Videometer Forensic Applications

ABOUT US

Videometer

- Spectral imaging company
- Founded 1999
- Products
  - Lab instruments,
  - Turn-key in-line systems, and
  - R&D projects
- App. 700 imaging R&D projects since 2000
- In-line 24/7 spectral imaging since 2002
- Based in Copenhagen, Denmark
- Partnerships worldwide

OUR LEGACY

1999

The beginnings

Videometer was co-founded by Jens Michael Carstensen and 7-Technologies in 1999, as a spin-off from the Technical University of Denmark. The first patent application was filed.

2000

Project-based

In 2000, Videometer began its project-based activity. During these years, the company's main focus was set on custom-made vision systems for in-line and on-line quality control.

2018

A new era

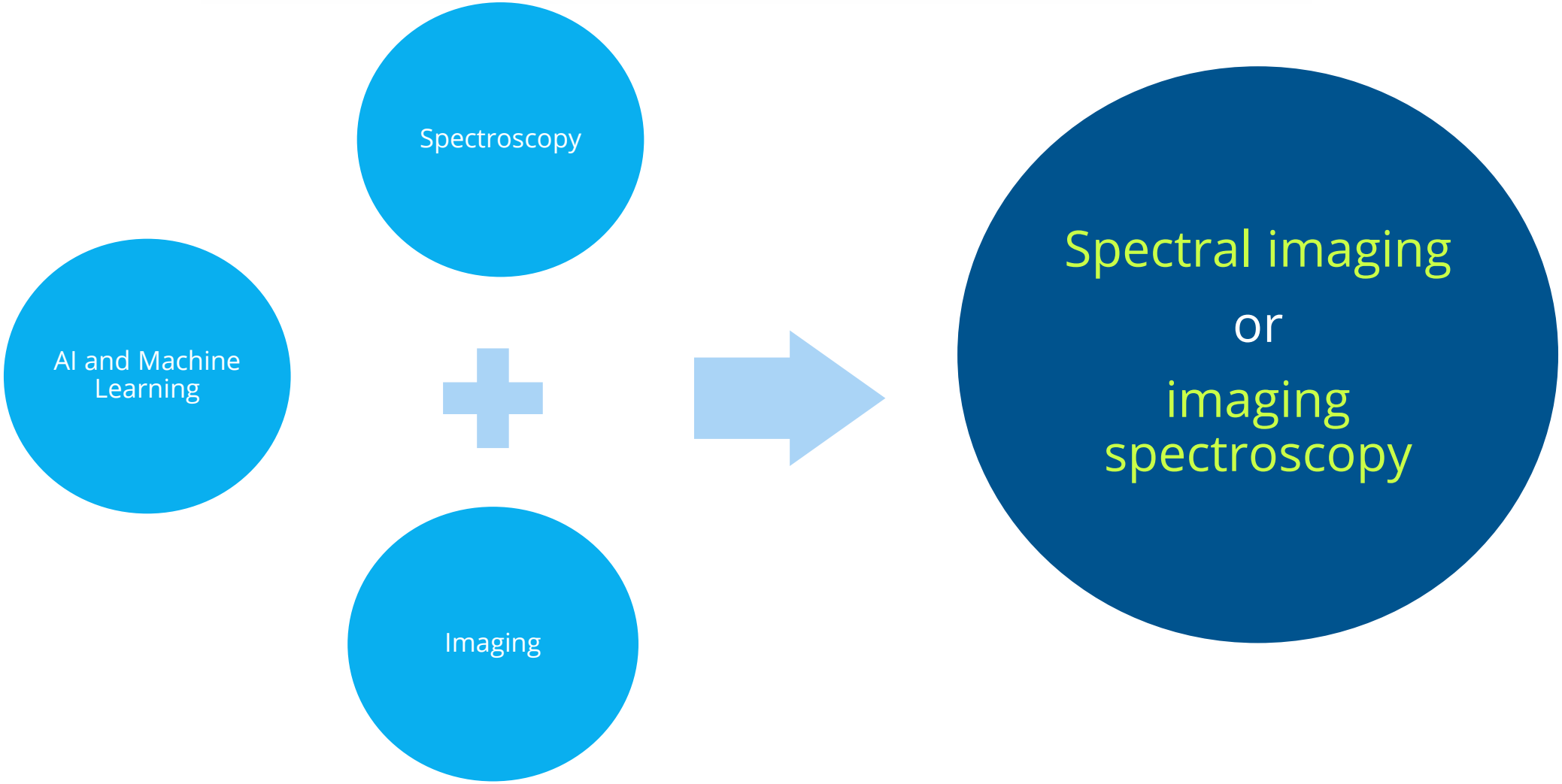
In 2018, Videometer's structure underwent new developments both in terms of strategy and structure. This year marked the beginning of a new era for the company, in terms of focus on instruments.

2020s

Today

Today, Videometer is a leading provider of spectral imaging solutions worldwide, selling both spectral imaging instruments and custom-made vision systems. Videometer is synonym of excellence and innovation in its field.

SPECTRAL IMAGING



WHAT COLOR IS THE CAR?

Videometer

APPEARANCE

=

CHEMISTRY

X

PHYSICS

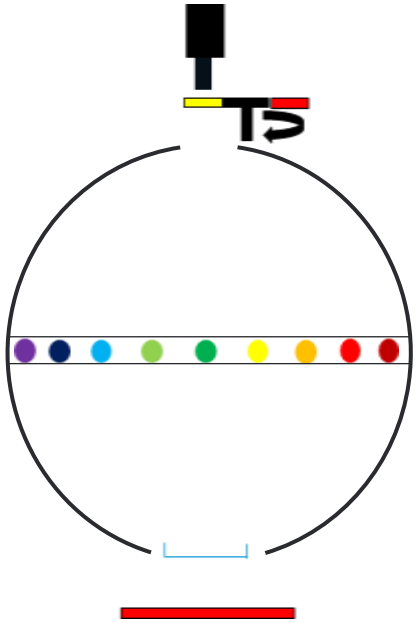
X

ENVIRONMENT

X

ILLUMINATION

LED BAND SEQUENTIAL SPECTRAL IMAGING



Camera and lens

Emission filter changer

Integrating sphere

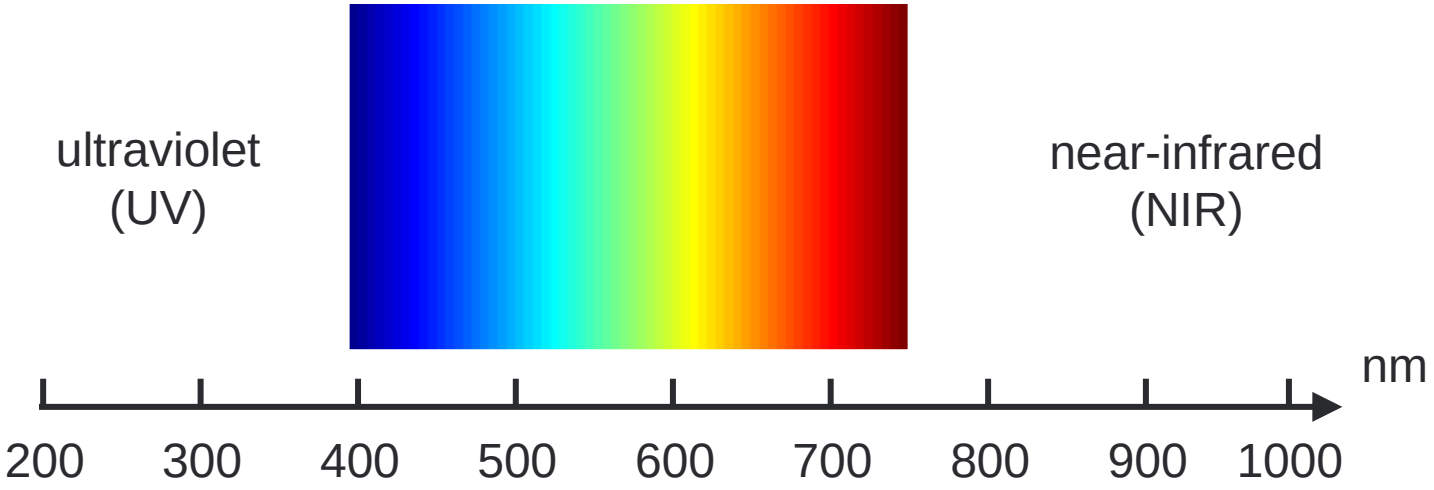
LEDs of multiple wavelengths

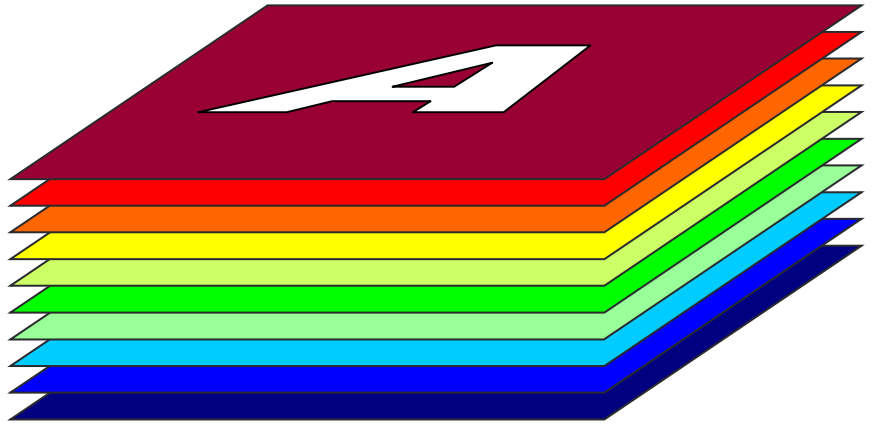
Sample is placed in target opening

Backlight or background

- LEDs: Stable, durable, large selection, rapidly developing technology
- Up to 20 different high-resolution bands acquired sequentially in 0.5-1.0 seconds
- May be combined with emission filters, backlight, and darkfield illuminant
- Combined reflectance spectral imaging and fluorescence spectral imaging possible!

SPECTRAL IMAGE



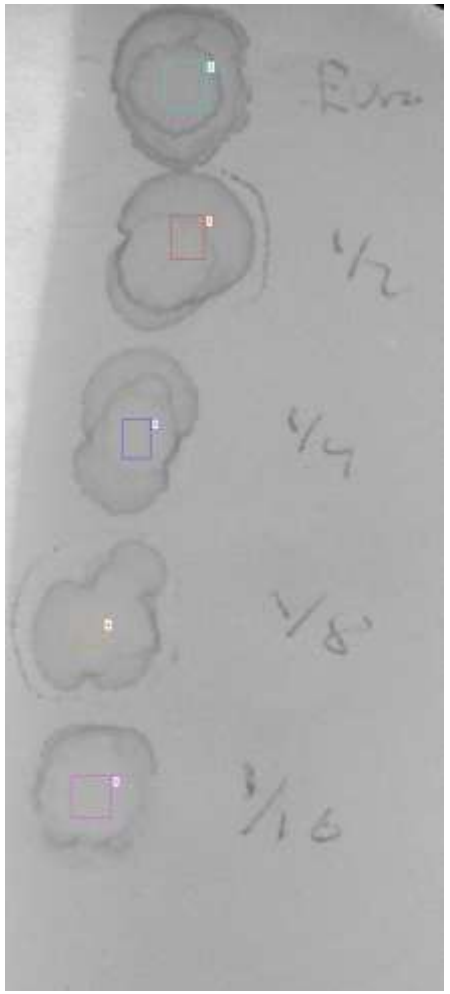


N images obtained at N wavelengths

Microbial and plant metabolites	Accurate color assessment and pigment concentration	Pigment baseline, moisture, fat, etc.	Spectral image is typically a large data structure of 100 MB to 10 GB

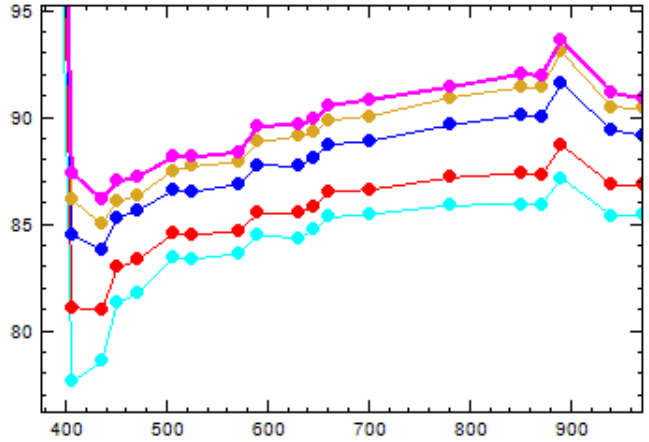
BLOOD STAINS IN 5 DIFFERENT DILUTIONS

RGB

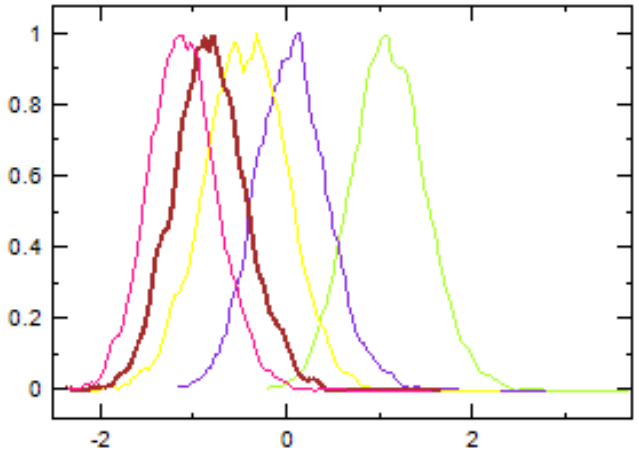


405 nm

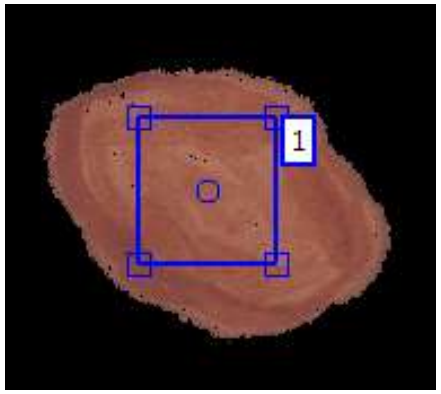
Spectrum

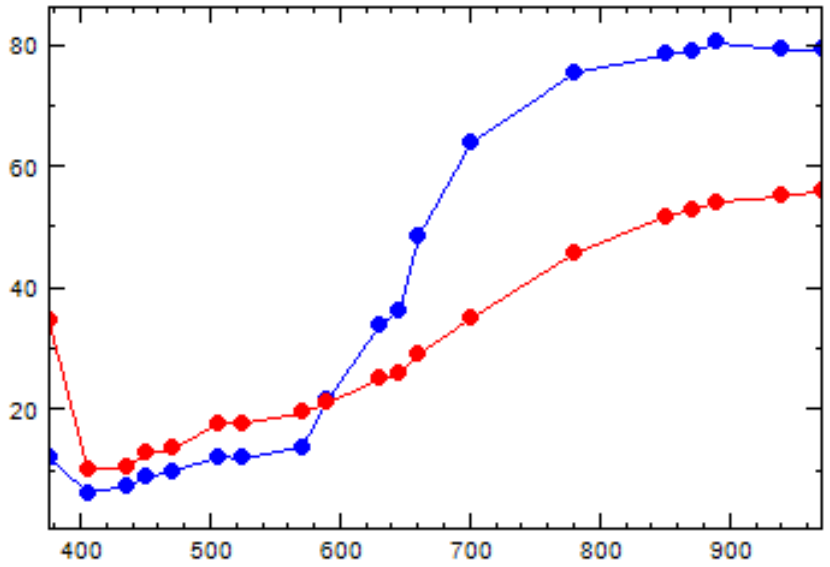


Blood index histograms



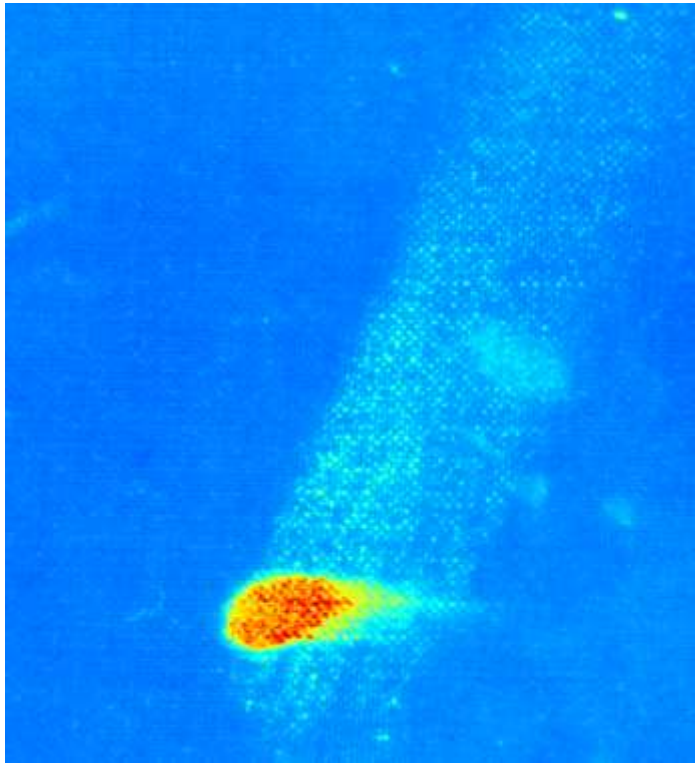
BLOOD ON PAPER AND FABRIC





BLOOD SMEAR ON FABRIC

sRGB

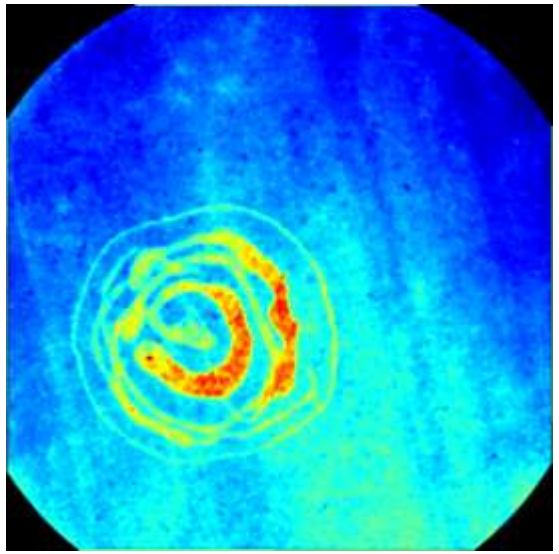


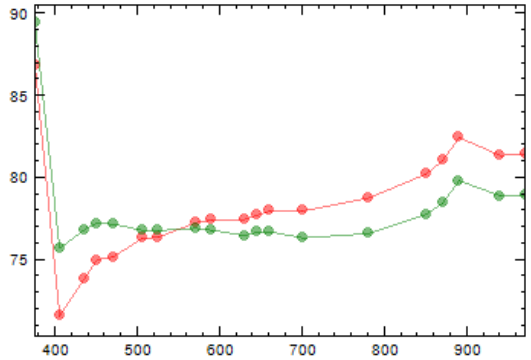
Blood index

SALIVA ON PAPER

Saliva on paper

Saliva detector

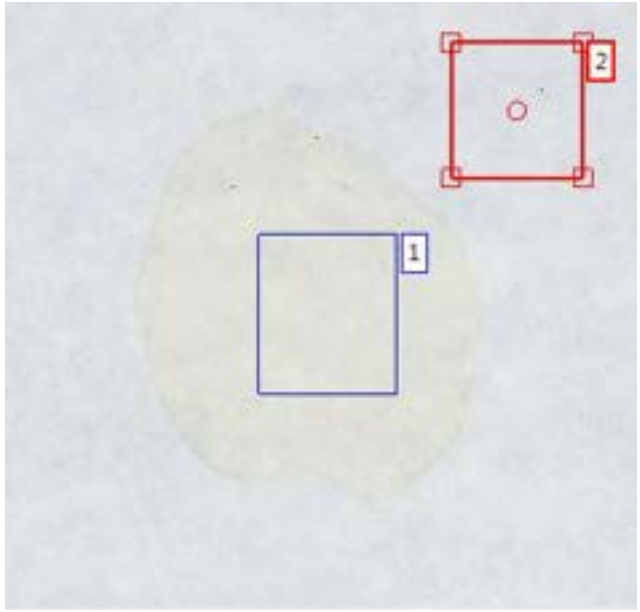




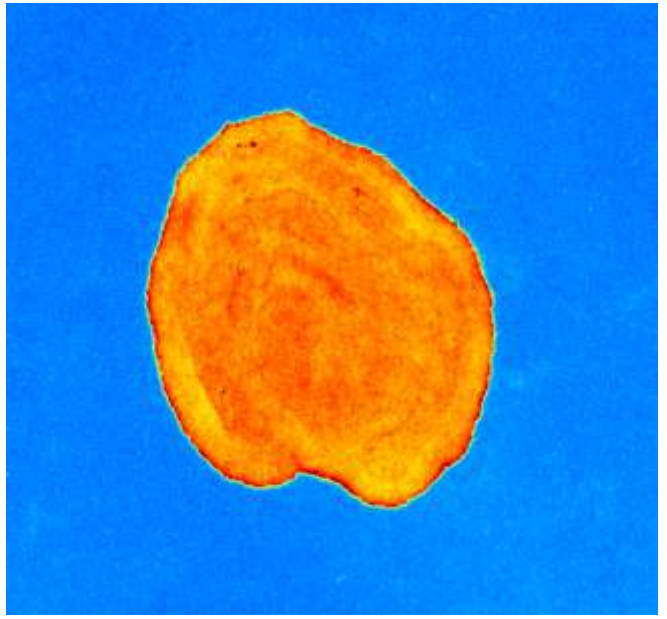
Spectrum
Saliva: red curve
Paper: green curve

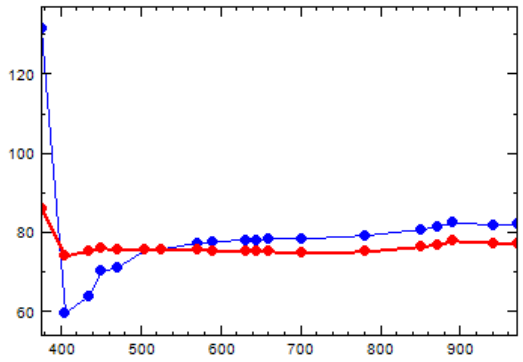
SEMEN ON PAPER

Semen on paper



Semen detector



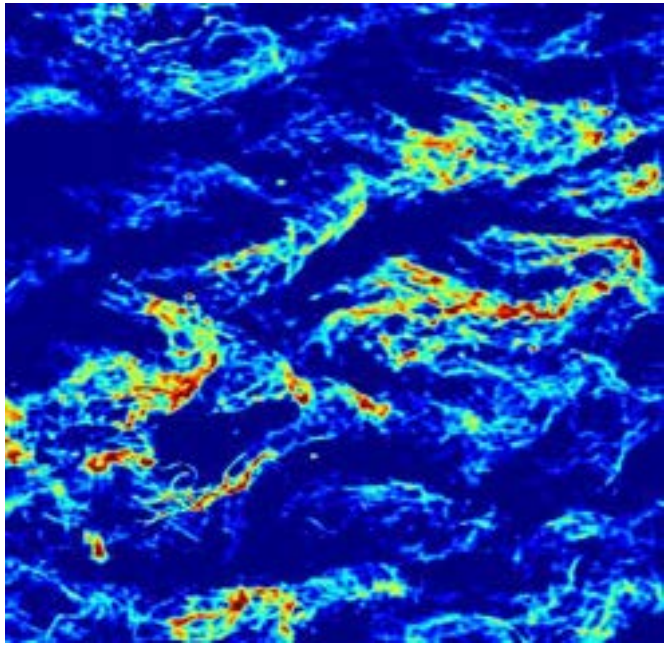


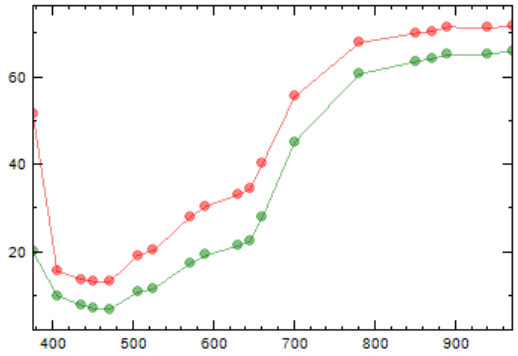
Semen: blue curve
Paper: red curve

SEMEN ON CARPET

Semen on carpet

Semen detector

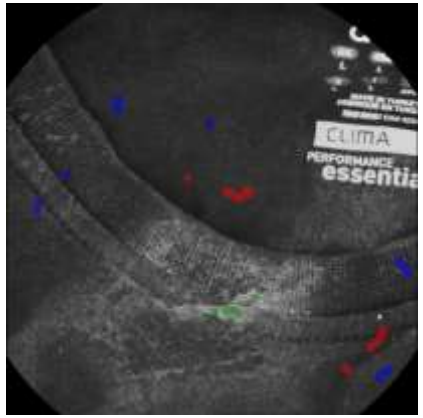




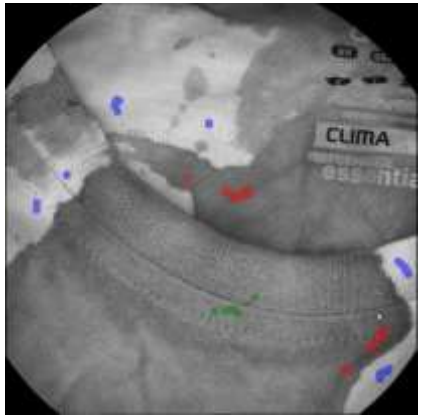
Semen: red curve
Carpet: green curve

FABRIC WITH BLOOD AND SEMEN

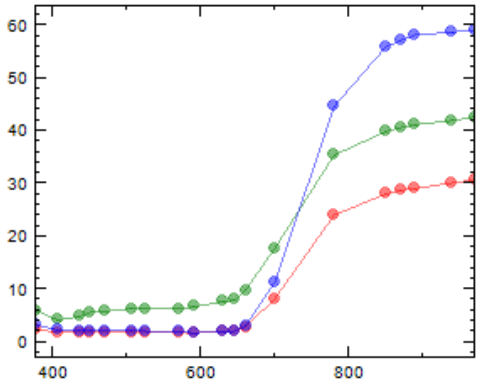
sRGB



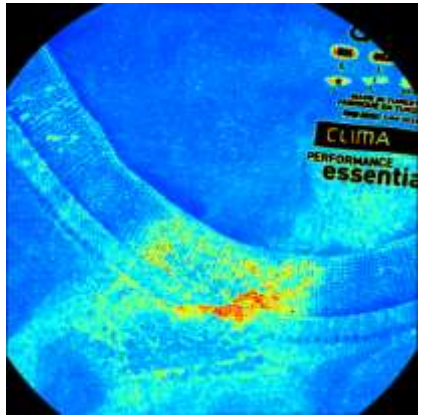
525 nm



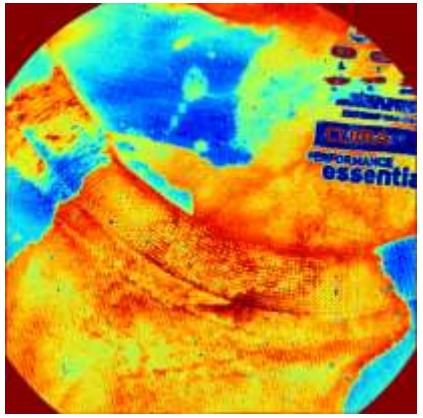
870 nm



Spectra of blood, semen, and fabric

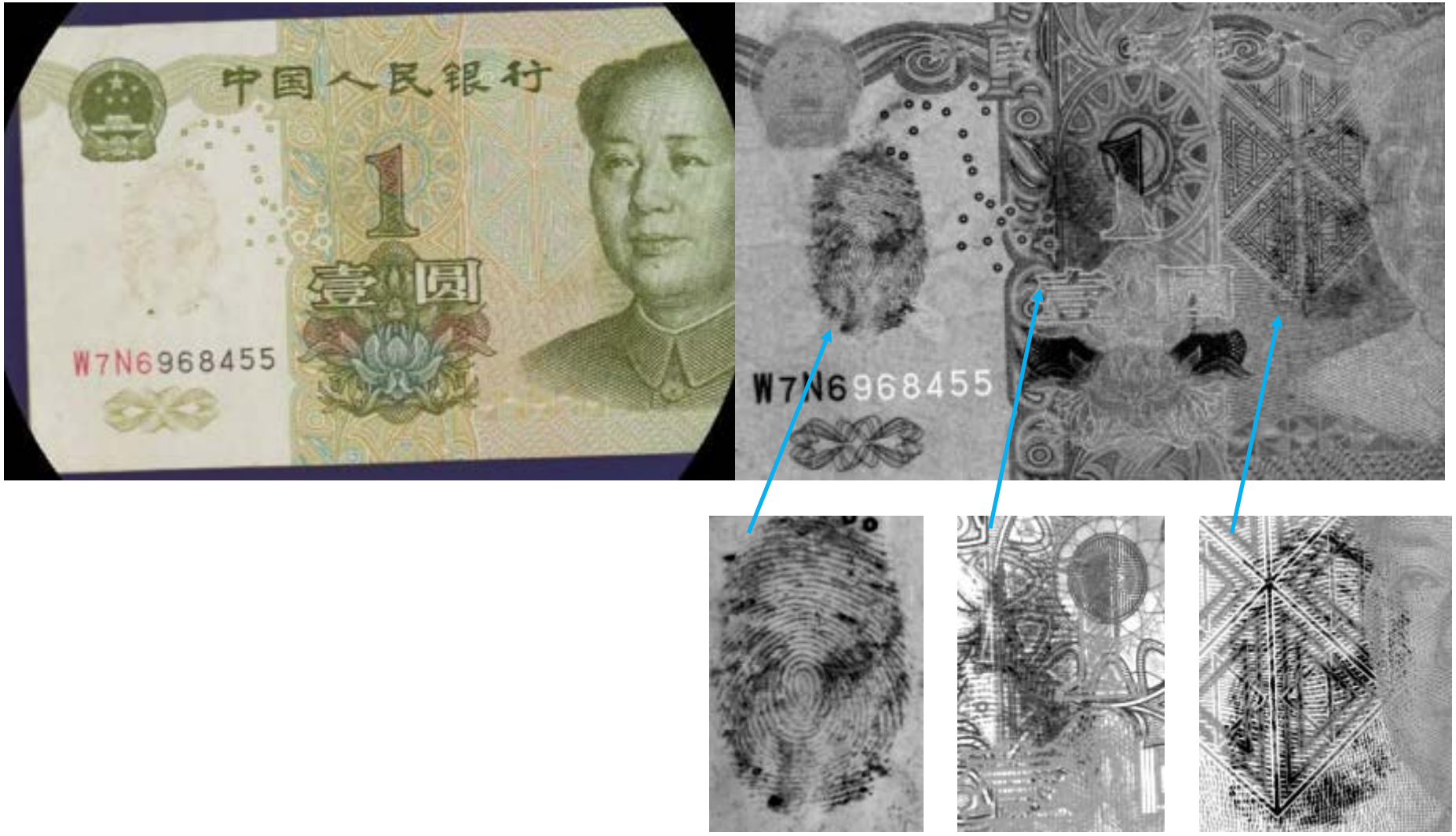


Semen detector

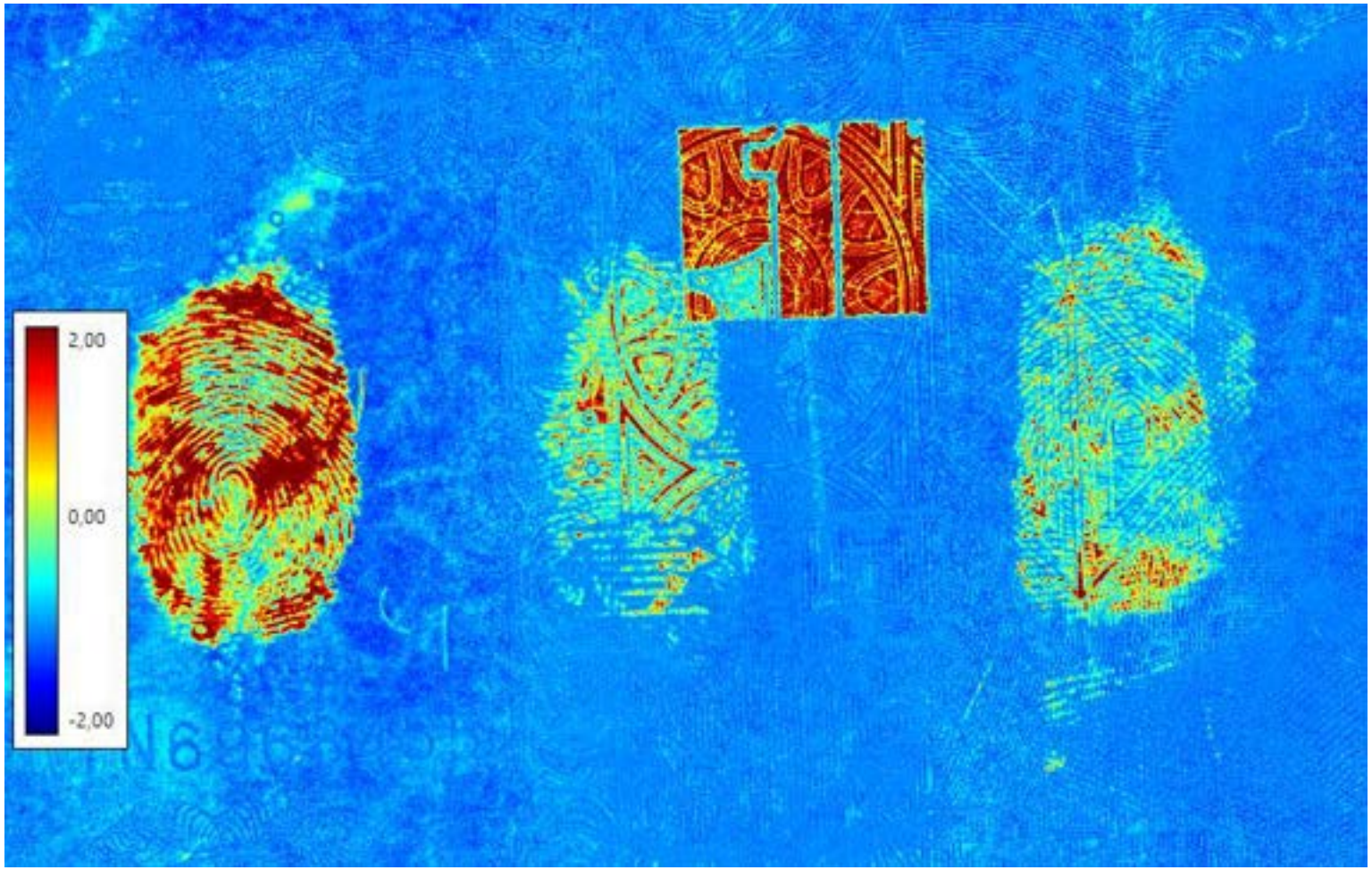


Blood detector

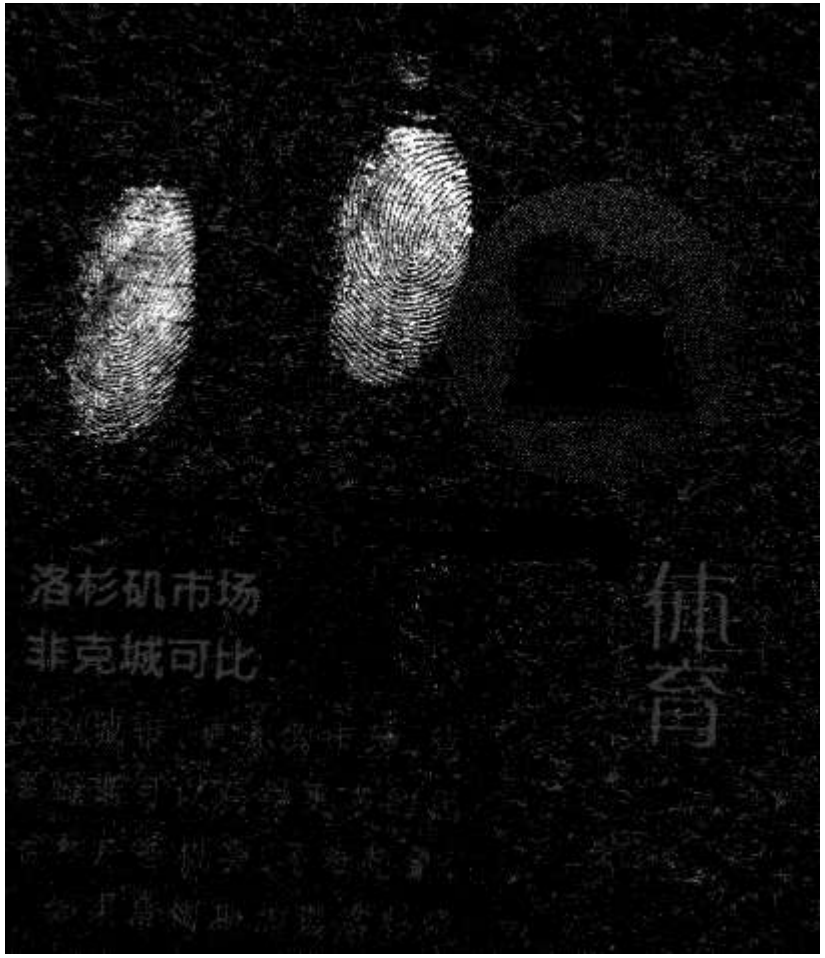
BLOOD FINGERPRINT ON 1 YUAN



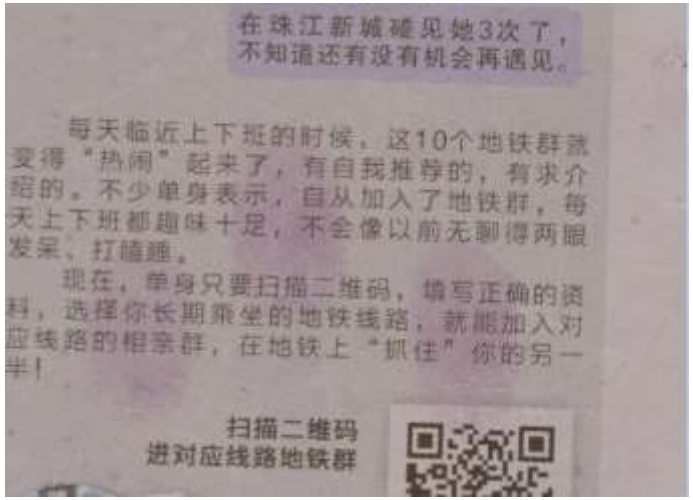
SUPERVISED FINGERPRINT DETECTION



BLOOD FINGERPRINT ON NEWSPAPER

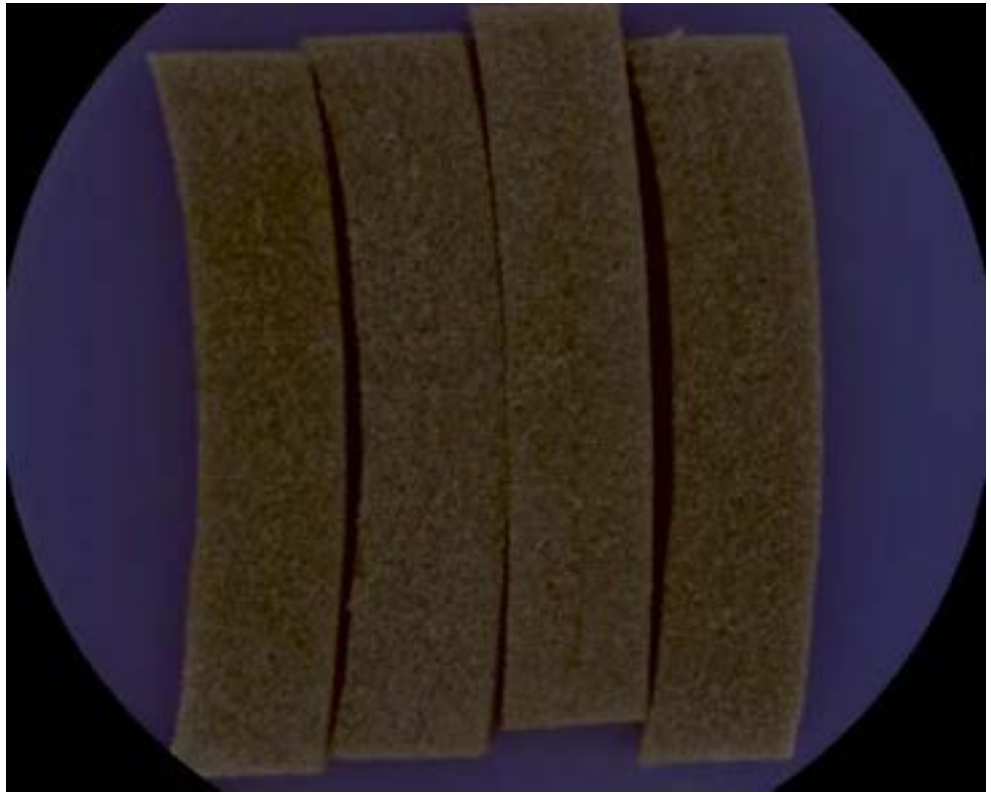


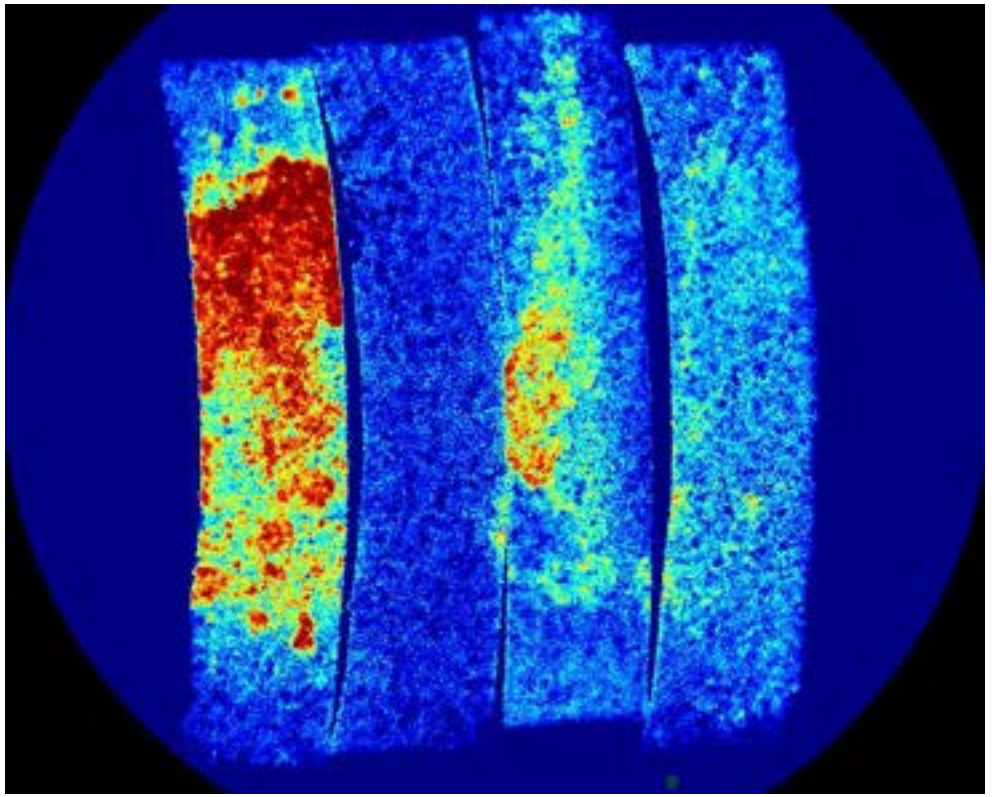
NINHYDRIN FINGERPRINT ON PAPER



Ninhydrin fingerprint with minimal influence from other print on the paper

BLOOD ON SPONGES
1:5 1:10 1:20 1:40





Presumably wrong side of 1:10 imaged by the camera

BLOOD ON COTTON 1:5 1:40

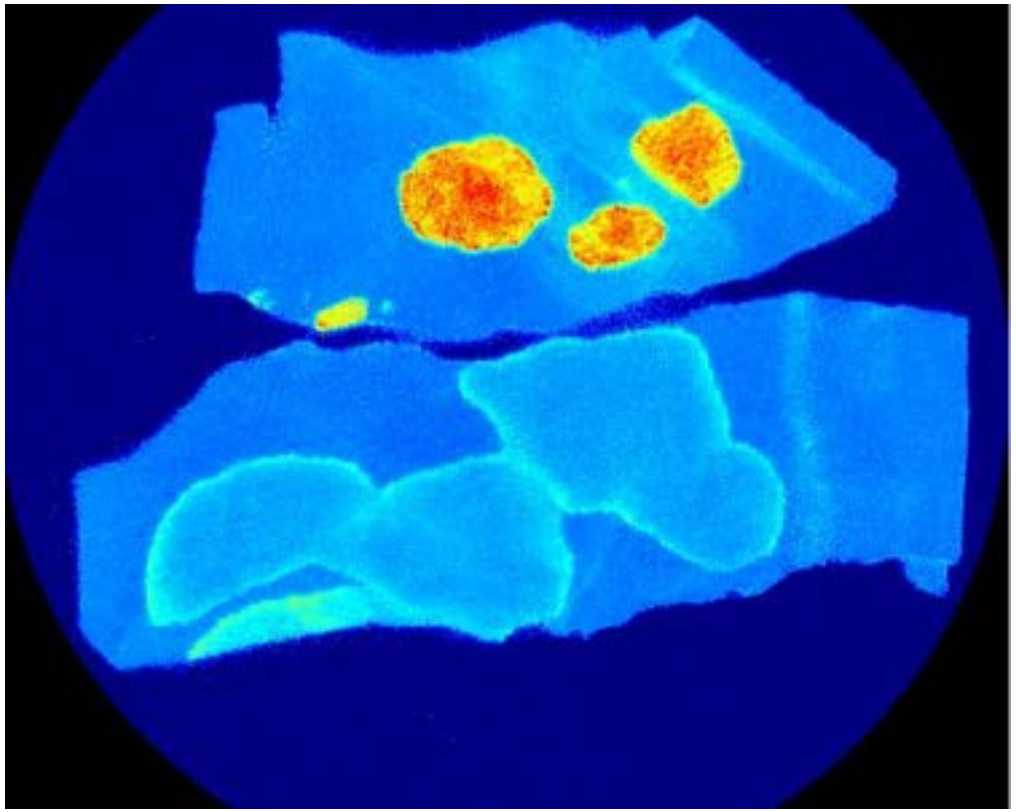
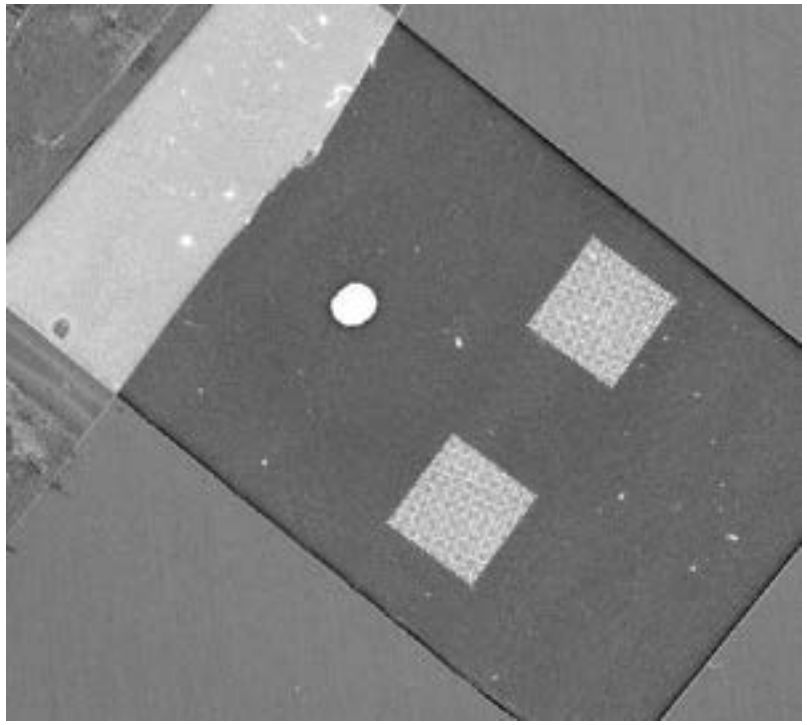


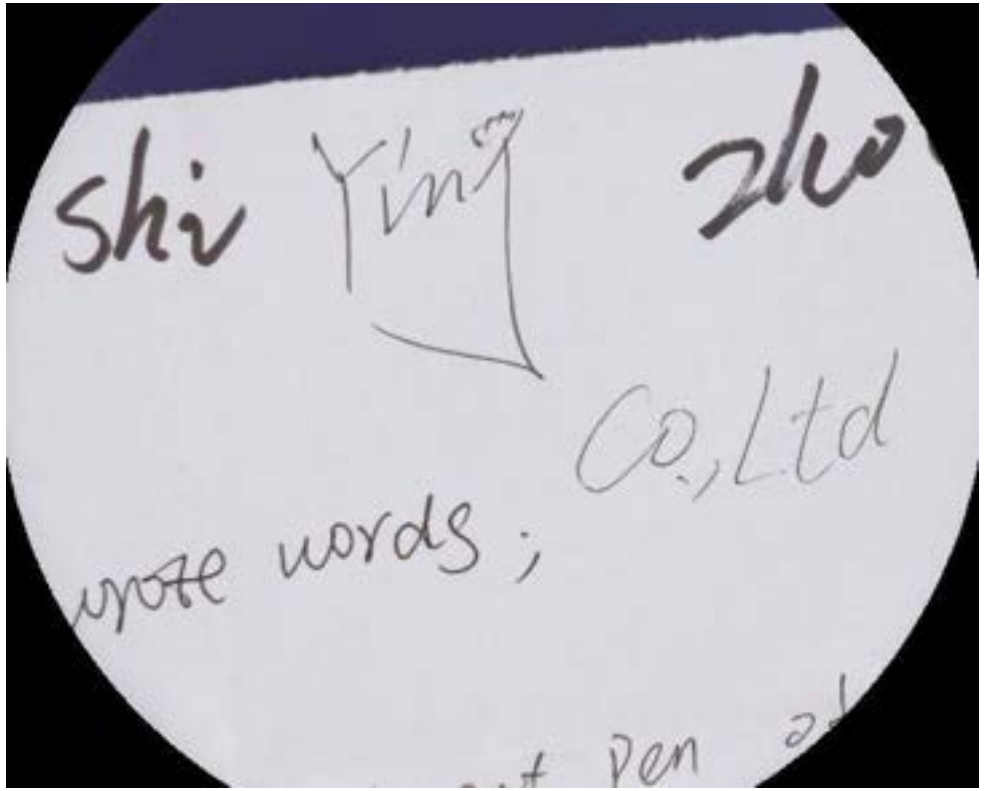
PLATE WITH BLOOD STAIN AND MATRIX

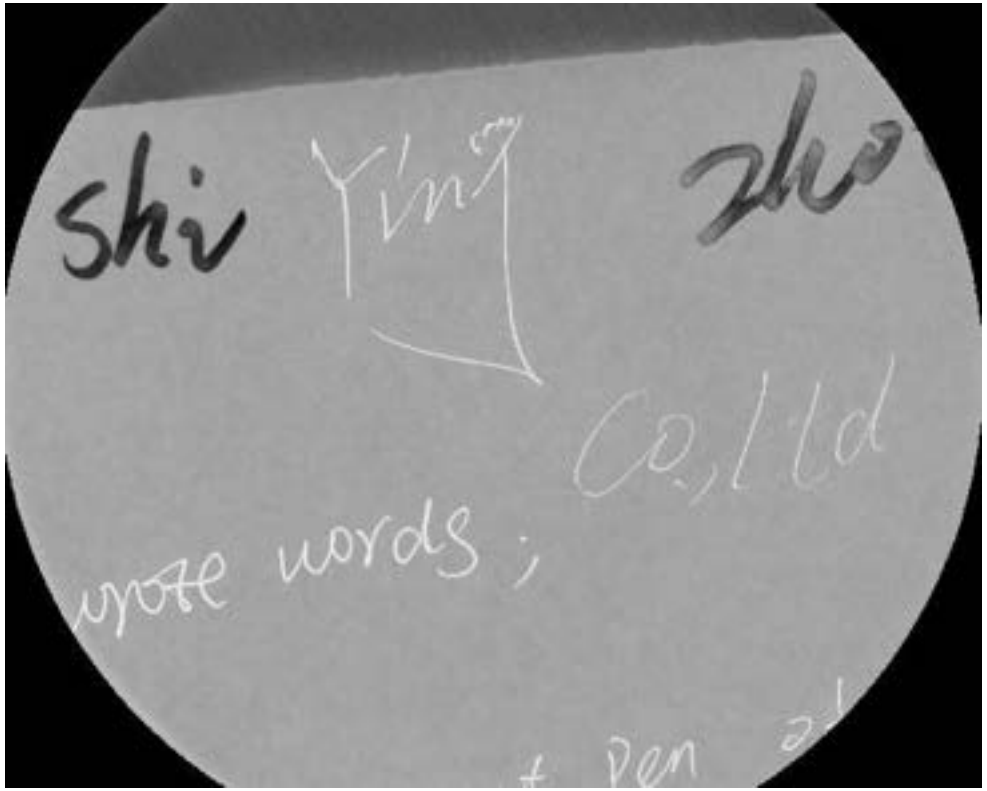
sRGB image



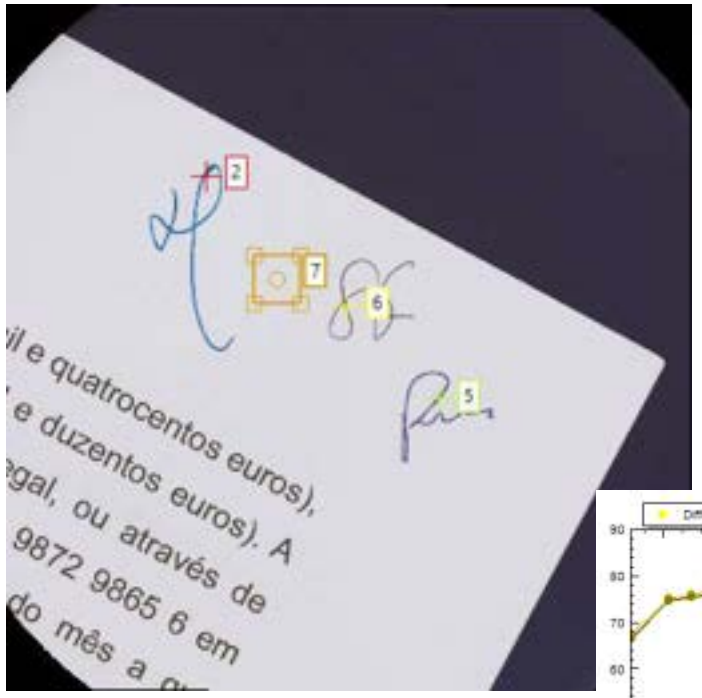
MNF2 score image after blind extraction

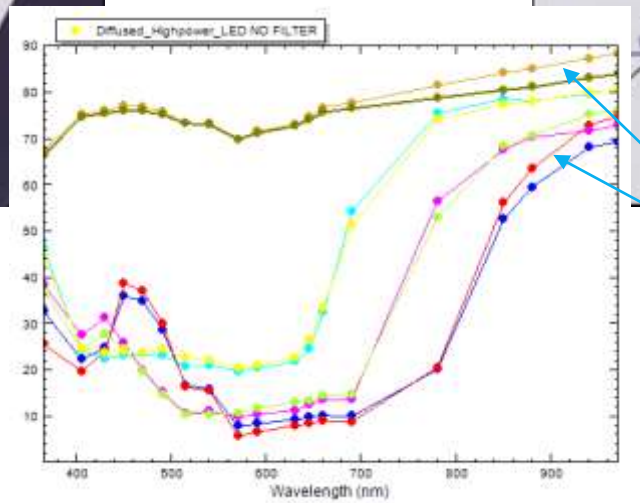
INK TRACES

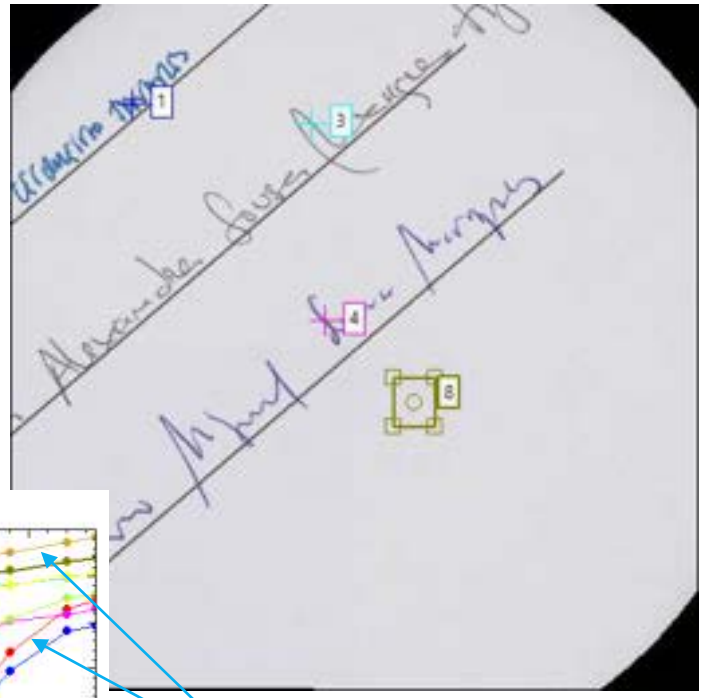




INITIALS PAGE AND SIGNATURE PAGE

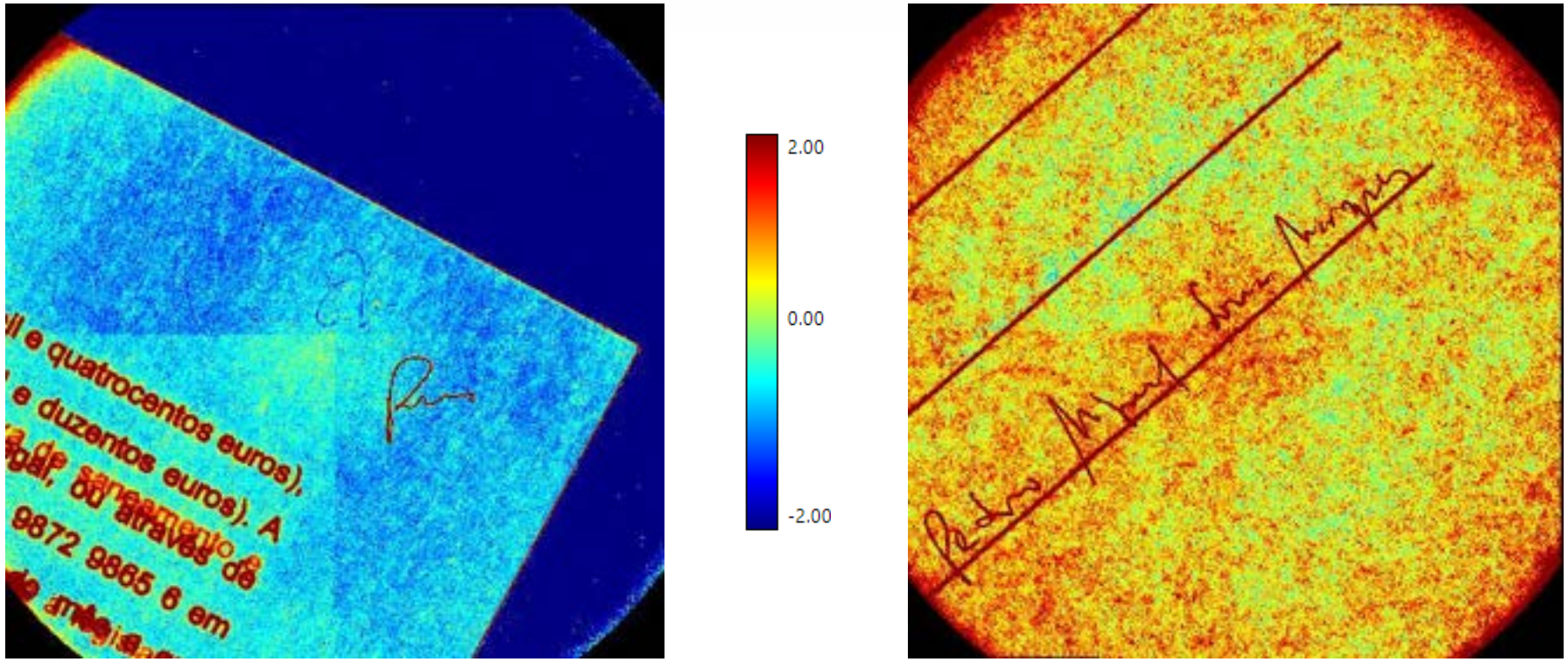






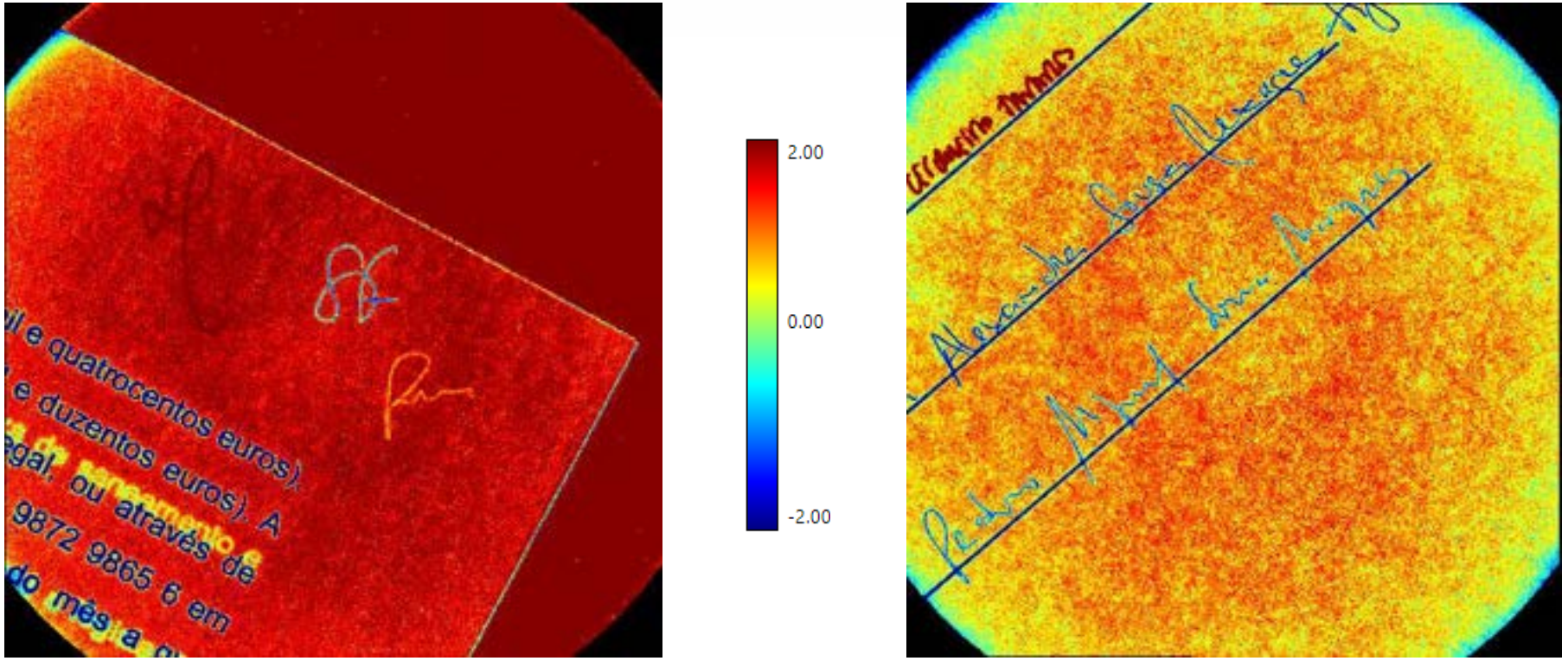
NIR gap caused by paper difference

nCDA separating the black initial and signature



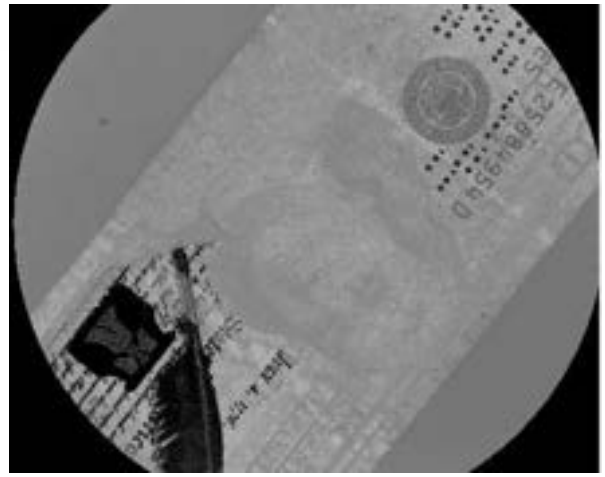
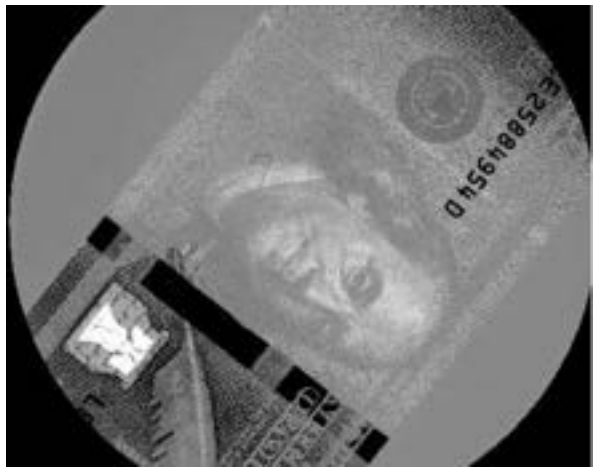
Maximum difference between ink spectra is actually caused by the paper.

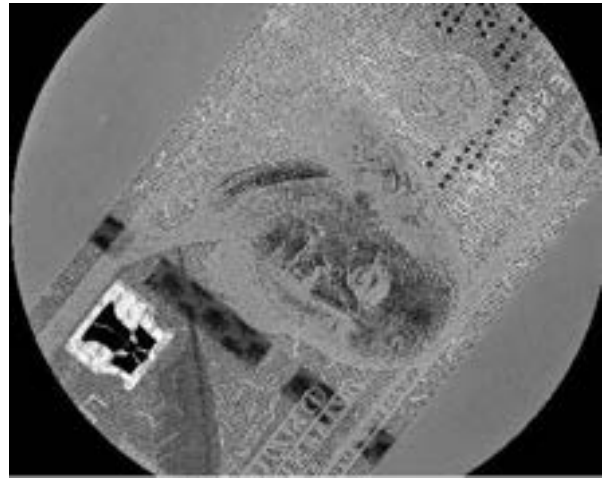
nCDA separating the last blue initial and signature



Maximum difference between blue ink spectra is caused by the paper and ink spectra.

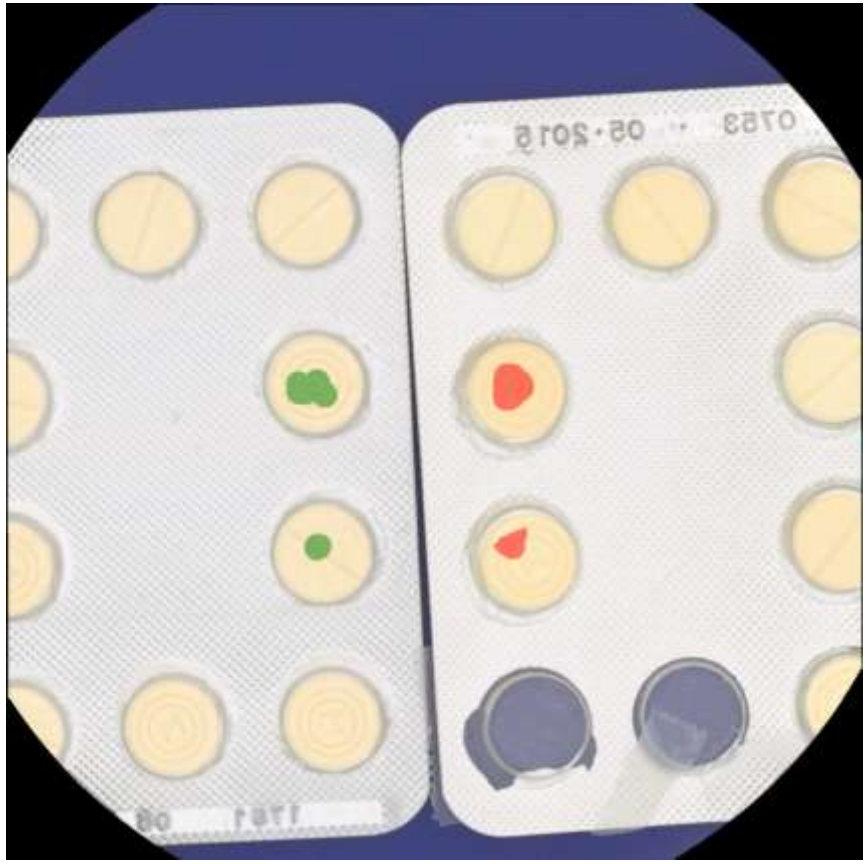
100 DOLLAR NOTE

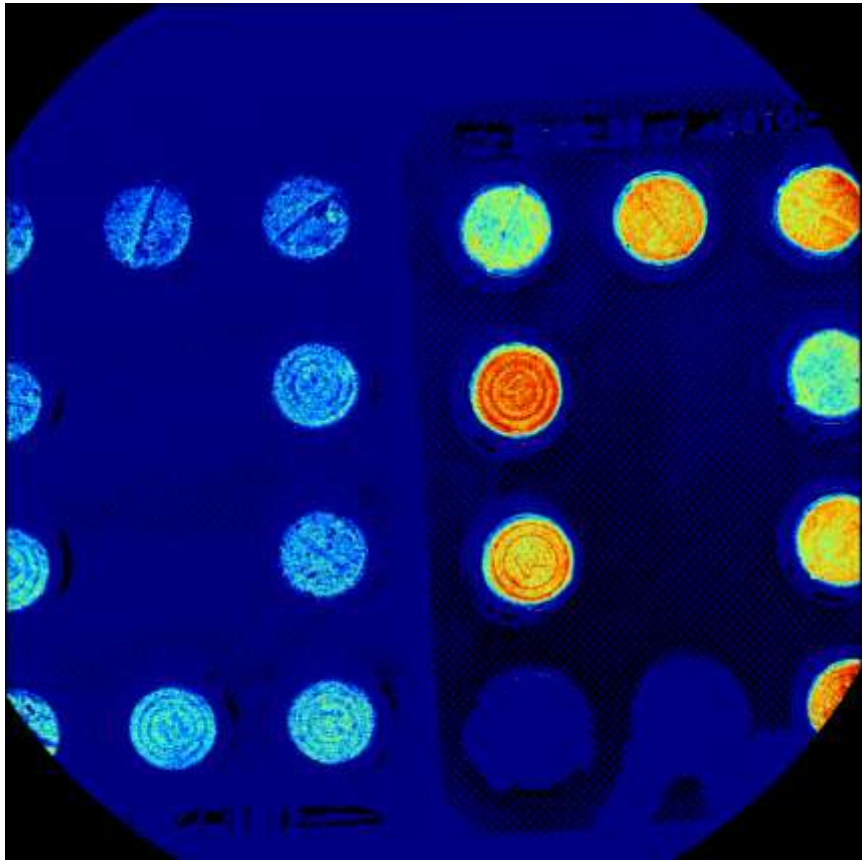


sRGB and 5 MNFs

GENUINE AND COUNTERFEIT TABLETS



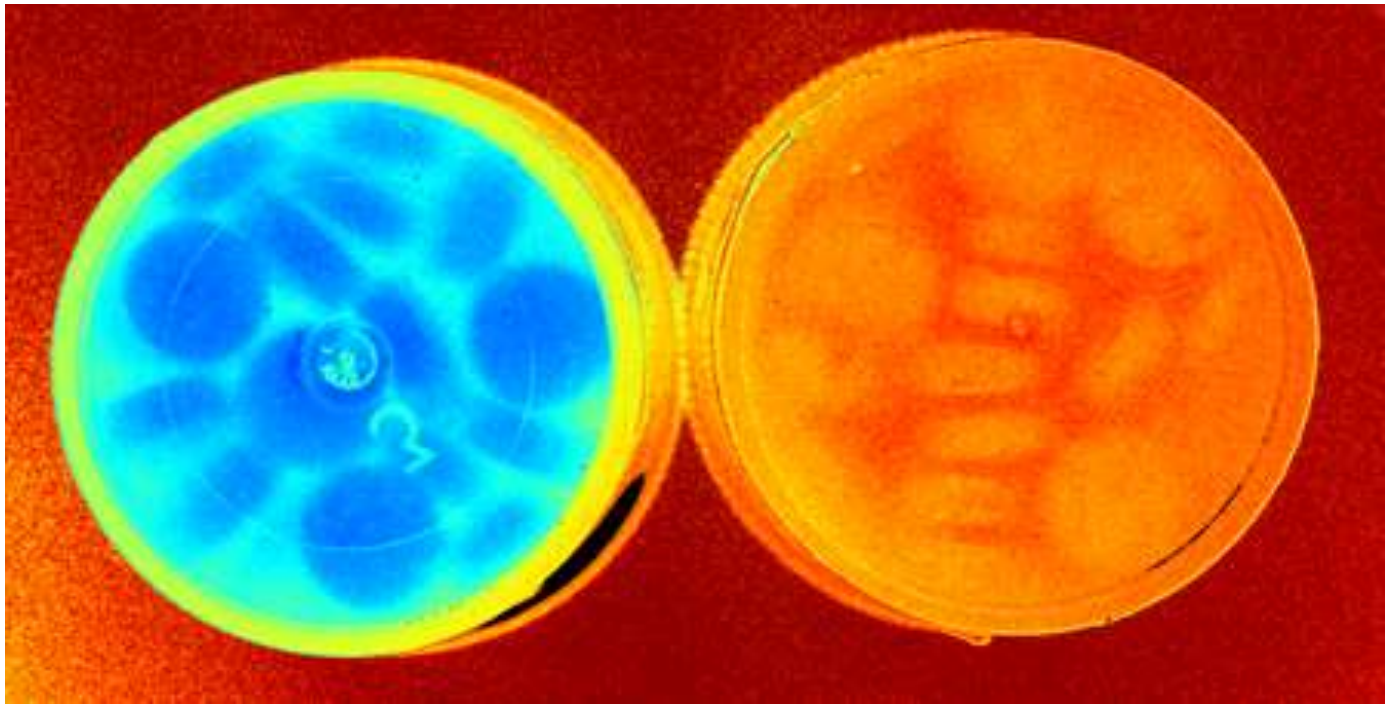
Two tablet in the genuine package (left) has been marked with green layer.



The spectral fingerprint of counterfeit tablets is significantly different from the genuine tablets. Further there seem to be a much larger variation among counterfeit tablets.

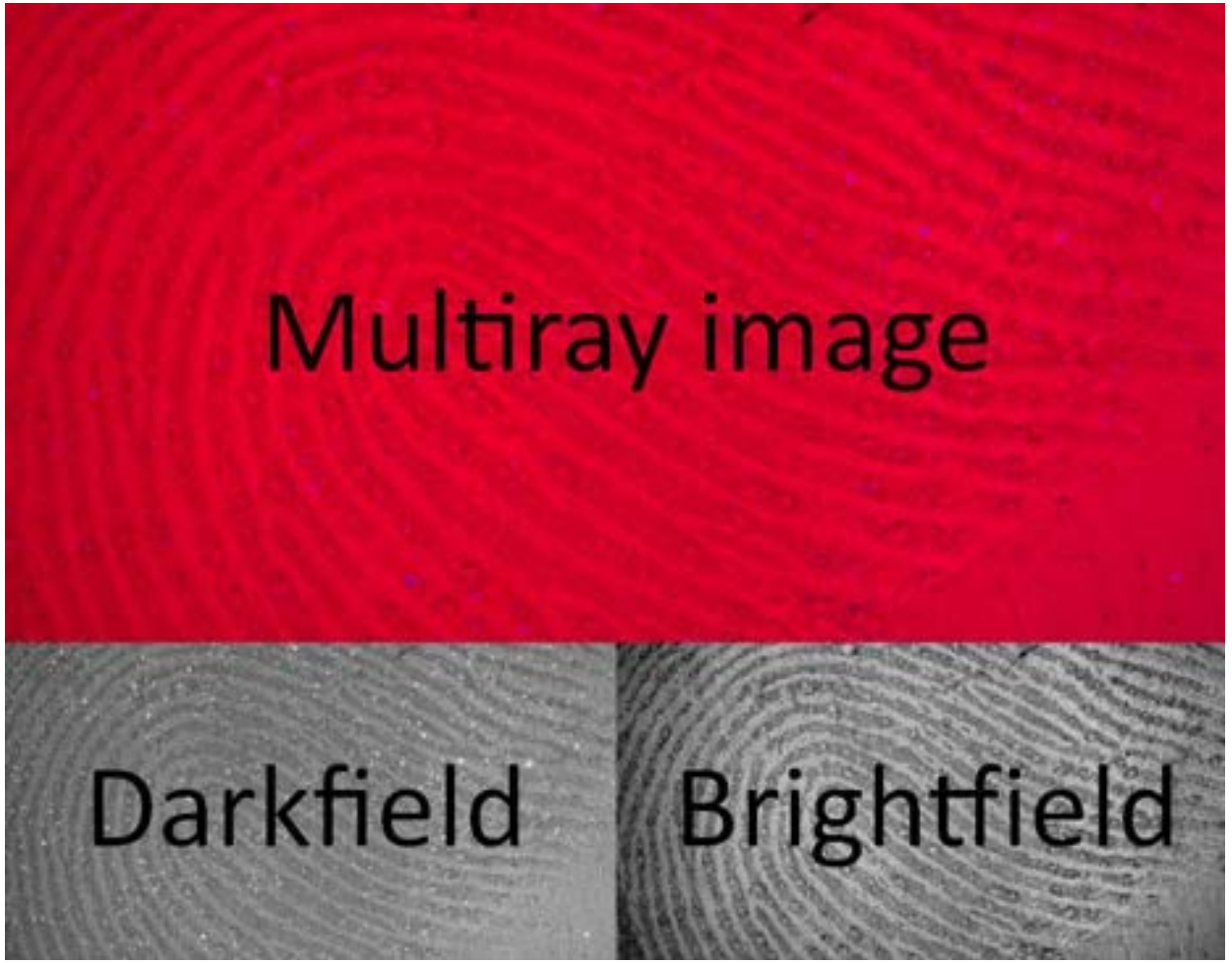
TABLETS IN PLASTIC BOTTLE

Genuine left, Counterfeit right



Counterfeit tablets can be detected through the bottle

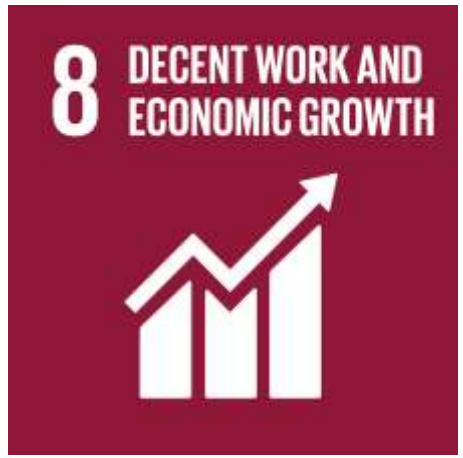
LATENT FINGERPRINT ON MOBILE PHONE



OUR VALUES

Zero Hunger and
Food Security

Good Health and
Well-Being



Decent Work and
Economic Growth

Responsible Consumption
and Production

Life Below Water

Partnership for
the Goals

THANK YOU!

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