

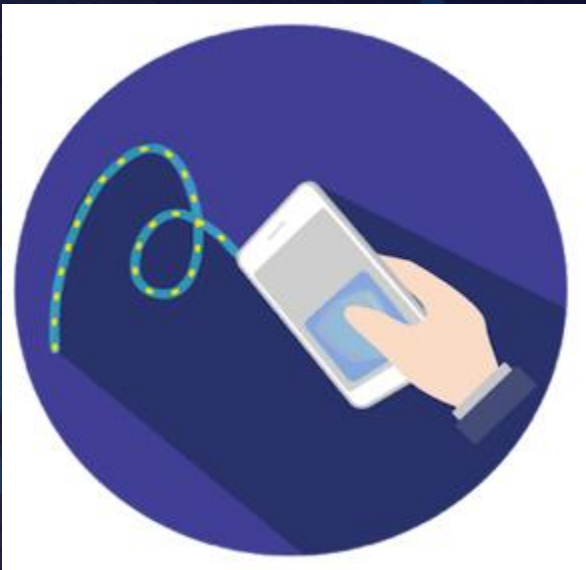
Egis Company Overview

Egis Technology Inc. 神盾股份有限公司

2021



How to Secure Your Device



Major Technologies in Mobile Device



Egis



Established

Founded in 2007
Public Company since 2015



Core Business

Biometric Solution Provider
(Fingerprint + Iris + Facial)



Patents

Over 338 granted
347 patent pending



Employees

400+ Global Employees
(75% RD)

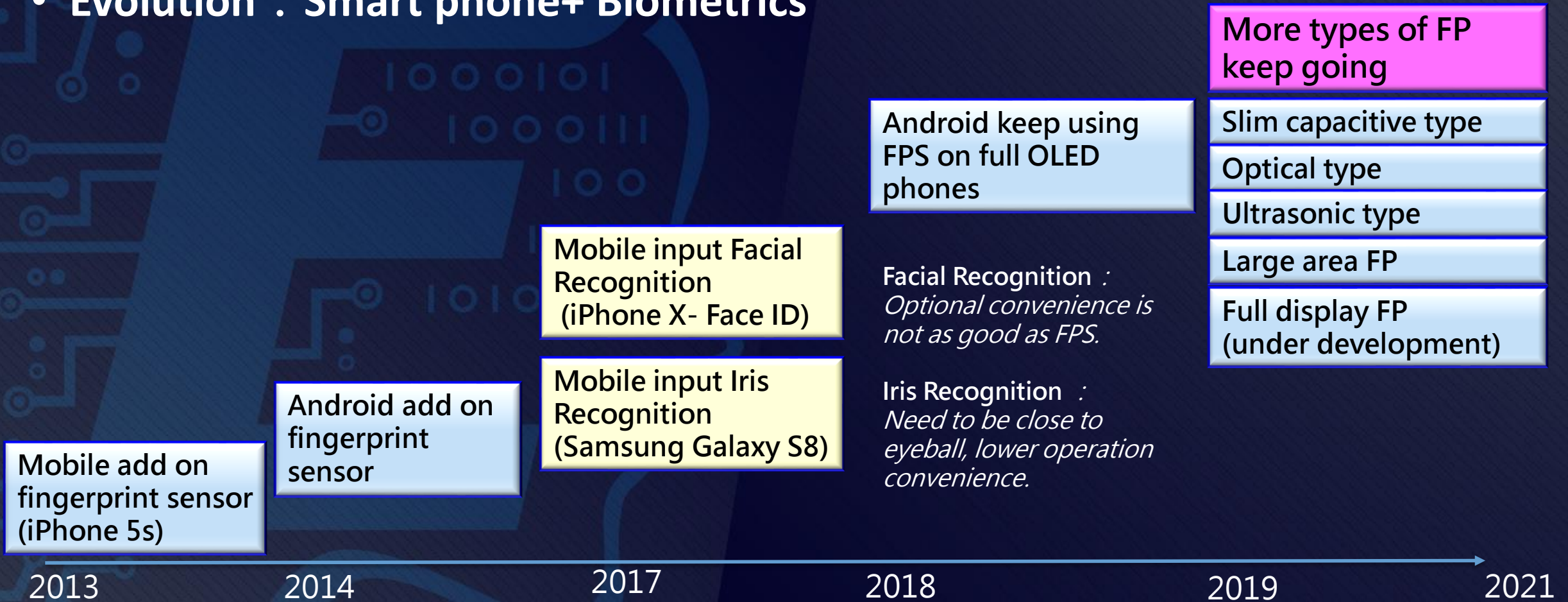


Offices

Taiwan (Taipei & Hsinchu),
Japan, Korea and China

Market Trend – Fingerprint Sensor

• Evolution : Smart phone+ Biometrics



Egis Fingerprint Technologies



Back Capacitive
fingerprint



Side Capacitive
fingerprint

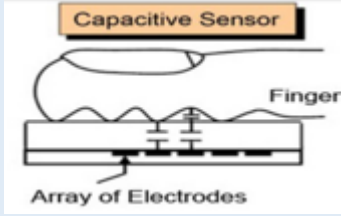

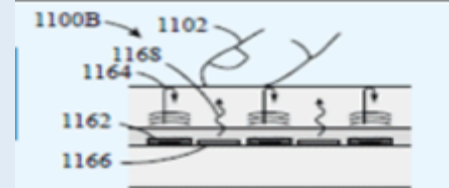


Under-display
Optical fingerprint

*The images are from the phones designed by Samsung, and Sony

Demand and Application Analysis

- Fingerprint Sensor Technology

Identification Technology	Capacitive	Optical	Ultrasonic
Picture			
Principle	Record the distribution of charge, temperature, pressure, etc. through the semiconductor	The peaks and troughs are distinguished by light irradiation, and then stored through the photosensitive element.	The sensor emits ultrasonic waves to the surface of the finger, and the difference in the density of the skin and air on the fingerprint surface is used to construct a 3D image. After the sensor receives the ultrasonic echo message, it will recognize the fingerprint after comparison.
Advantage	Thin and light, easy to use on mobile devices	Less interference from ambient light Low cost Complete supply chain . Can be used to identify under the screen.	Strong penetration Identifies even if the fingers are wet or dirty Can be used to identify under the screen.
Disadvantage	Easy to be affected by external factors such as sweat and dirt. Low anti-static ability. Not easy to identify under the screen.	The light source requirements are high, currently mobile phones are only used on OLED	<ul style="list-style-type: none"> High Cost Technical complexity Few supply chain vendors High fit requirements

Automotive



(Source: Genesis)



- Driver Personal Setting
(Membered different setting of
seat, music, steering wheel, air
conditioner.)



(Source: Digitaltrends)

- Automotive Door lock

國際身分識別標準組織 FIDO Alliance 董事會員



A person in a dark suit and blue tie is shown from the chest up. Their right hand is extended, and a glowing blue fingerprint overlay is visible on their index finger. The background is a soft, out-of-focus grey.

AI+ 新銳選拔賽 神盾競賽項目

May 13, 2021



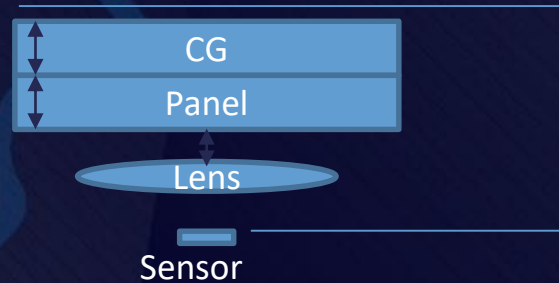
神盾競賽項目

- 屏下指紋成像系統簡介
- AI輔助判別屏下摩爾紋分類技術
- AI輔助判別屏下真假指紋防偽技術



手機屏下指紋應用示意圖

Focus Plan



手機屏下指紋成像系統剖面圖



手機屏下指紋成像範例

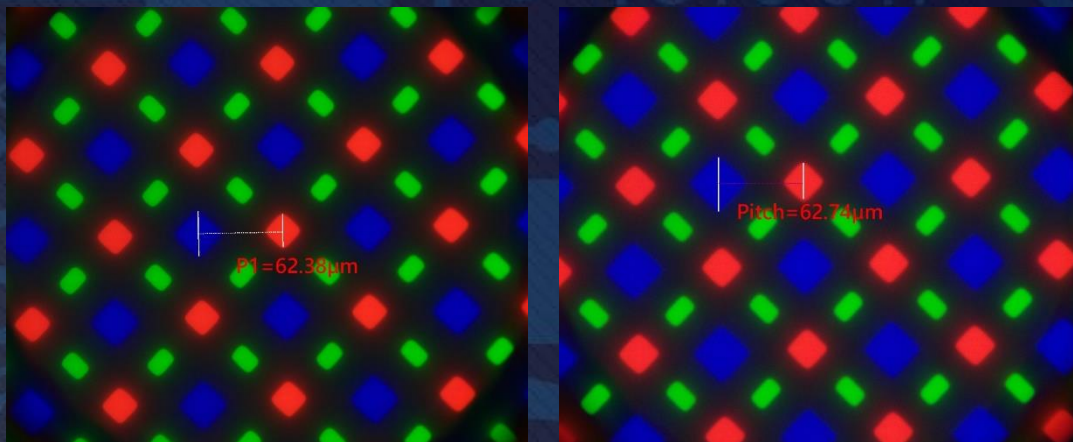
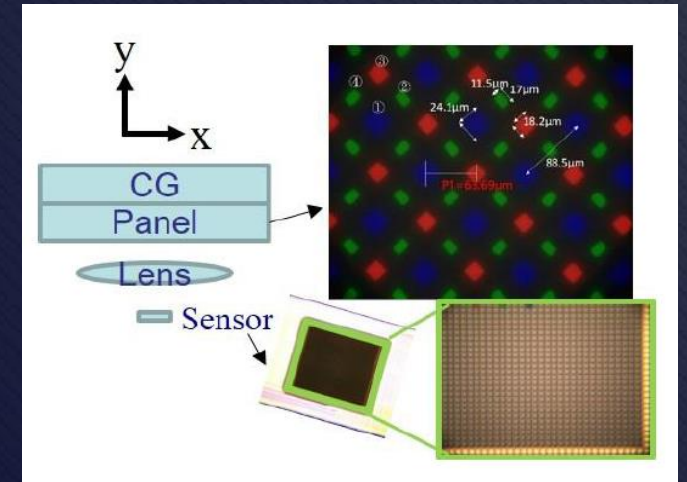
*The images are from the phones designed by Oppo



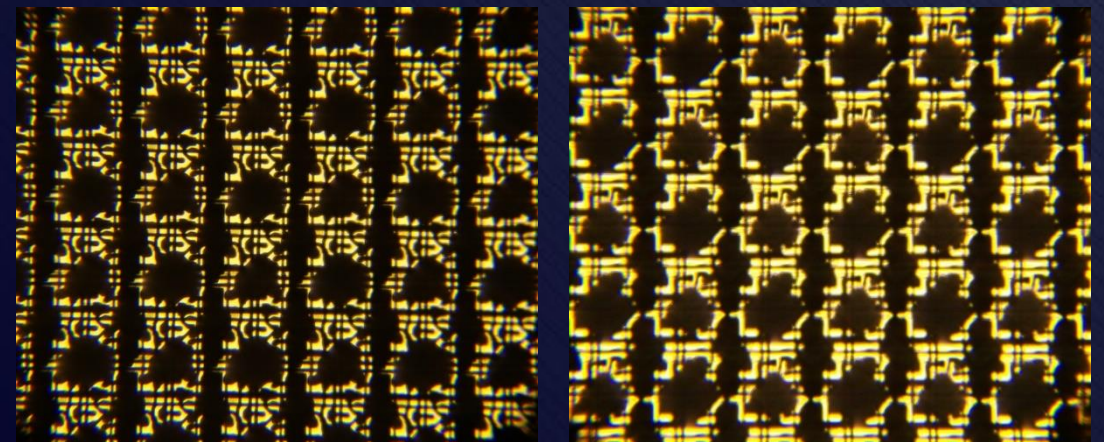
AI輔助判別屏下摩爾紋分類技術

AI輔助判別屏下摩爾紋分類技術

- 摩爾紋形成主因
 - Panel light source/cell 空間頻率
 - sensor pixel 空間頻率
 - 兩者產生新頻帶上的干擾圖案



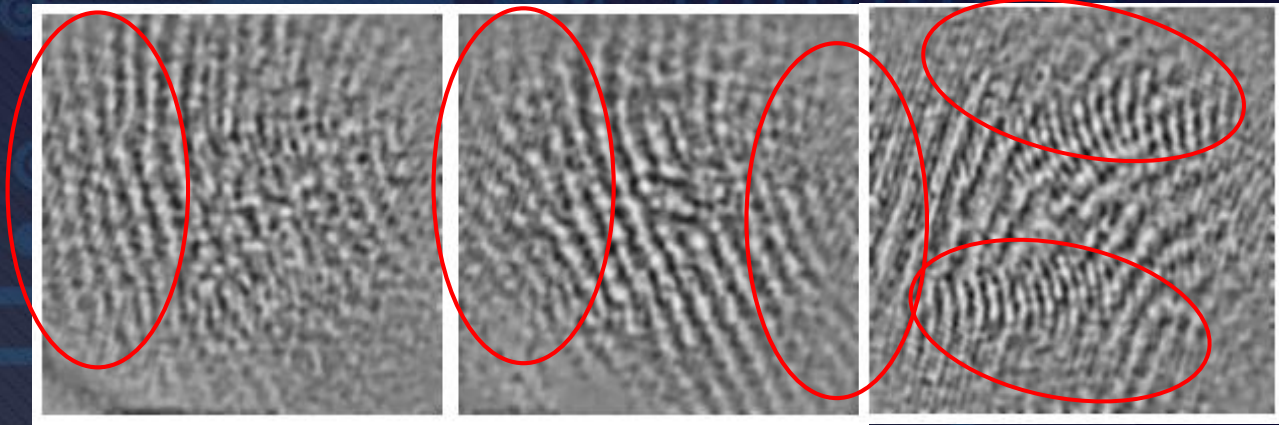
Panel Light Source Cell Image



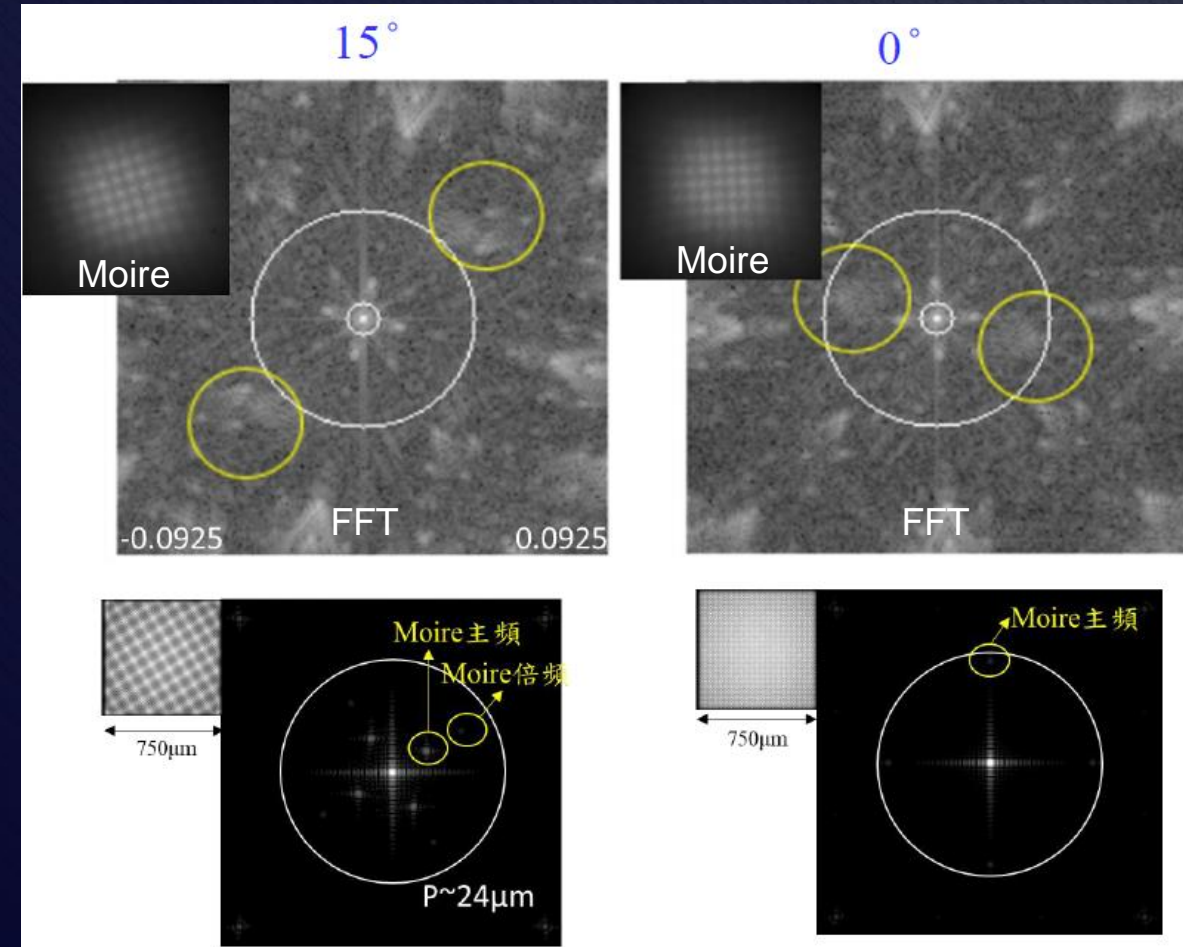
Panel Cell Image

摩爾紋範例圖示

- 屏下摩爾紋
 - 干擾指紋成像品質
 - 易造成指紋判別錯誤

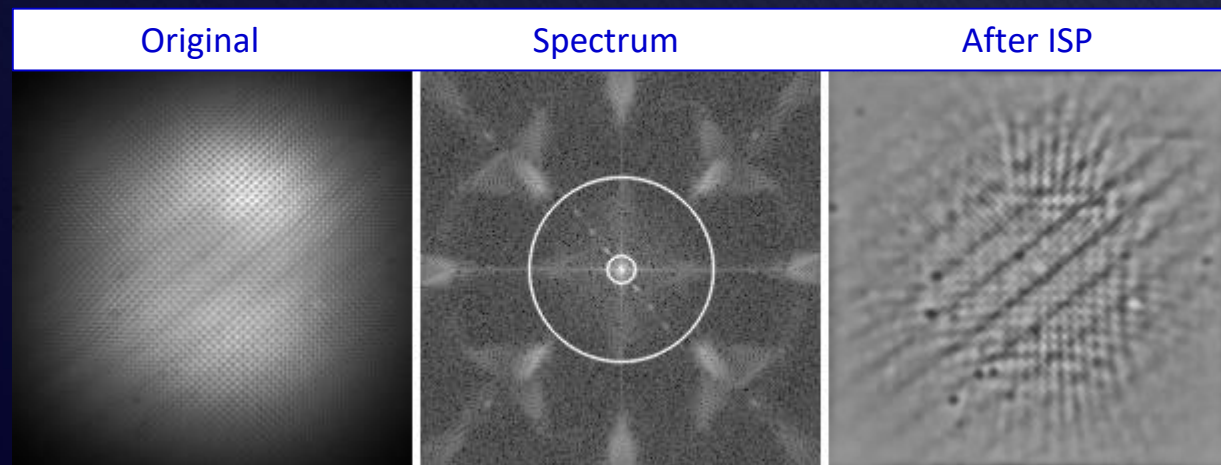
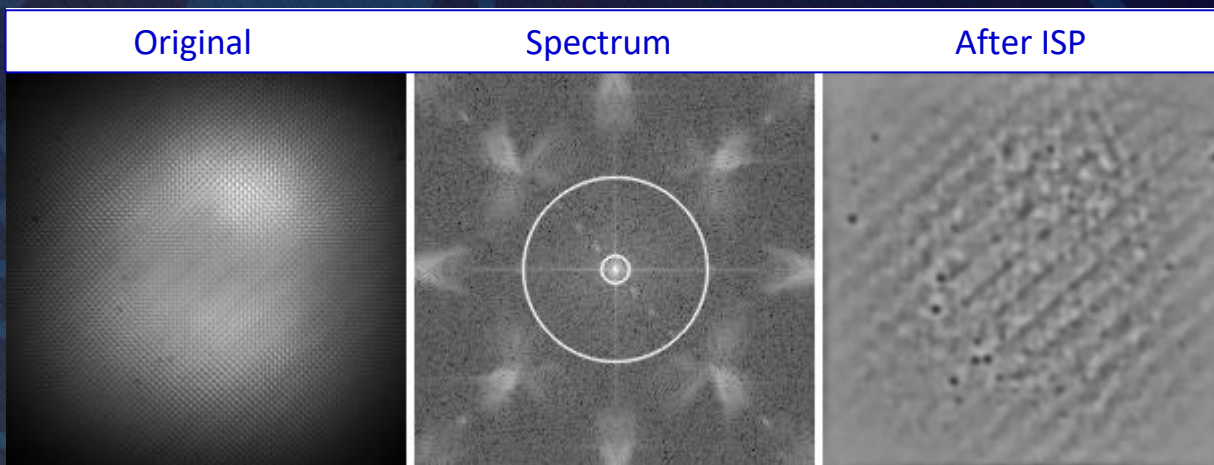
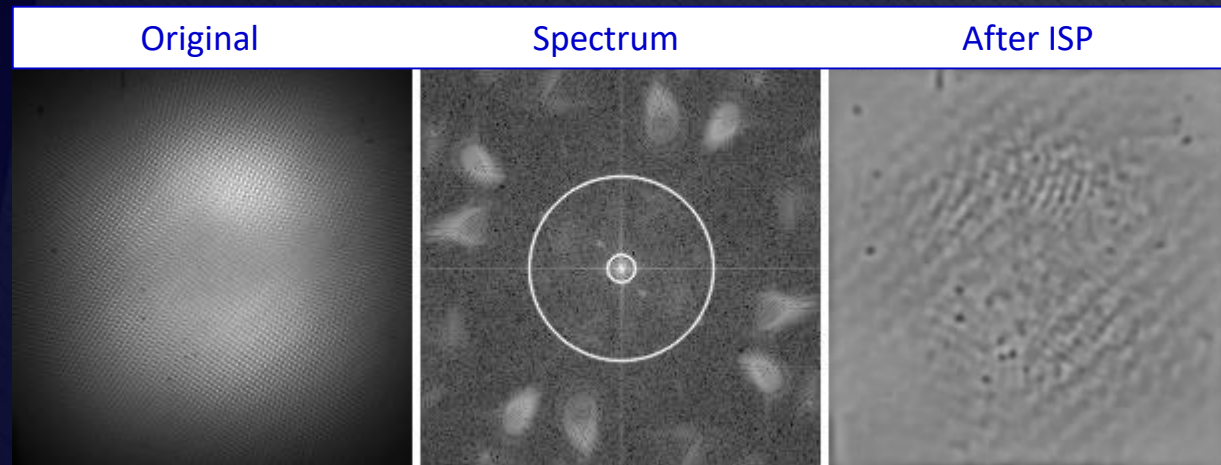
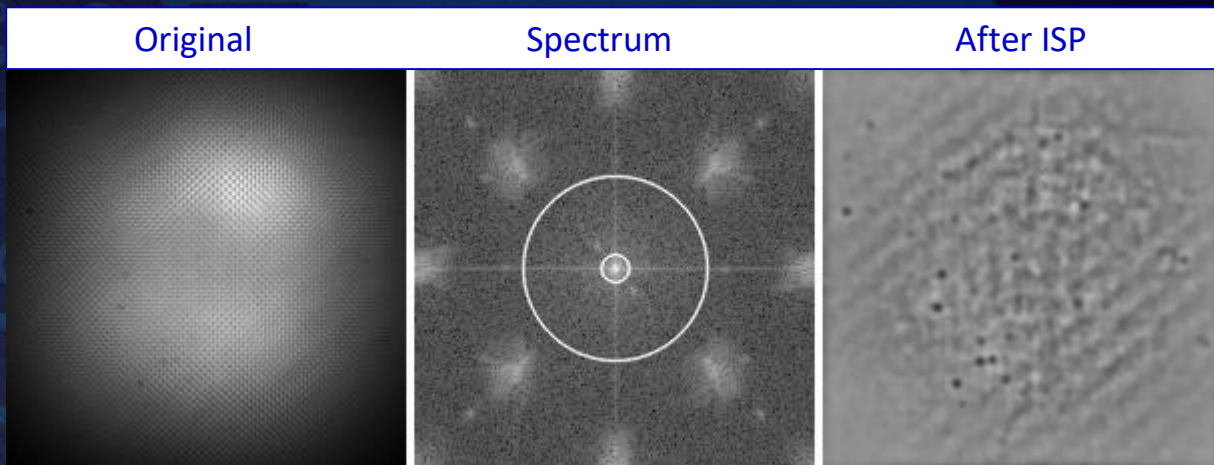


指紋信號受摩爾紋干擾圖



摩爾紋光學模擬及分析圖

屏下摩爾紋圖



摩爾紋範例圖示

- 角度與重量形成不同程度的摩爾紋
 - 以人眼及ISP算法判別嚴重程度
 - 發展AI輔助判別屏下摩爾紋分類技術
 - 增加精準度
 - 減少人力需求

	P0D	P5D	P10D	P15D	P20D	P25D	P30D	P35D	P40D	P45D
0g	5	13	9	13	9	7	7	5	5	5
100g	13	13	13	6	9	7	7	7	7	5
200g	13	13	13	6	10	7	7	7	12	5
300g	13	13	7	6	12	7	7	7	10	5
400g	13	13	7	6	11	7	7	8	5	10
500g	13	6	7	6	10	7	7	8	5	10
600g	7	5	6	6	10	7	7	8	5	10

AI輔助判別屏下摩爾紋分類技術











- Train an AI model to help classification.
 - Can use Pytorch/Caffe as the training framework
 - Model size must be less than 10MB.
 - Accuracy must >99.00%
 - Run time must be less than 2s per frame on 2GHz intel or AMD CPU.
 - Must provide C library and the evaluation tool.
 - Combination with ISP is highly recommended
 - The evaluation tool can run on PC(Windows) & Linux server.



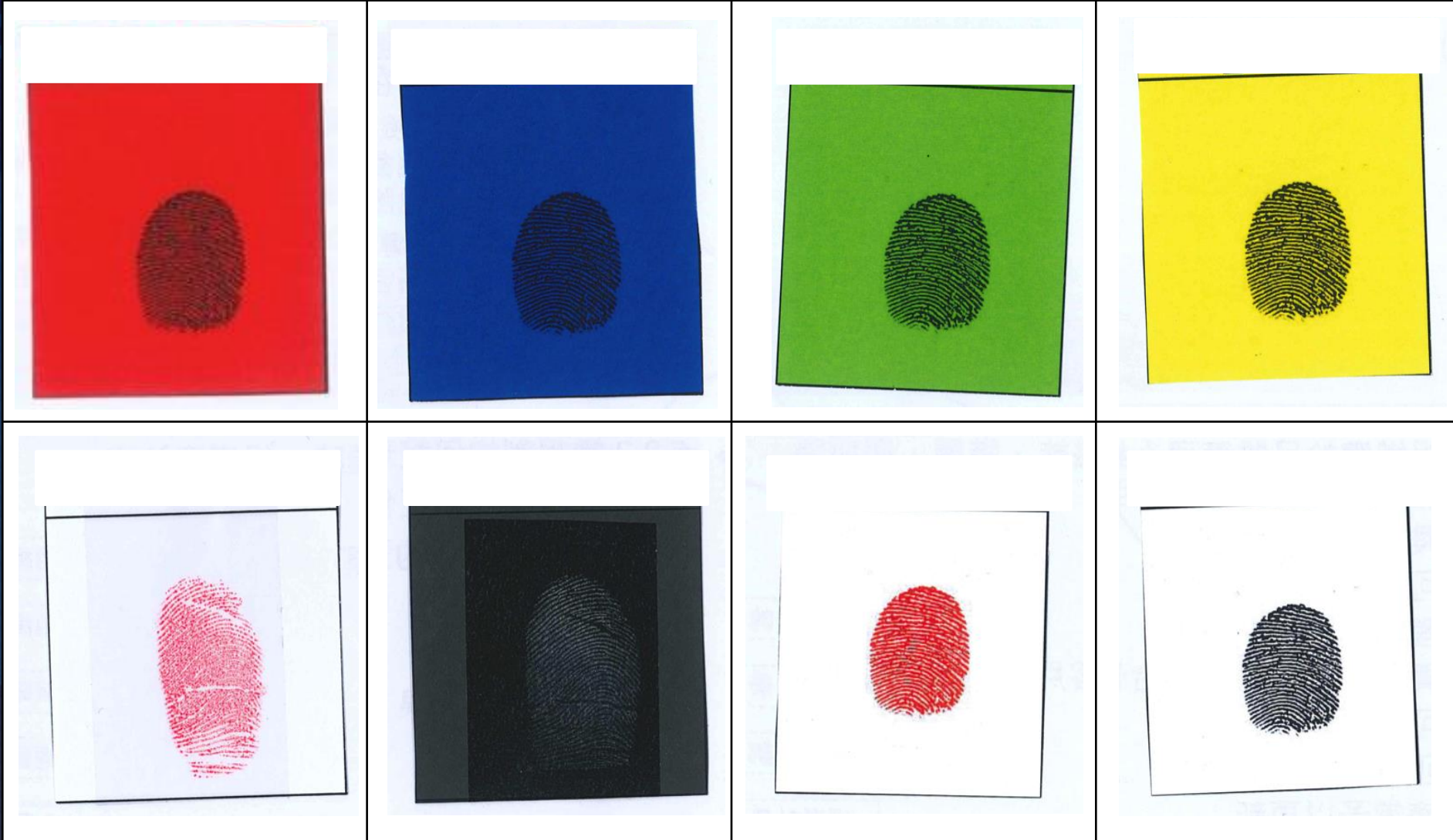
AI輔助判別屏下真假指紋防偽技術

AI輔助判別屏下真假指紋防偽技術

- 指紋假材料介紹

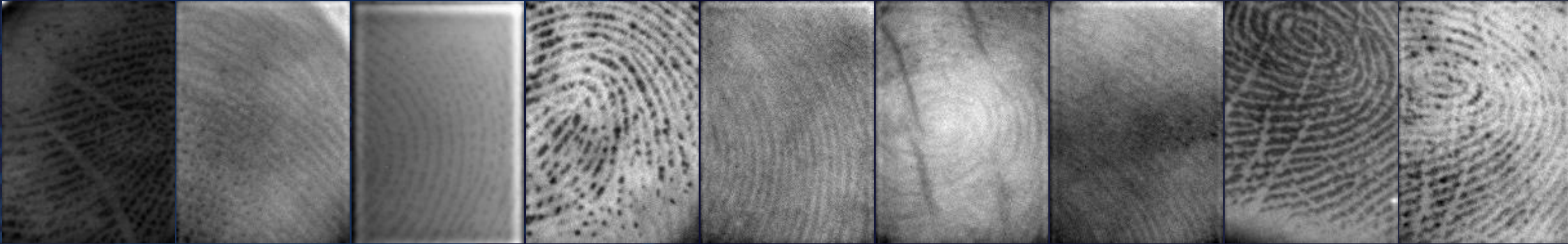
	木膠	矽膠		乳膠漆	
PCB Mold					
Transparency Mold					

2D 假手指 - 色紙/印泥



真假指紋圖像

True Fingers

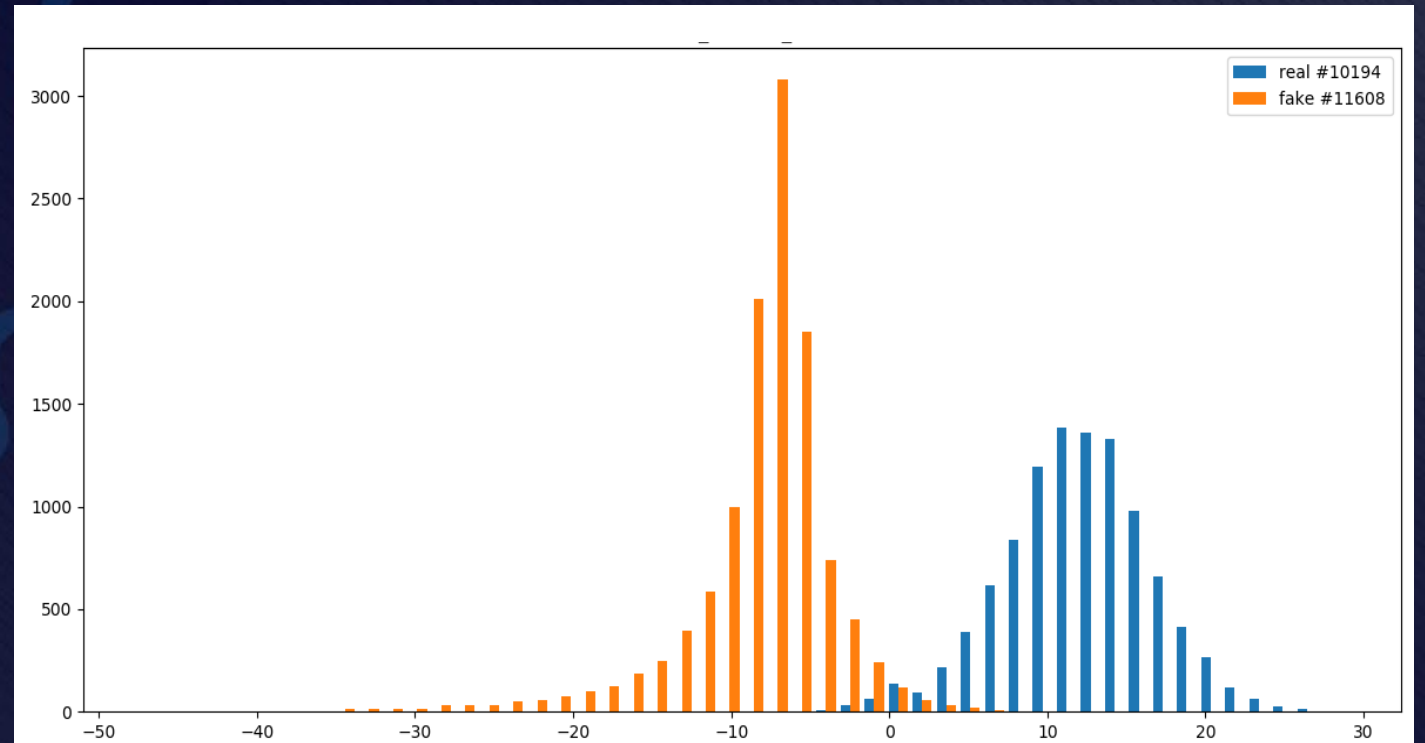


Fake Materials



AI輔助判別屏下真假指紋防偽技術

- 指紋防偽標準及技術提昇
 - 2D & 2.5D 假指紋攻擊
 - Google Android 新的指紋防偽標準
- 真指紋種類
 - Normal/Washed
 - Chamber/Sunlight
- 假指紋種類
 - 2D/2.5D
- 指紋圖的種類繁多
 - ISP algorithm 辨識率不足
 - 以AI輔助判別真假指紋



AI輔助判別屏下真假指紋防偽技術

- Train an AI model for classification.
 - Can use Pytorch/Caffe as the training framework
 - Model size must be less than 10MB.
 - Accuracy
 - SAR < 7% (假手誤放)
 - FRR < 0.5% (真手誤擋)
 - Run time must be less than 1s per frame on 2GHz intel or AMD CPU.
 - Must provide C library and the evaluation tool.
 - ISP algorithm is highly recommended
 - The evaluation tool can run on PC(Windows) & Linux server.