Venenerkennung hacken

Eine Geschichte vom Fall der letzten Bastion biometrischer Systeme

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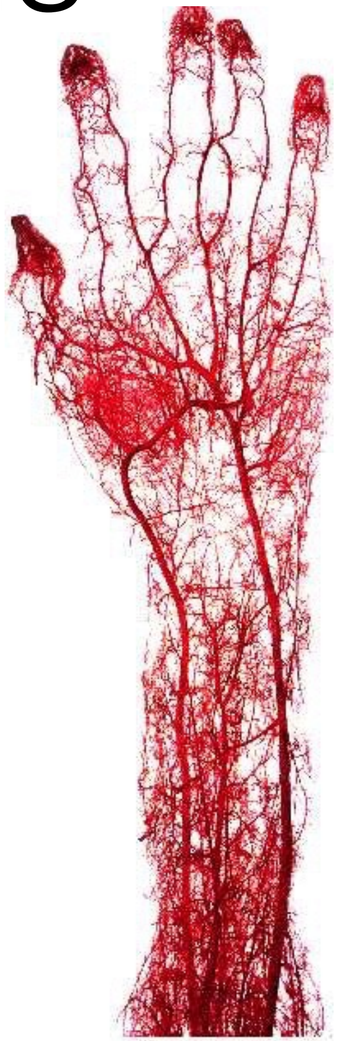
Entwicklung des Merkmals

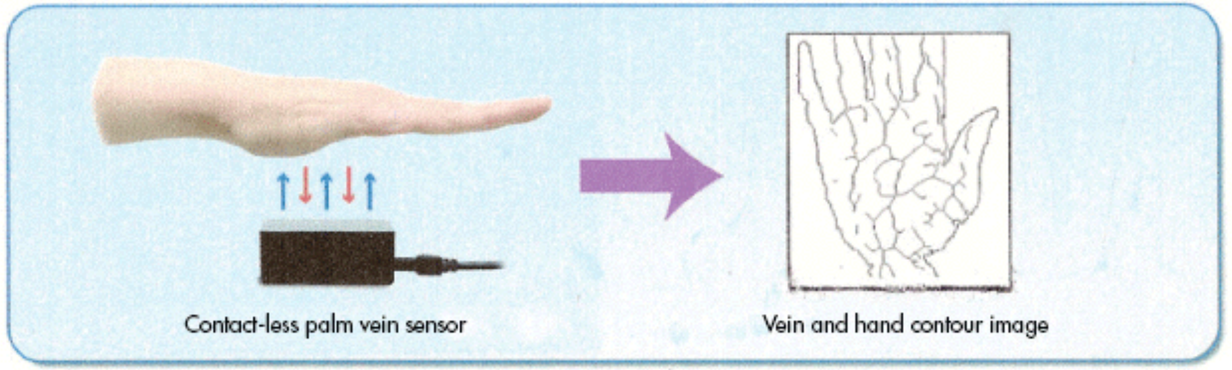
- Blutgefäße entwickeln sich in der sechsten Schwangerschaftswoche
- Grobe Struktur ist genetisch bestimmt
- Finale Ausprägung durch Zufallsprozesse



https://www.pinterest.com/teodorayellow/anatomy/

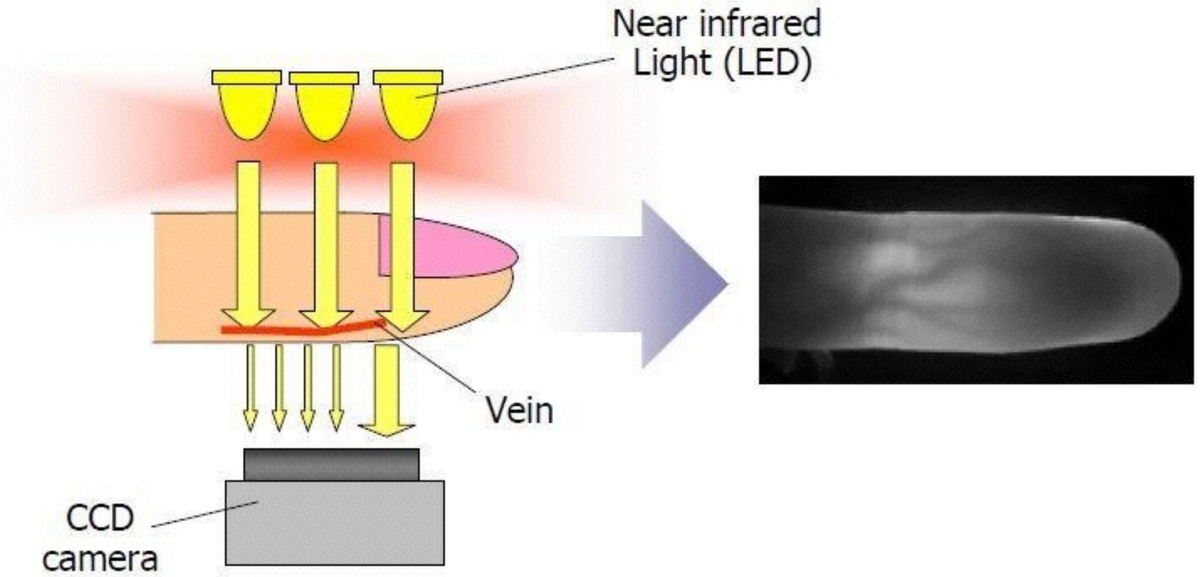
how it works (hardware)

6. In Fujitsu's Palm Secure technology for biometrics, contact-less palm-vein sensing can be used to project a vein and hand contour image.



http://www.fujitsu.com/

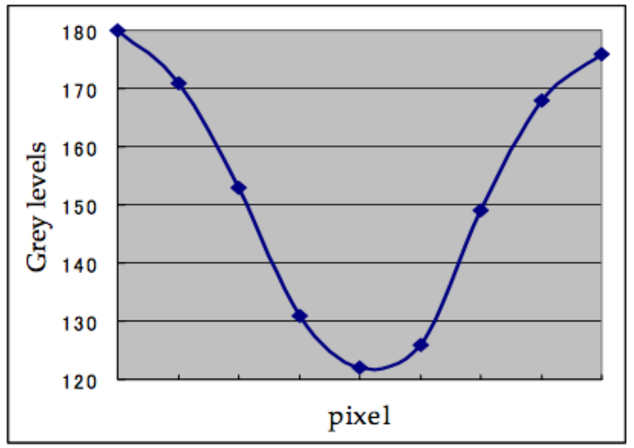
how it works (hardware)

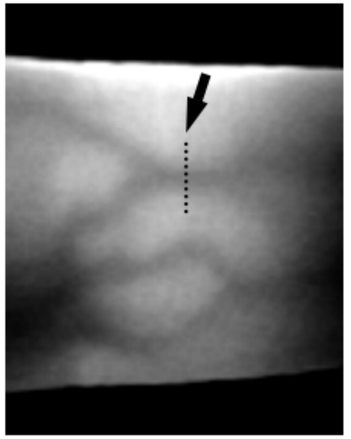


https://pbs.twimg.com/media/DGXISJ6WsAAwYvh.jpg

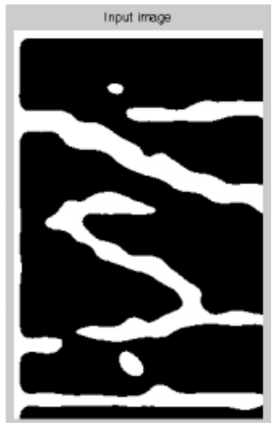
how it works (software)

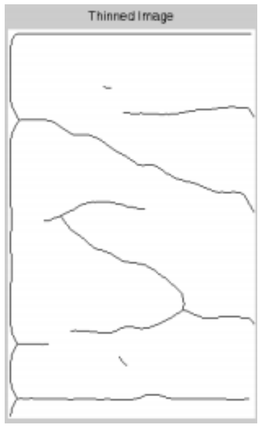
- Extraktion: Miura tracking
- Postprocessing: Skelettonisierung
- Verwendete Merkmale:
  - Enden
  - Aufspaltungen

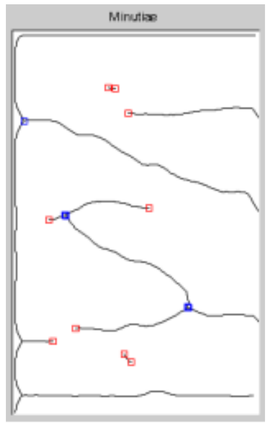




https://de.mathworks.com/matlabcentral/profile/authors/1836574-bram-ton



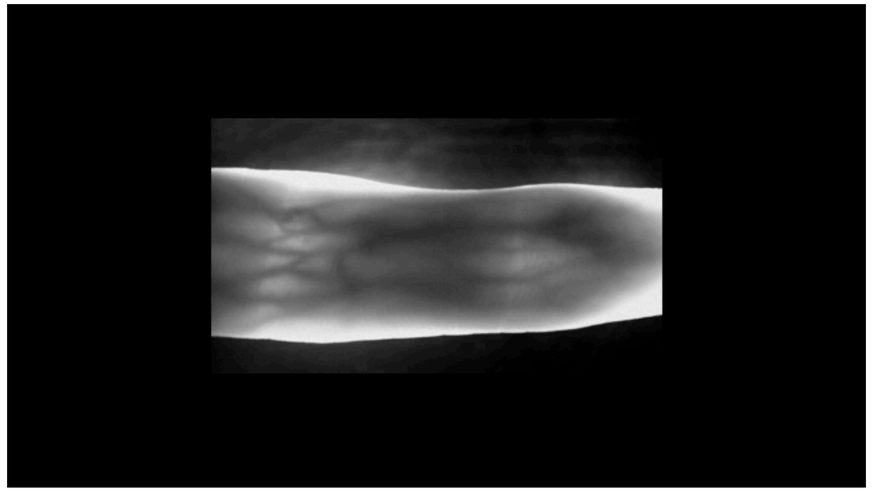




https://www.irjet.net/archives/V4/i4/IRJET-V4I4266.pdf

how it works (software)

- Extraktion: Miura tracking
- Postprocessing: Skelettonisierung
- Verwendete Merkmale:
  - Enden
  - Aufspaltungen



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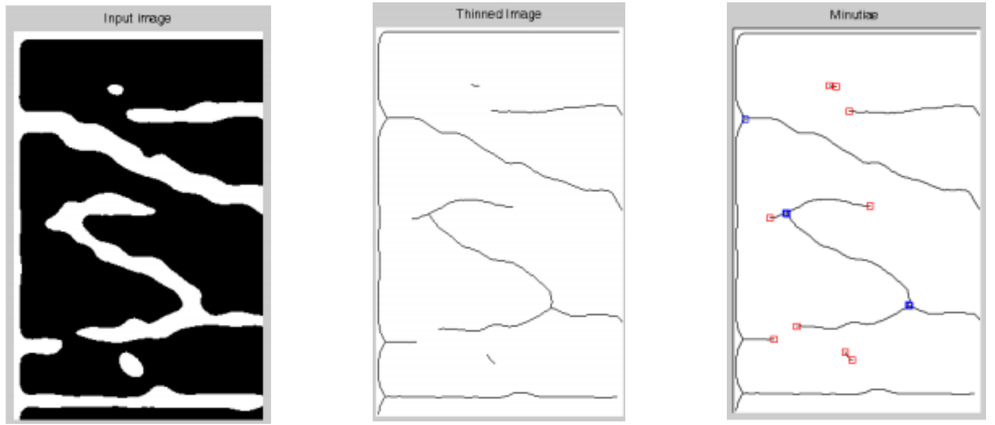


https://www.irjet.net/archives/V4/i4/IRJET-V4I4266.pdf

where to look

- Computer
- Krankenhäuser
- Geldautomaten
- …

https://m.smedata.sk/api-media/media/image/sme/8/44/44788/44788_1200x.jpg
https://www.blog-nouvelles-technologies.fr/wp-content/uploads/2018/02/palm-vein-scan-2.jpg
http://vietnamsmart.vn/images/tintuc/ACCESS-CONTROL-2.png

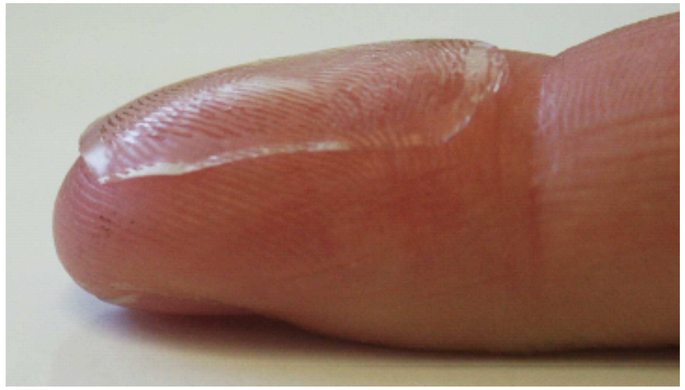
where to look

- Computer
- Krankenhäuser
- Geldautomaten
- und beim BND :-D

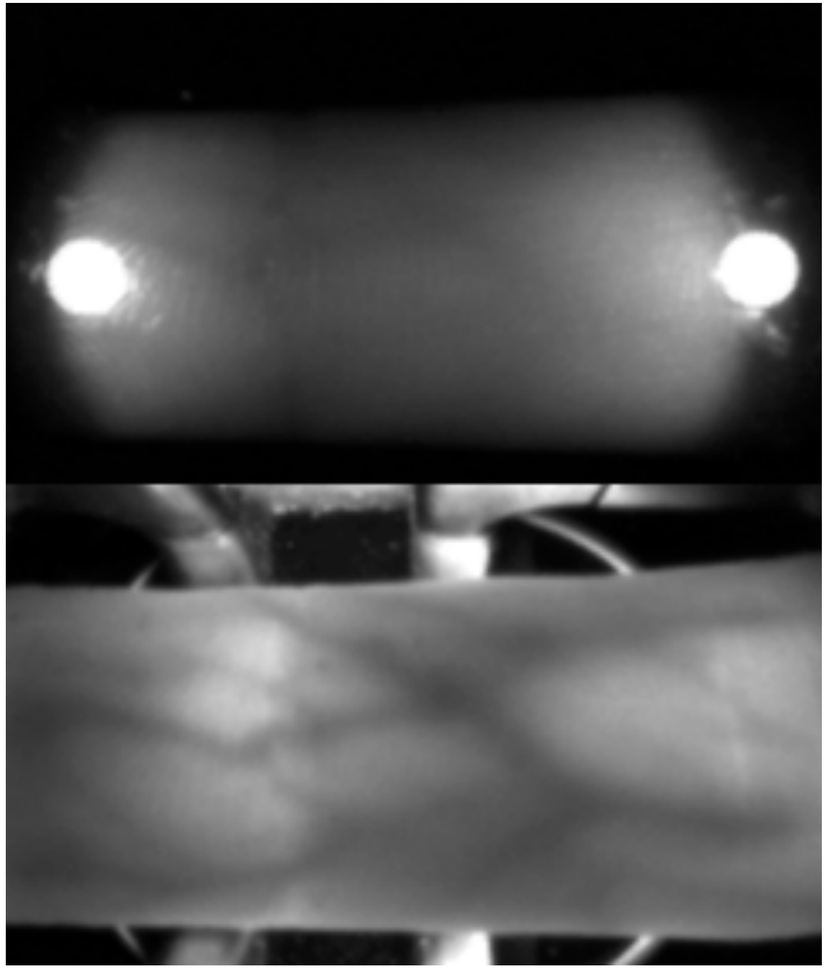
Foto: dpa

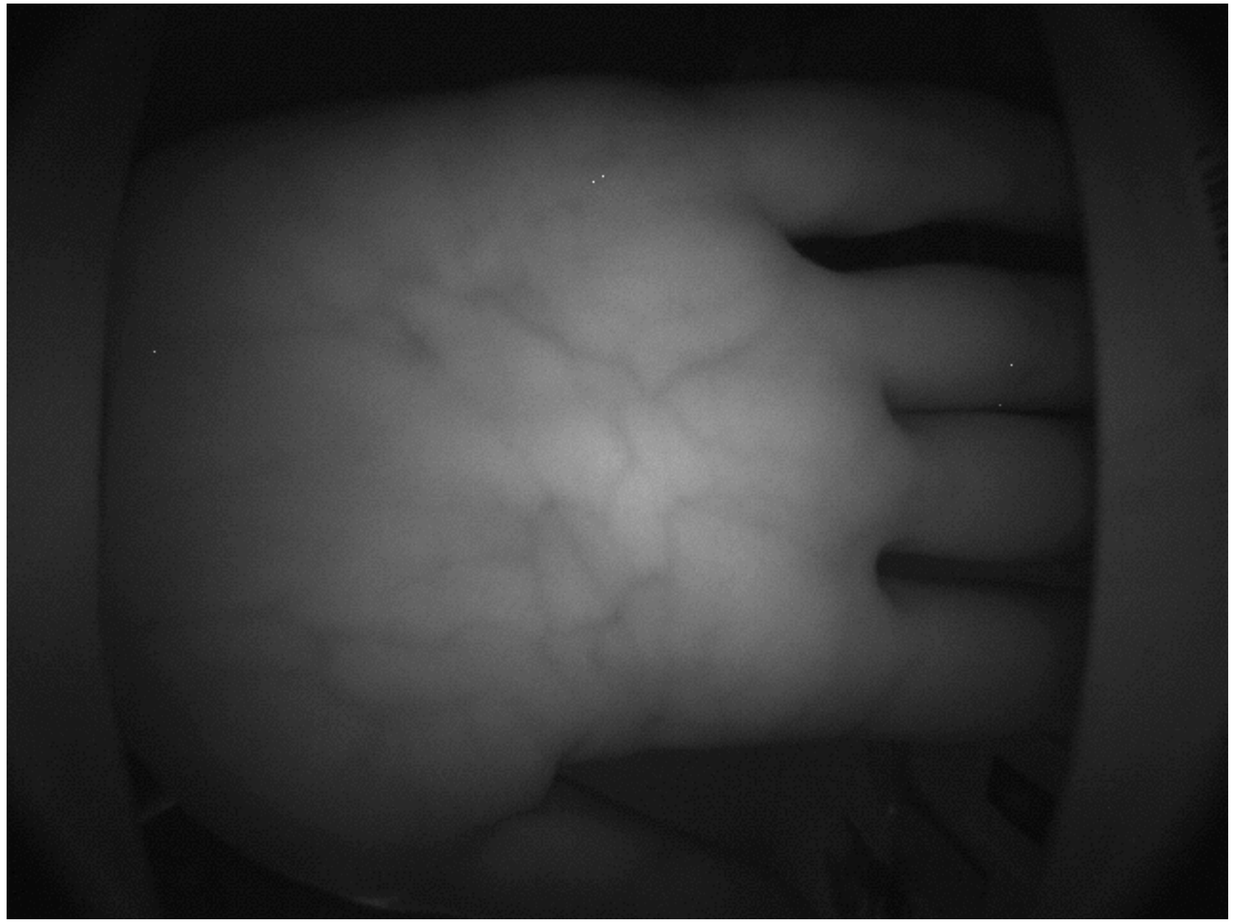
Biometrische Systeme hacken

- **Merkmale beschaffen**
  - Kommunikation Sniffen
  - Aus den Templatedaten generieren
  - Ein Foto machen
- **Attrappe herstellen**
  - Passendes Material finden
  - Merkmal Kopieren



Merkmalsbeschaffung :: Sniff



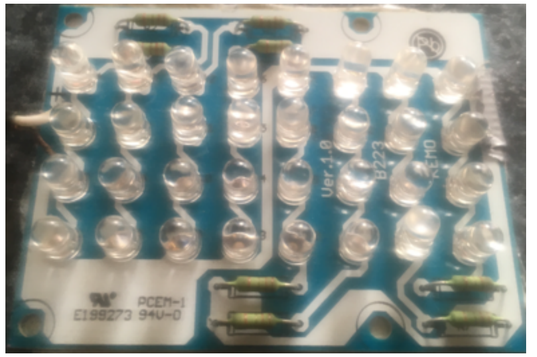


Merkmalsbeschaffung :: DLSR

https://images-na.ssl-images-amazon.com/images/I/81KvgTUdSOL._SL1500_.jpg

Parameter

- Kameratyp (Graustufen, Auflösung)
- Objektiv (Zoom, Beschichtung)
- Kameraeinstellungen (Apertur, Belichtungszeit)
- Optische Filter
- Lichtquelle (Wellenlänge, Intensität, Position)

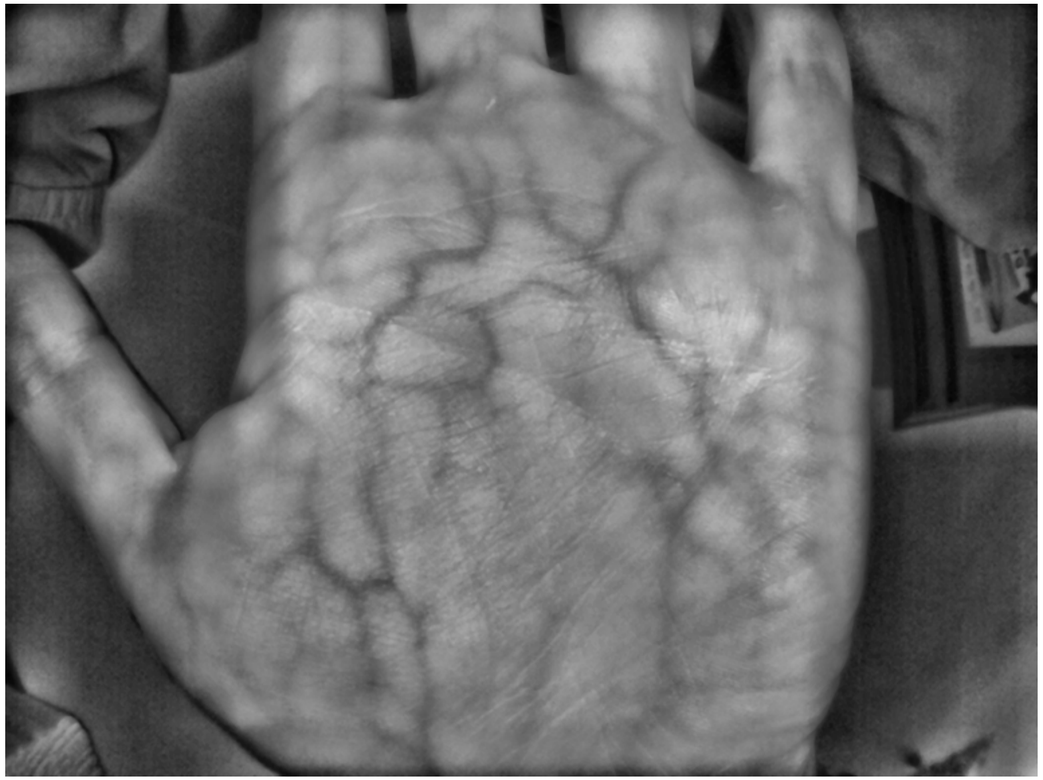


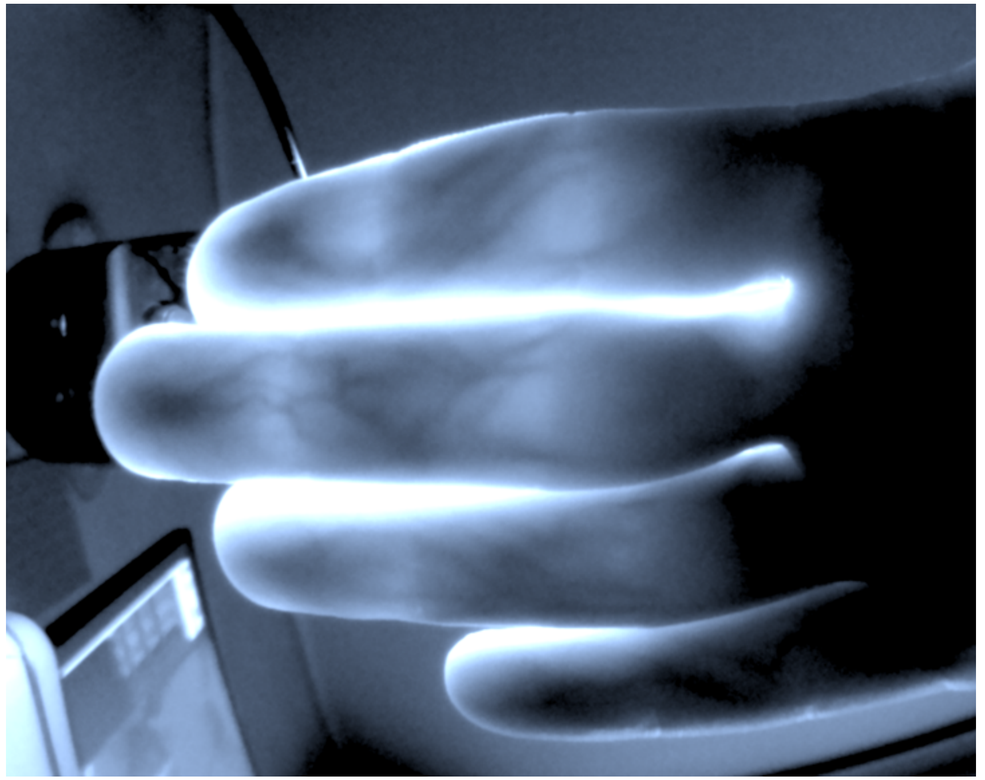
http://keywordsuggest.org/gallery/409649.html
https://swiss-sale.ch/media/image/product/2330/md/fenix-tk25-ir-led-taschenlampe-infrarotstrahler.jpg

DLSR :: Bilder

Merkmalsbeschaffung :: sneaky

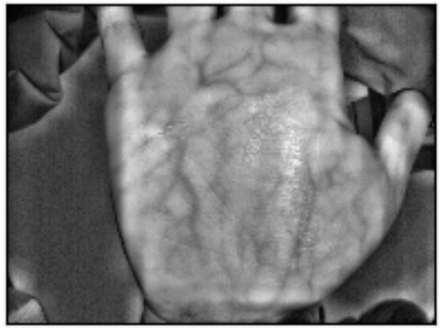
Raspberrykamera :: Bilder





preprocessing

Original Image with CLAHE



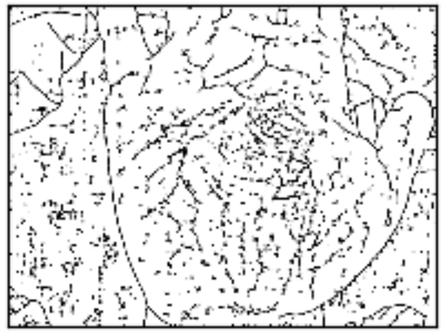
adaptiveThreshold 11,3

Median Noise Reduction

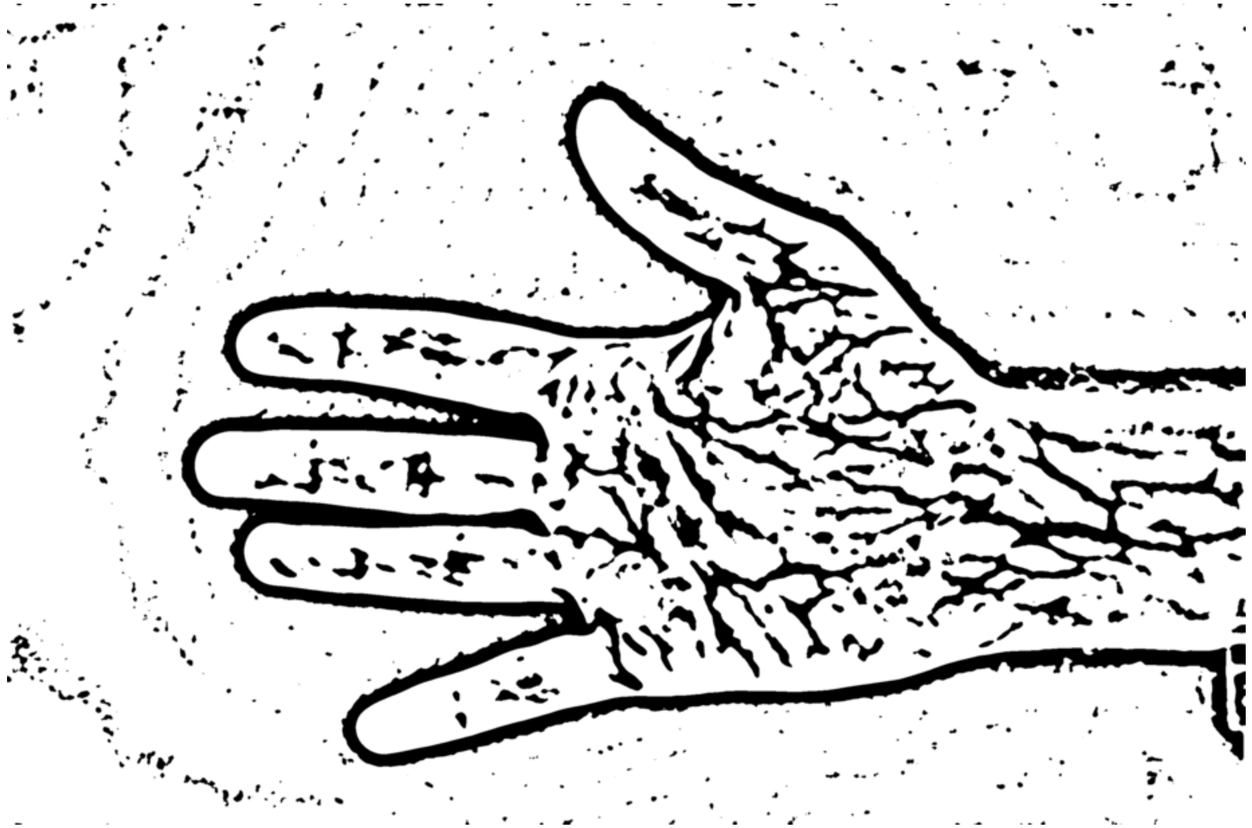
Gaussian Blur 3,3 (Output Image)

blur_result

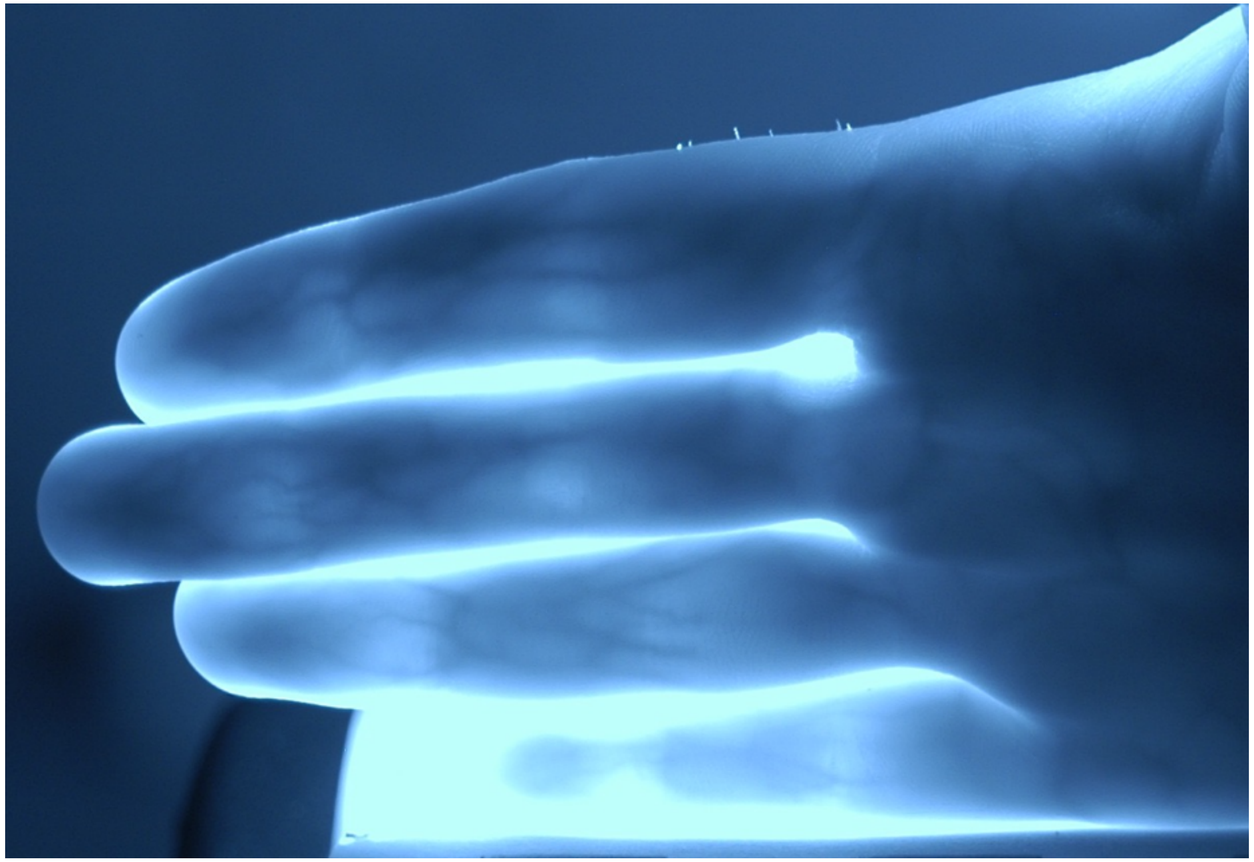
skeleton_result

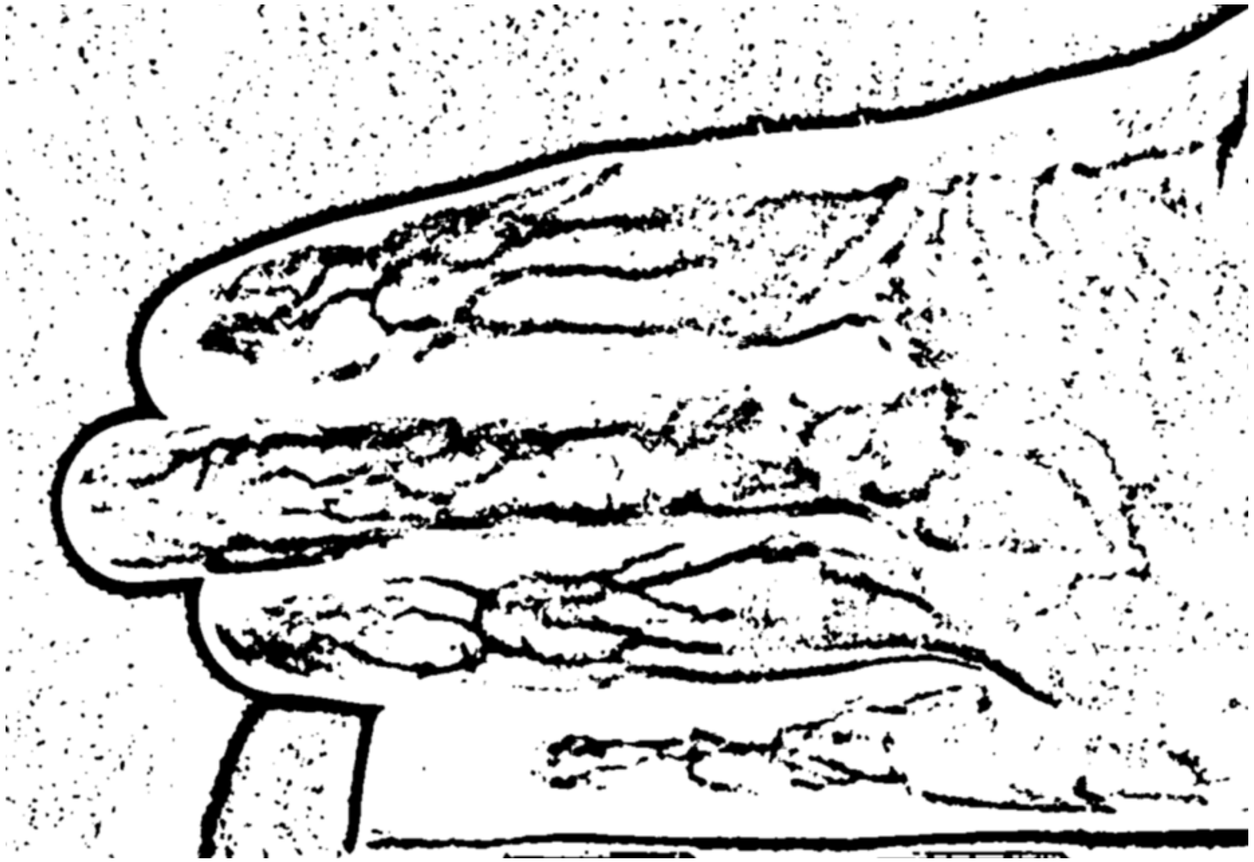


Ergebnis :: Hand



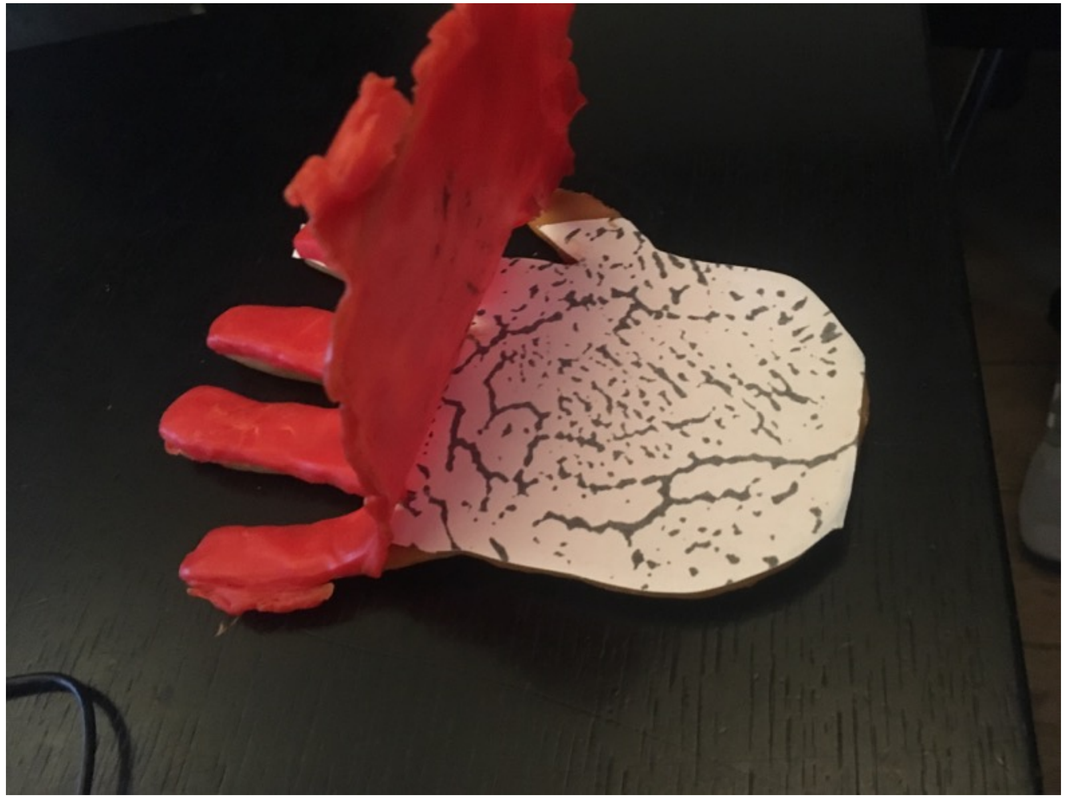
Ergebnis :: Finger



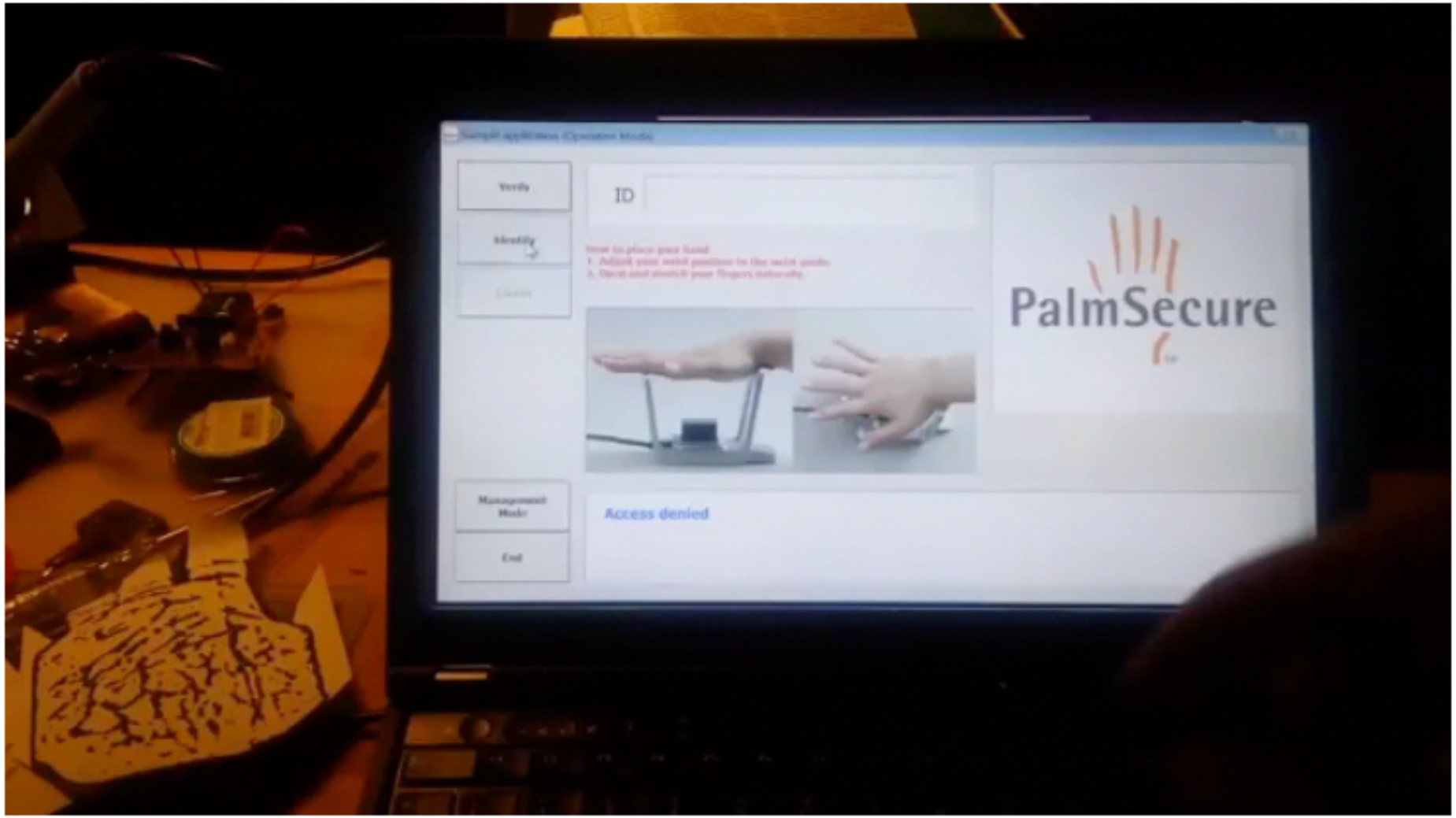


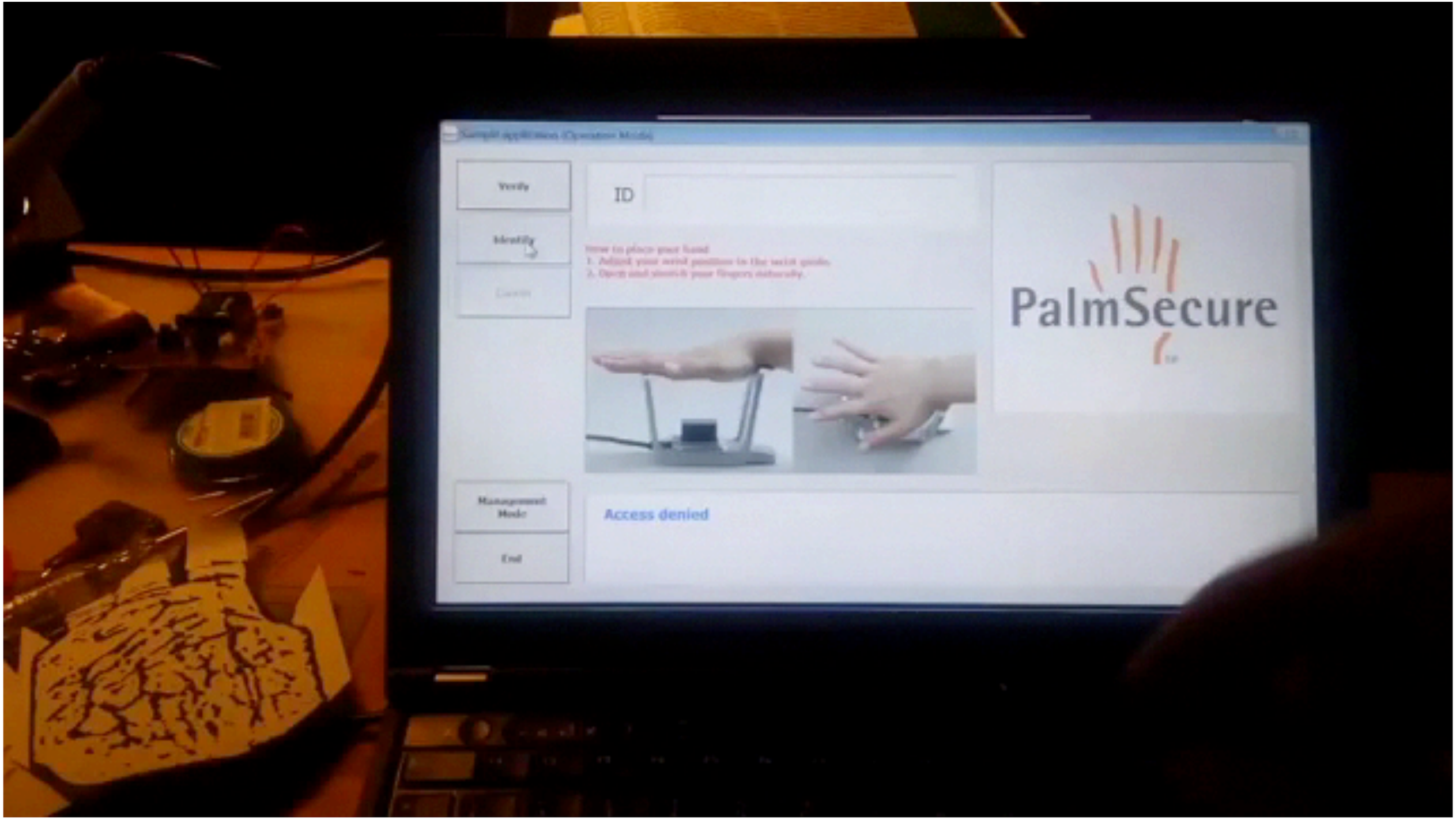
Attrappe :: Hand

Attrappe :: Hand

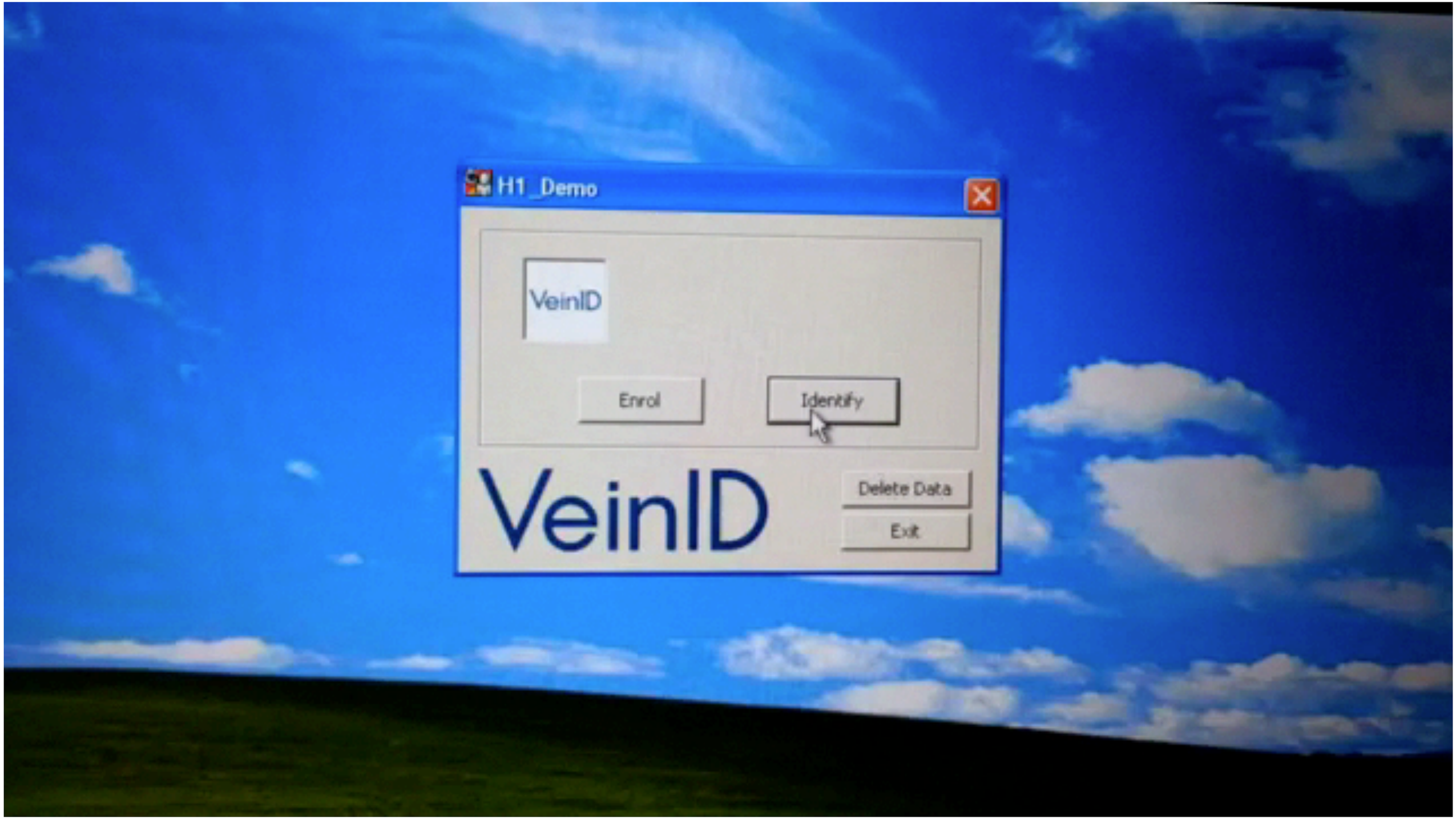


live demo



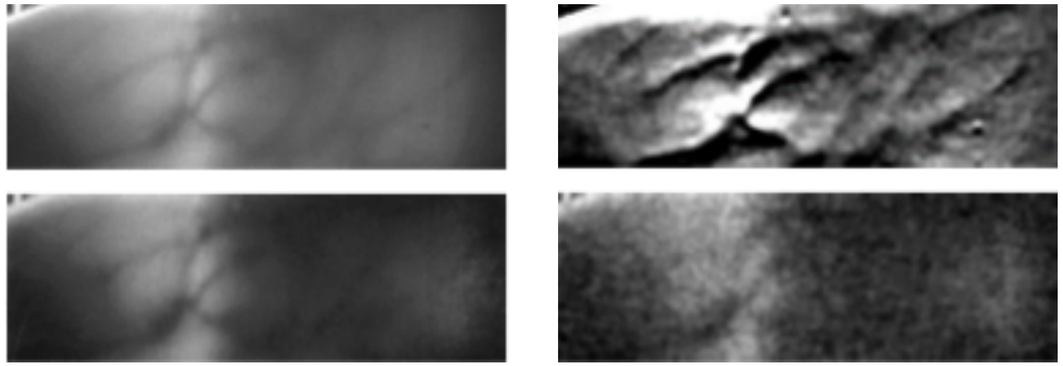

Verify
Identify
ID
PalmSecure
Management Mode
End
Access denied

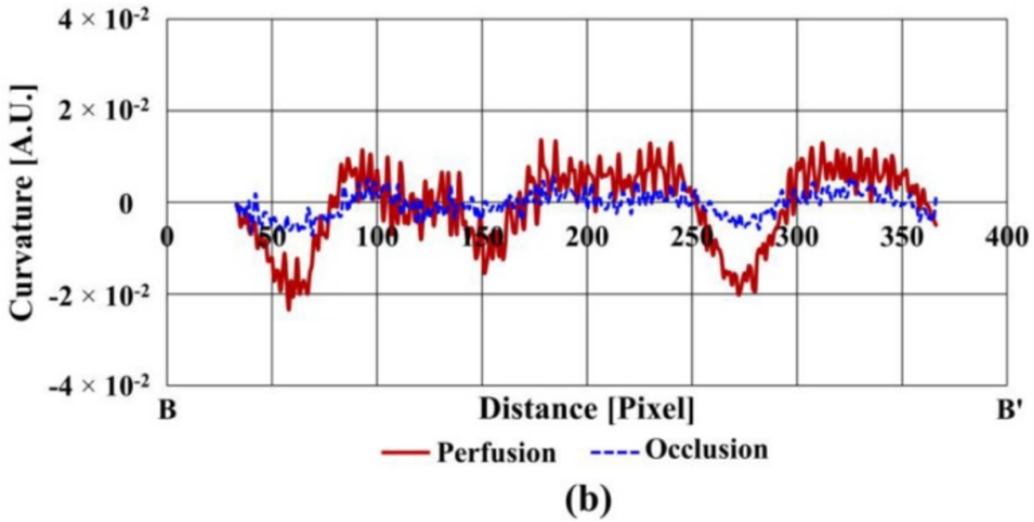
live demo


H1_Demo
VeinID
Enrol
Identify
VeinID
Delete Data
Exit

Attrappe :: Finger

Lebenderkennung

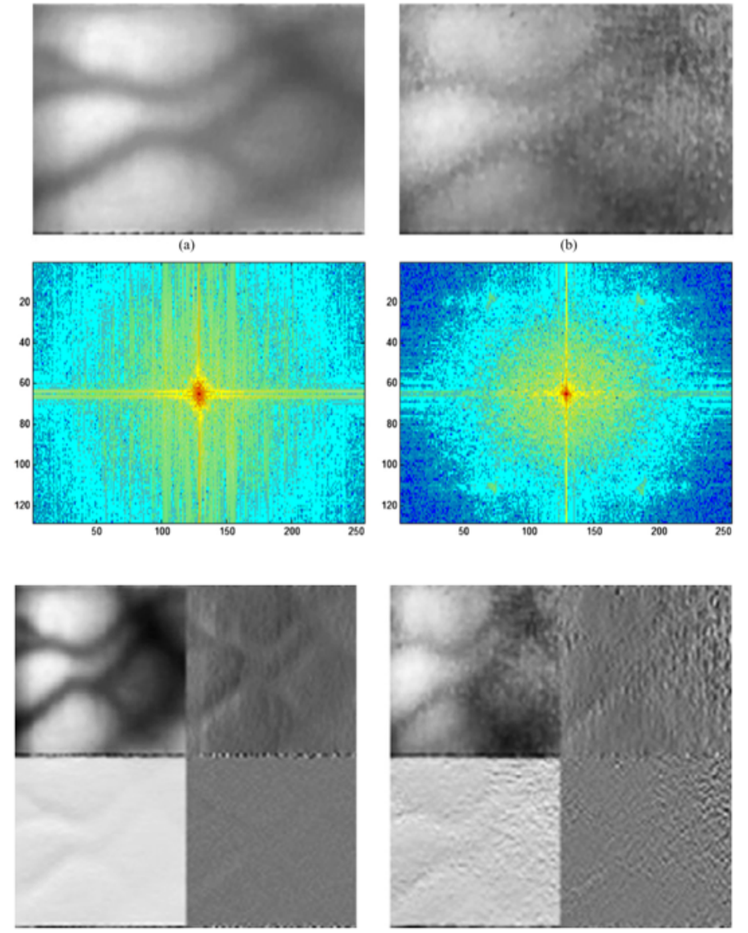




(b)

RAGHAVENDRA, Ramachandra, et al. Finger vein liveness detection using motion magnification.

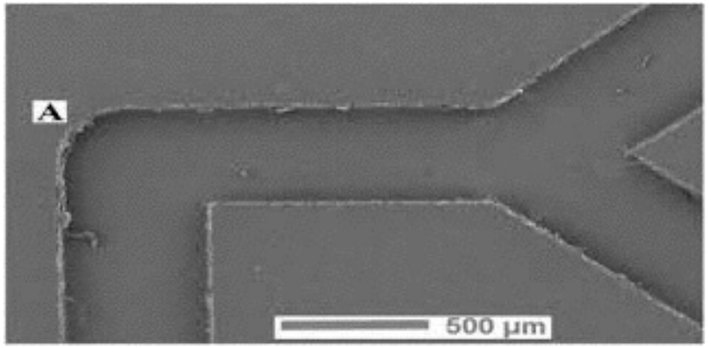
LEE, Jaekwon, et al. Imaging of the finger vein and blood flow for anti-spoofing authentication using a laser and a MEMS scanner



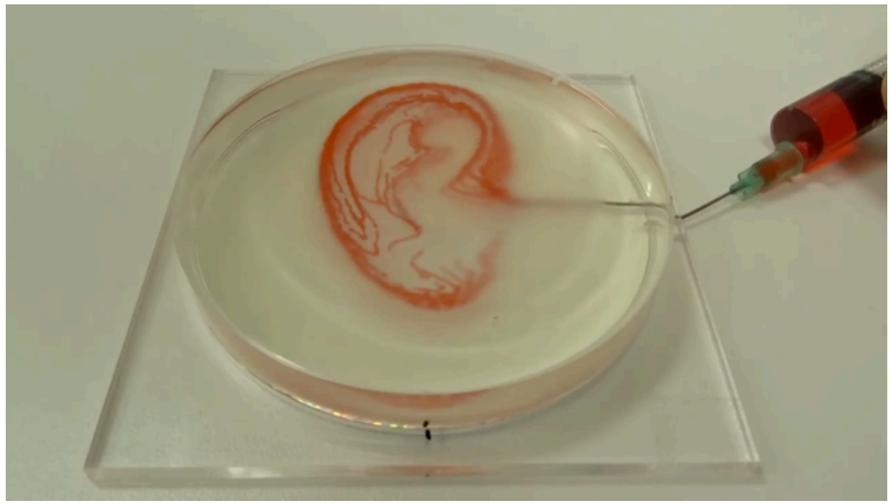
NGUYEN, Dat Tien, et al. Fake finger-vein image detection based on fourier and wavelet transforms

künstliche Blutgefässe

- Mechanisch
  - Fräsen
  - Laser
  - 3D-Druck
- Drucken von Blutgefässen



editorial.3dprint.com/wp-content/uploads/2017/12/Earlobe-vasculature.png



https://3dprint.com/196651/3d-bioprinting-vitaprint-platform/

Danksagung:

SIGINT
signal interrupt GmbH

derpeter,
Maik,
Felix,
Jan,
Ingo,
Iurii

HIRT Hitachi Incident Response Team

Sniffs :: echt vs. fake