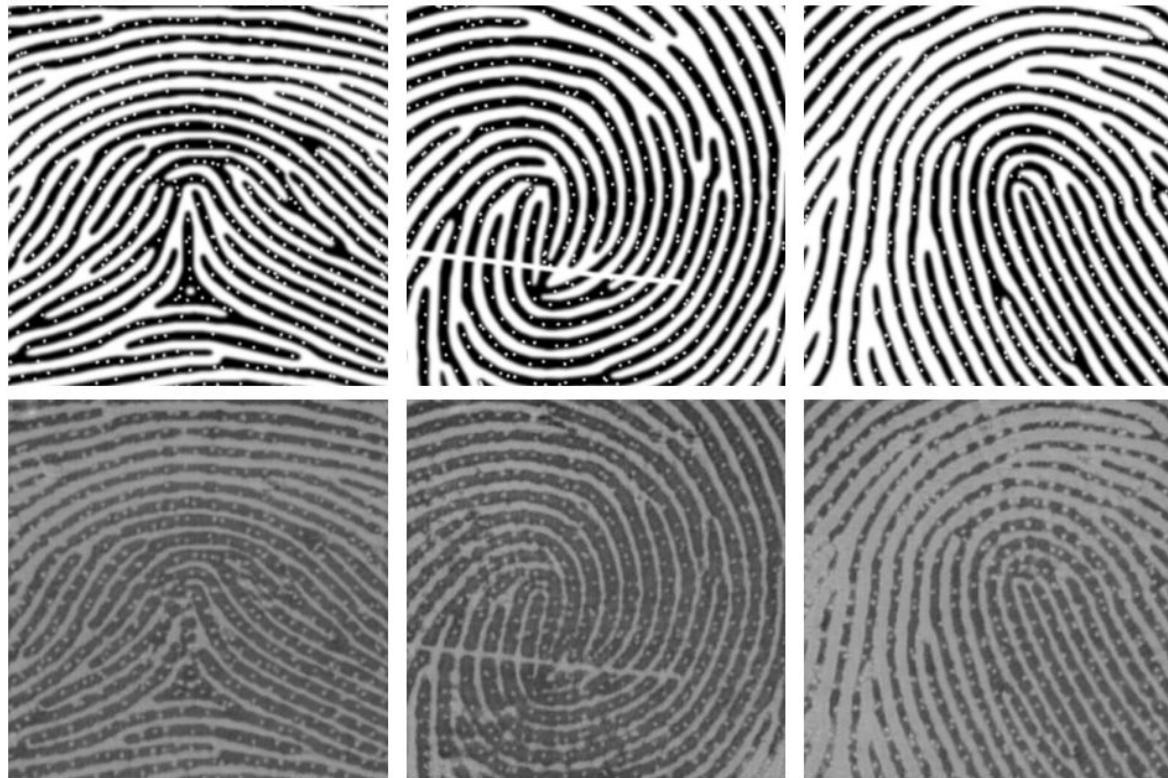


(c)

Texture translation with CycleGAN



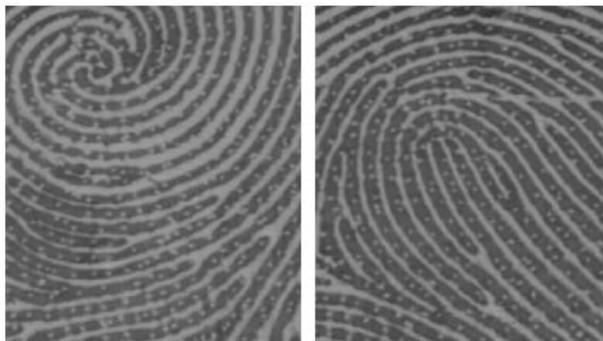
Texture translation with CycleGAN



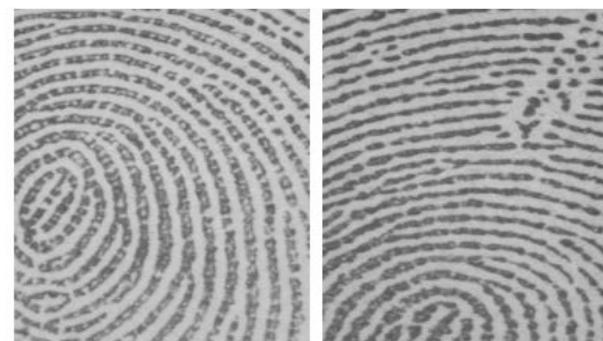
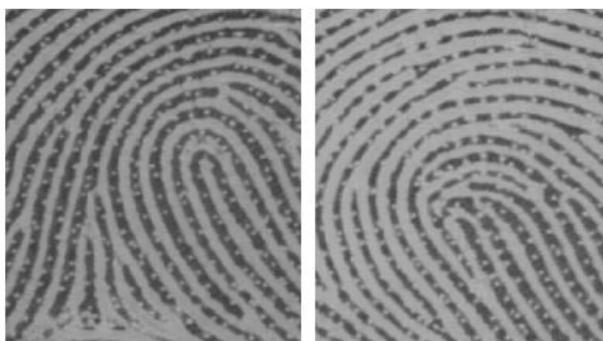
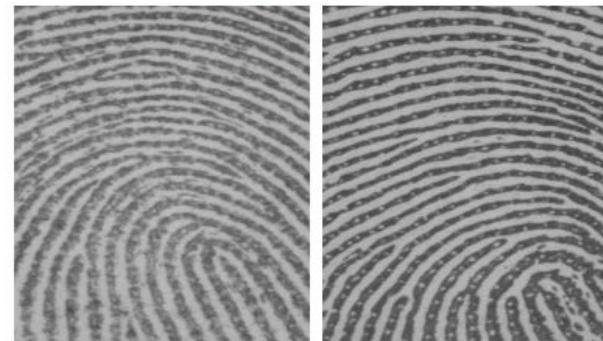
Qualitative results

Visual comparison

L3-SF (synthetic fingerprints)

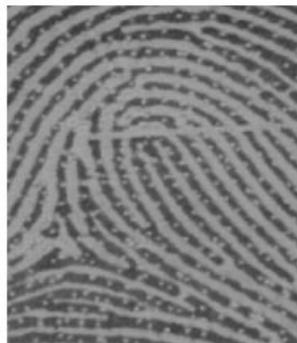


PolyU (real fingerprints)

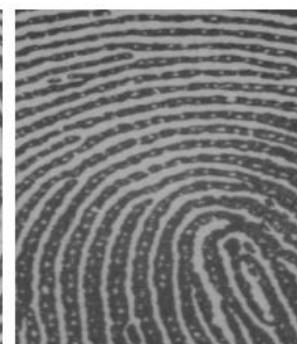
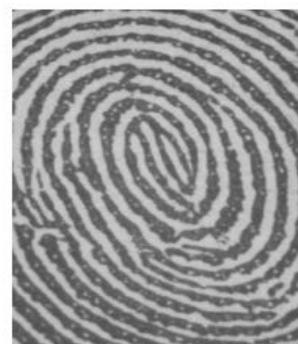
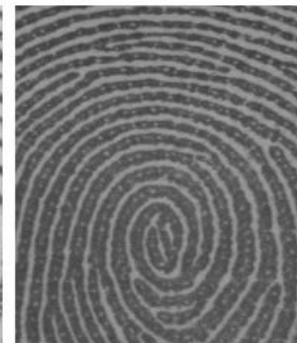


Visual comparison

L3-SF (synthetic fingerprints)

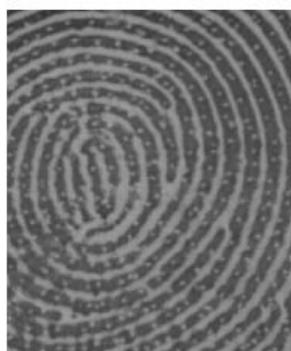
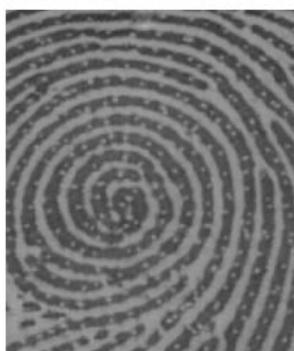
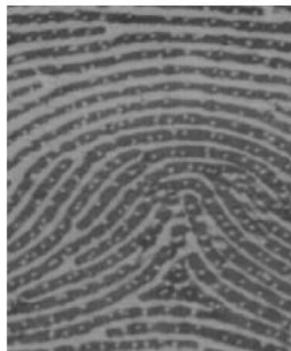
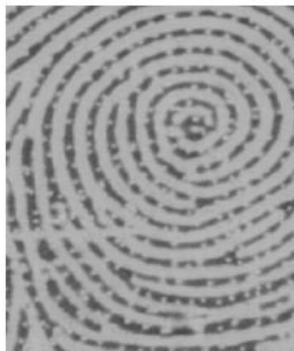


PolyU (real fingerprints)

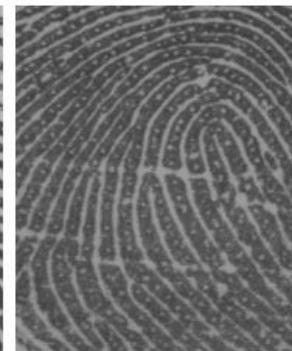
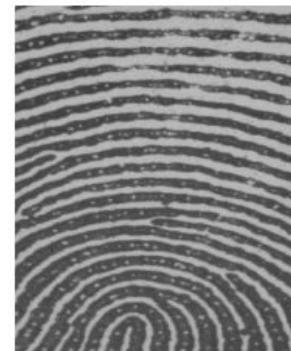


Visual comparison

L3-SF (synthetic fingerprints)



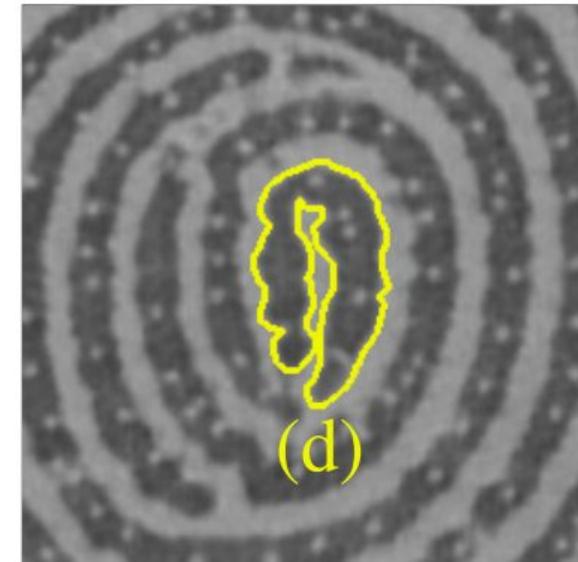
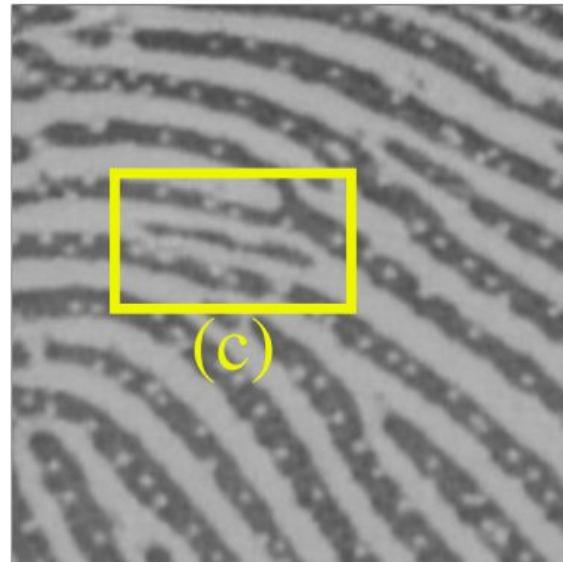
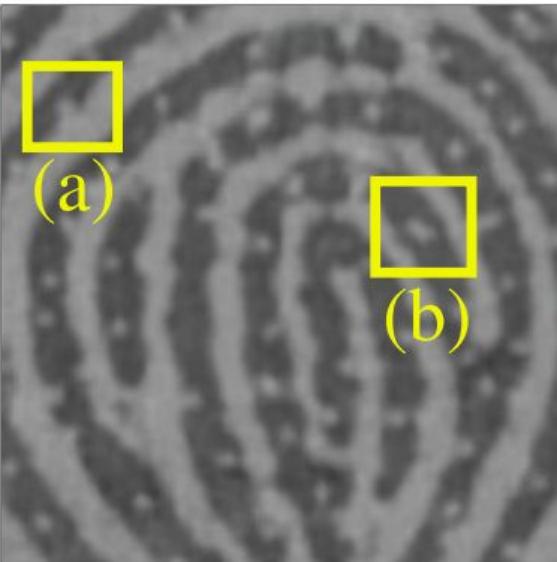
PolyU (real fingerprints)



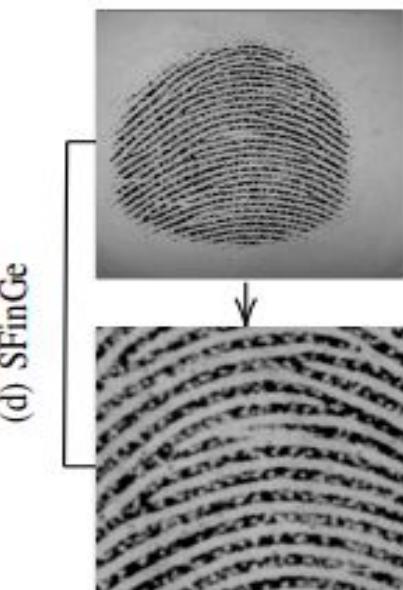
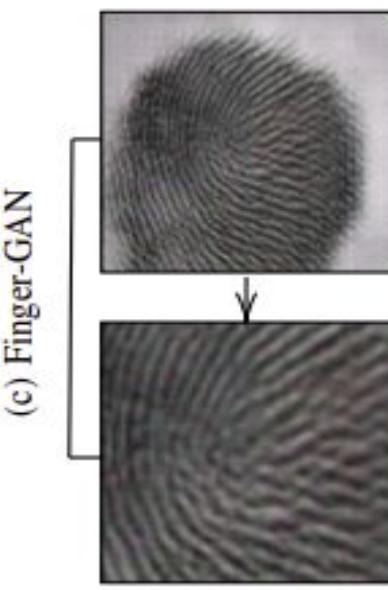
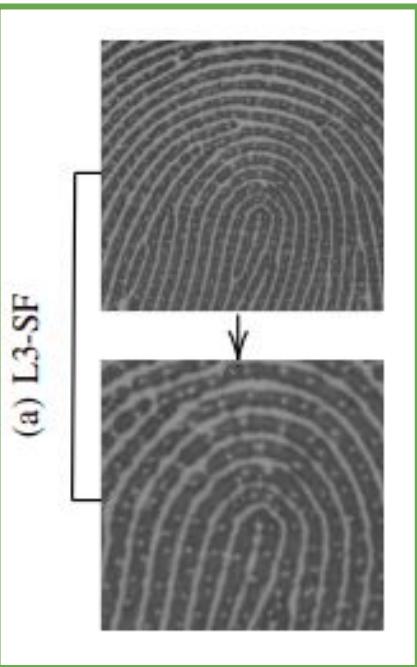
Visual comparison



L3 traits

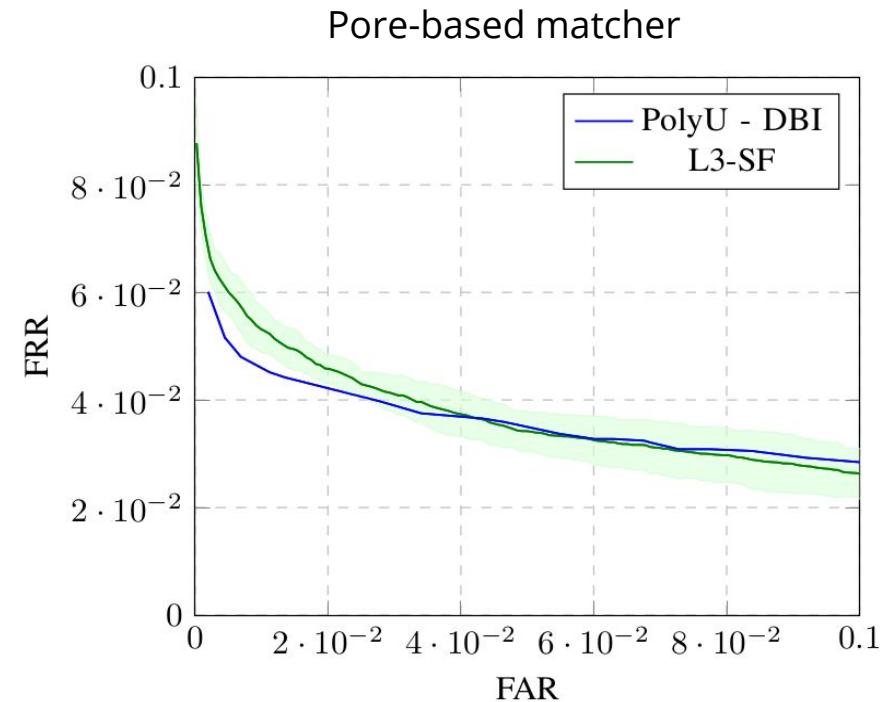
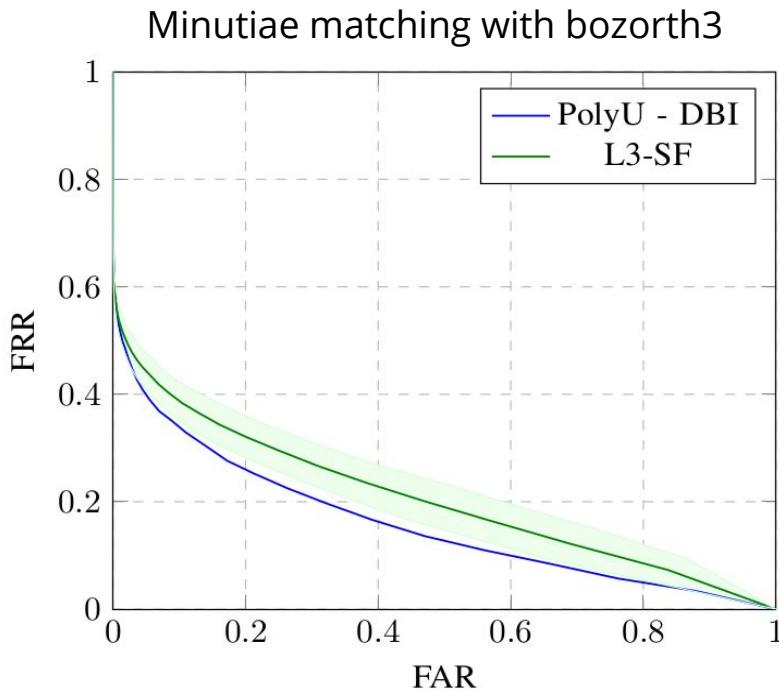


Visual comparison

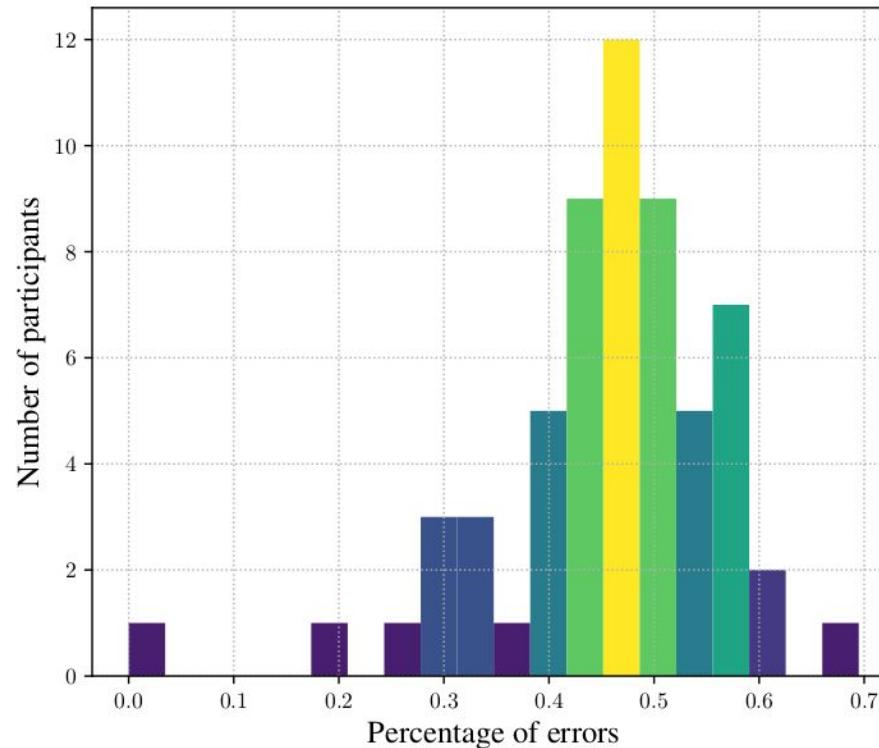


Quantitative results

Quantitative results



Quantitative results



Main contributions and conclusions

Main contributions and conclusions



Public database

<https://andrewyzy.github.io/L3-SF/>

Level Three Synthetic Fingerprint Generation



View the Project on GitHub
andrewyzy/L3-SF

Level Three Synthetic Fingerprint Generation

PREPRINT: <https://arxiv.org/abs/2002.03809>

L3-SF

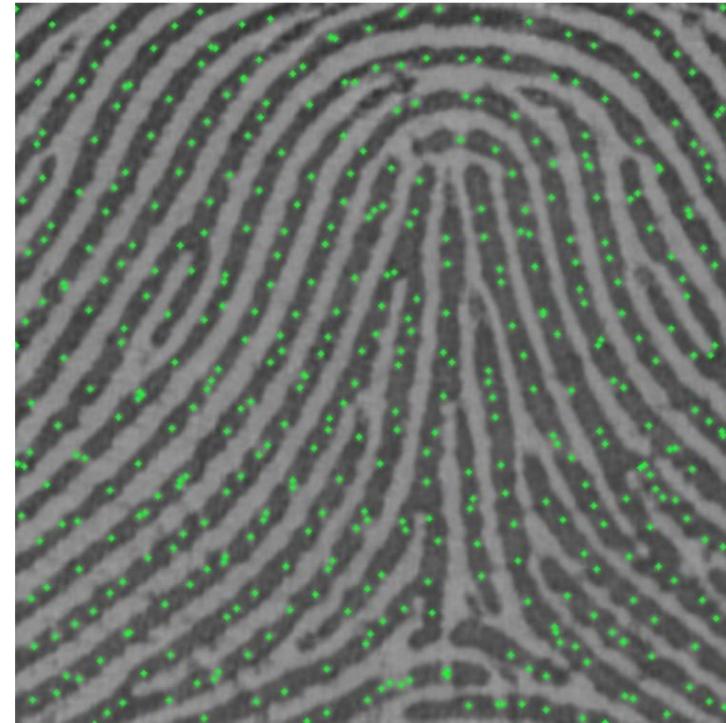
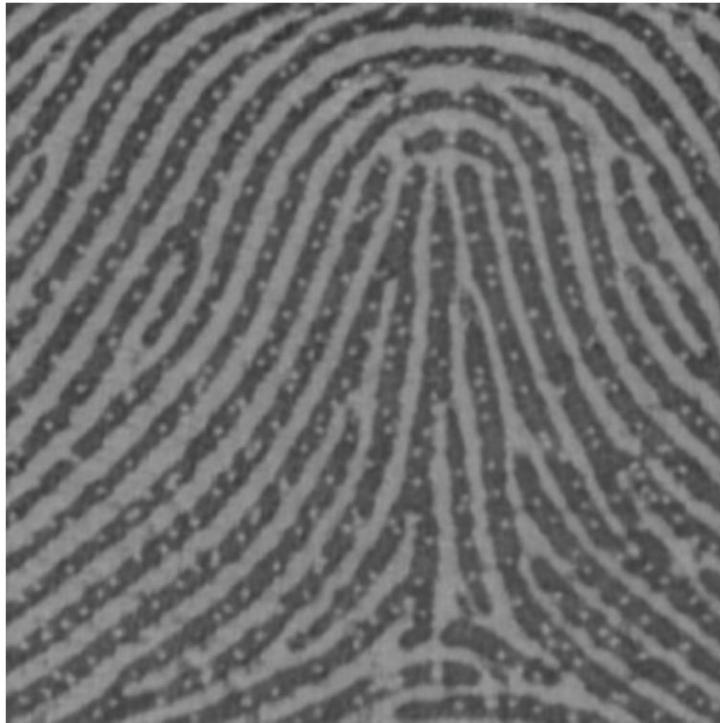
- A public database of L3 synthetic fingerprint images with five subsets of 148 identities, with 10 samples per identity, totaling 7400 fingerprint images.
- We include sweat pore annotations for 740 images to assist in pore detection research.
- The synthetic fingerprints contain L3 traits, such as distinct ridge contours and incipient ridges, features that increase the reliability of fingerprint recognition.
- Huge texture improvement on the fingerprint images.
- Scratches on fingerprint images.

L3-SF Database Download

- Fill out the form to download the L3-SF database

Authors

Sweat pore annotations



Thanks for watching!