

A blue triangle graphic is located on the left side of the slide, pointing towards the right. It has a gradient from dark blue to light blue.

X-Ray Cutting 精度量測

ML3CM0

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2021/4/9

Outline

1. 專案介紹

1. 背景目的
2. 定義問題
3. 製程流程說明

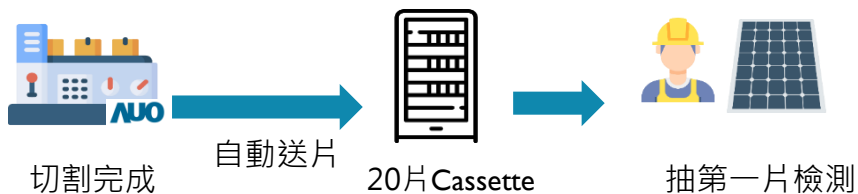
2. 專案執行過程

1. 資料蒐集
2. 資料前處理

X-Ray Cutting 精度量測



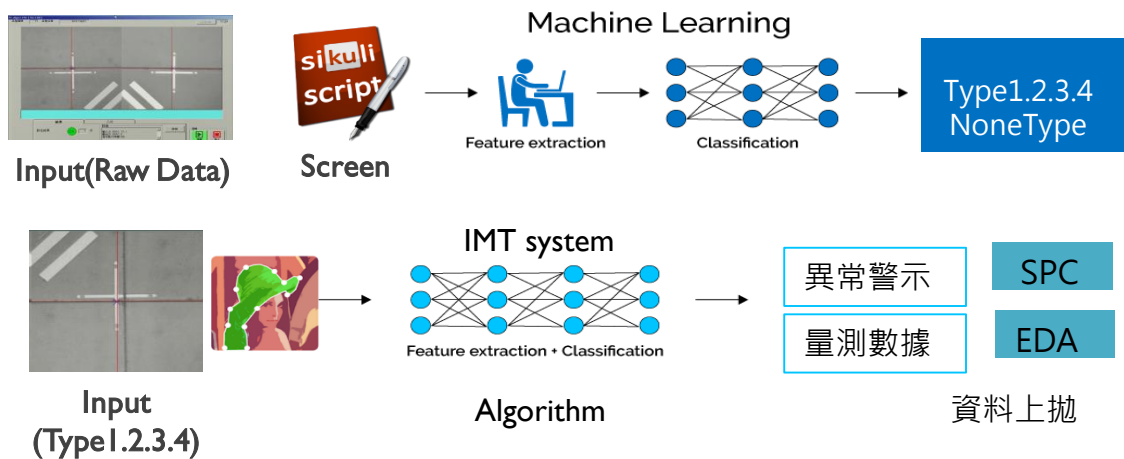
定義問題



原作業:



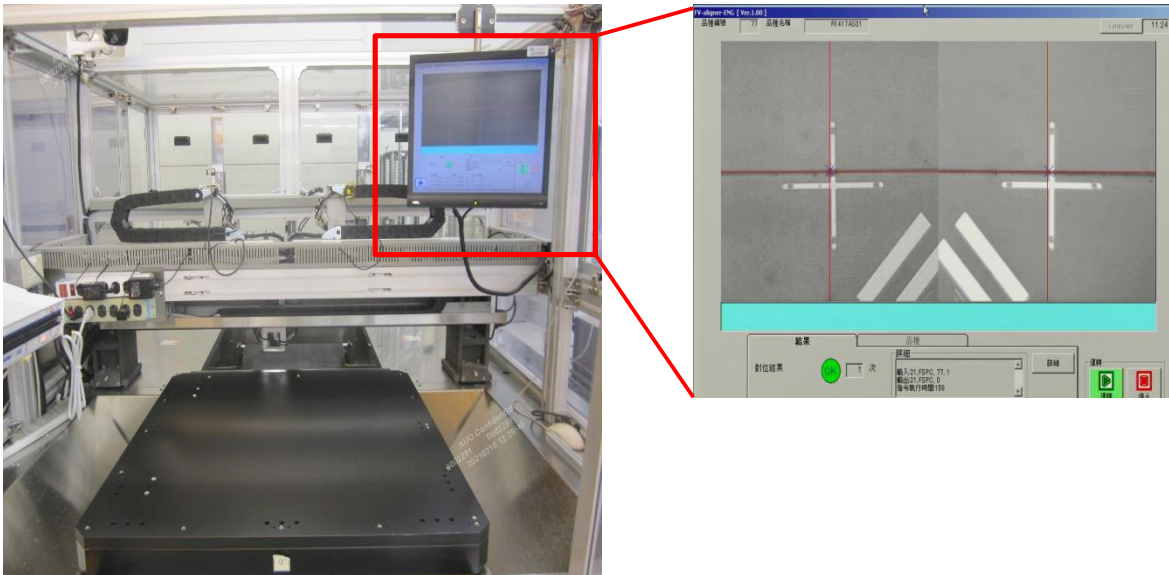
改善後:



X-Ray Cutting 精度量測

分析

- 流程痛點：抽樣檢測，且人工量測且紙本填寫耗時，可能有量測、填寫錯誤
- 改善目標：透過影像辨識的方式自動測量精度，可片片檢測異常
- 資料來源：收集X-ray Cutting影像，擷取攝影機訊號取出切割Data



X-Ray Cutting 精度量測

分析

□ 改善人工：(移動站點+量測24個點+填表+Keyin資料上拋) x 抽檢次數 x 生產頻率

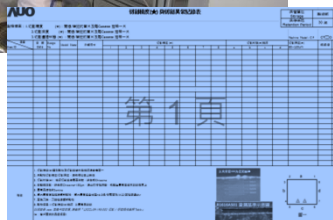
移動站點



抽檢量測24個點+填表



抽檢次數
(3/8共5次)
(3/9共7次)



Keyin資料上拋

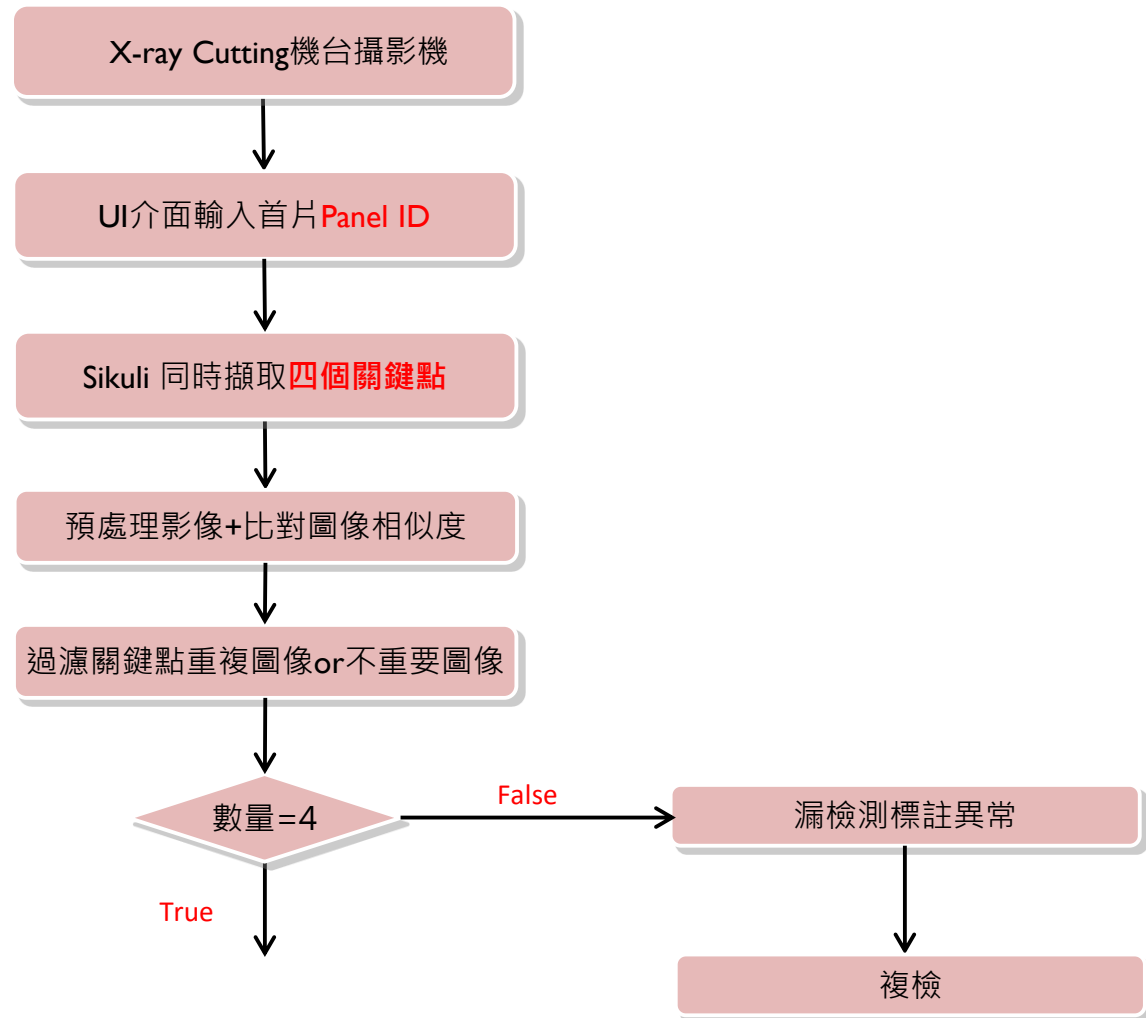


人工填表、人工keyin

X-Ray Cutting 精度量測改善流程



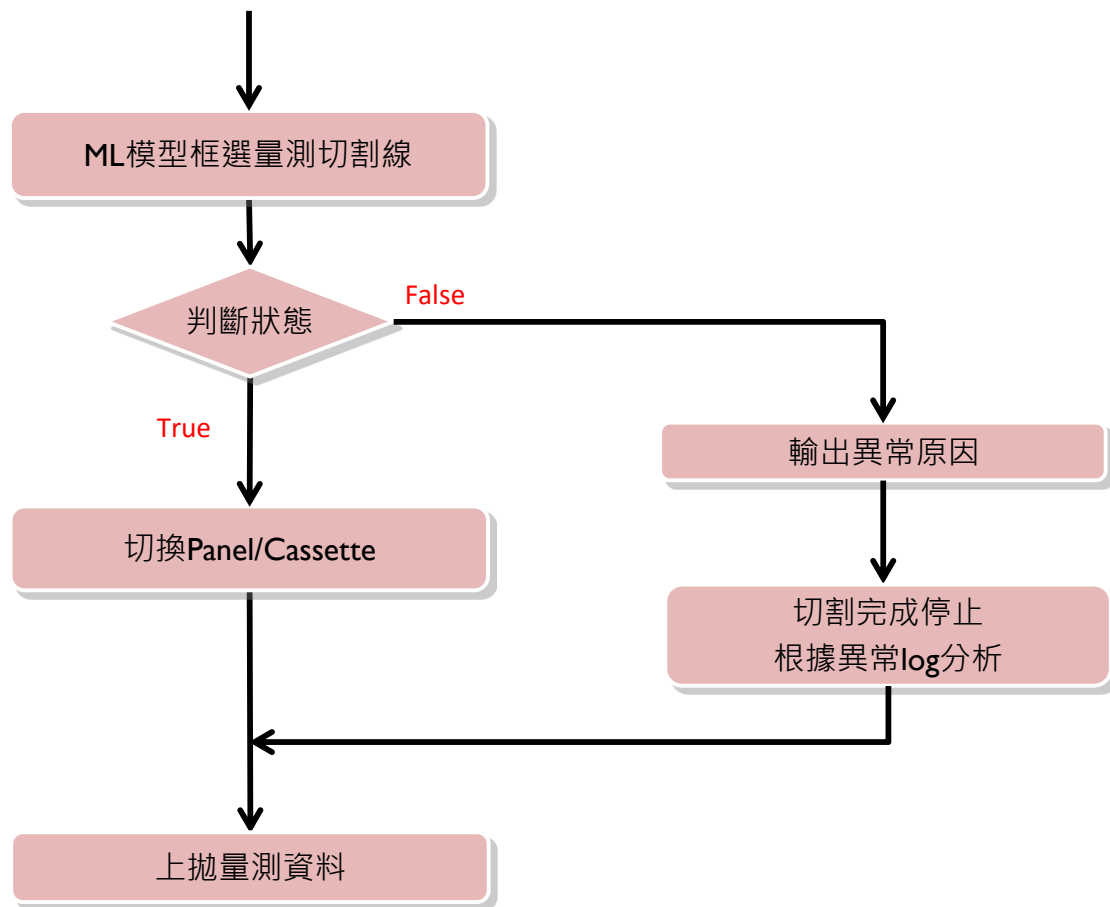
定義問題



X-Ray Cutting 精度量測改善流程



定義問題

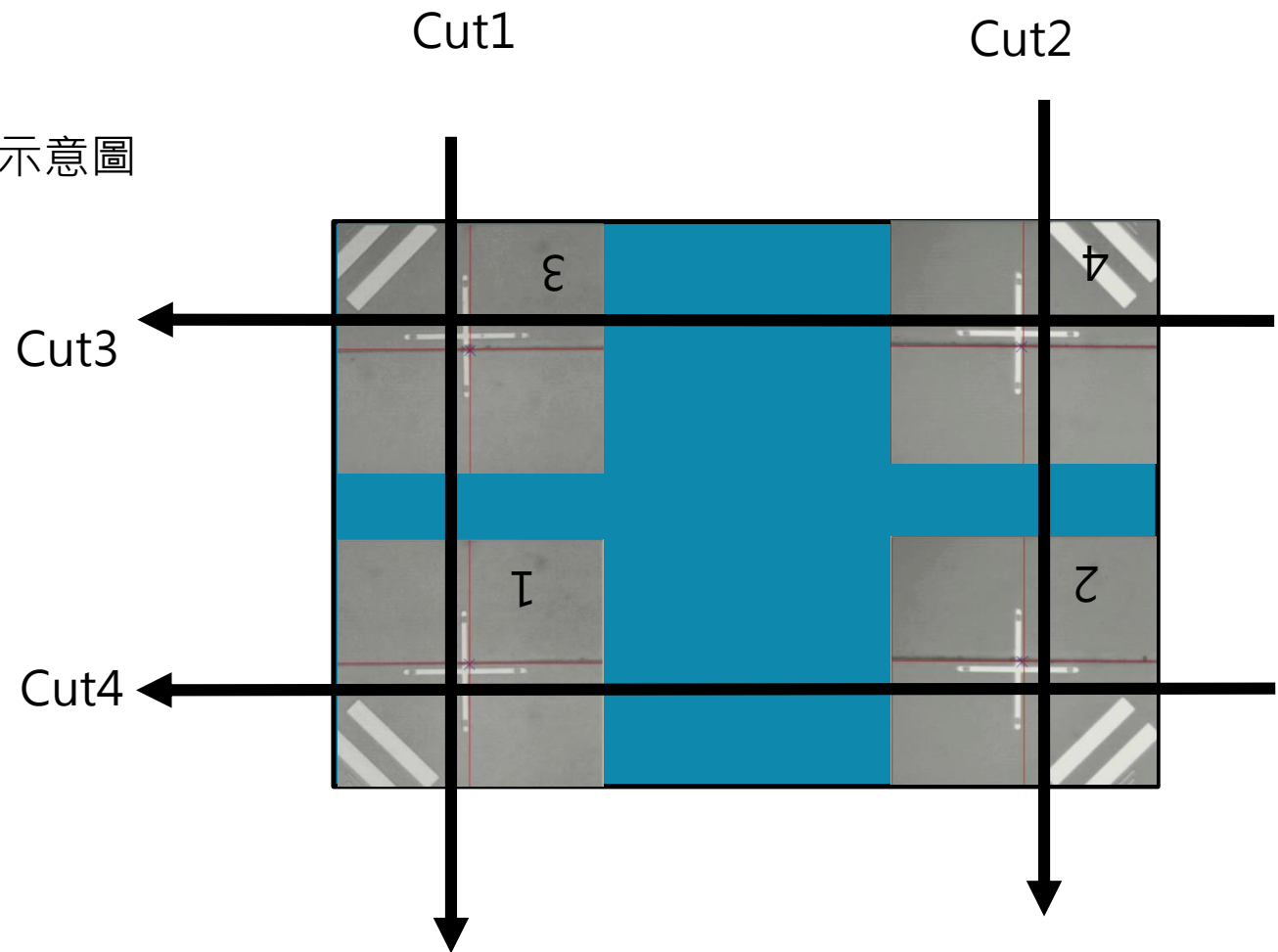


X-Ray Cutting 精度量測



定義問題

切割順序示意圖

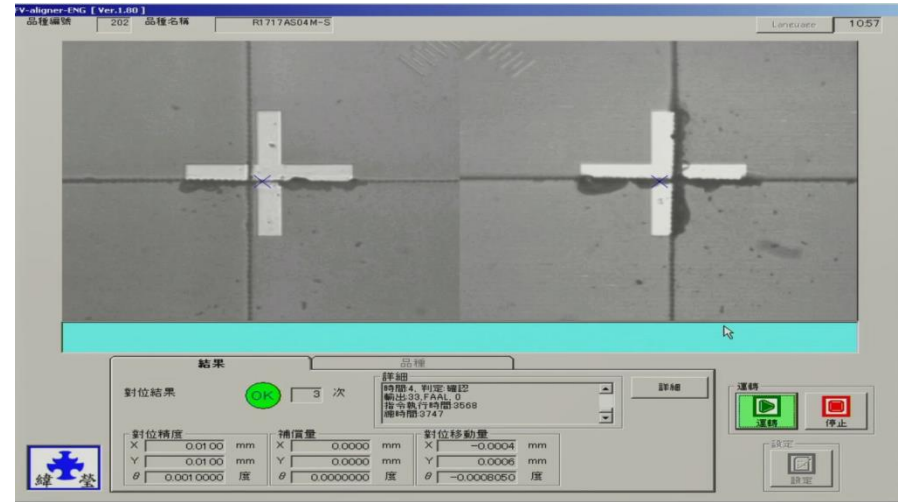
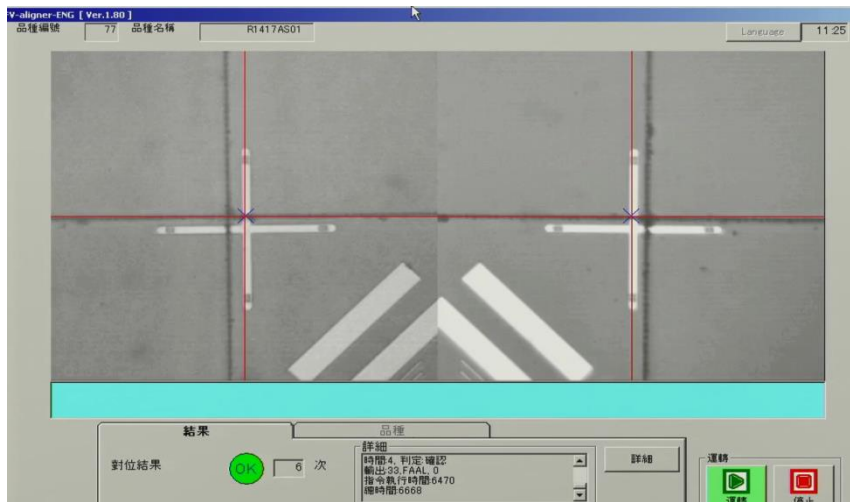


X-Ray Cutting 精度量測



定義問題

類別定義(Type)



X-Ray Cutting 精度量測

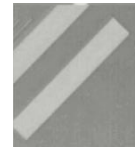


定義問題

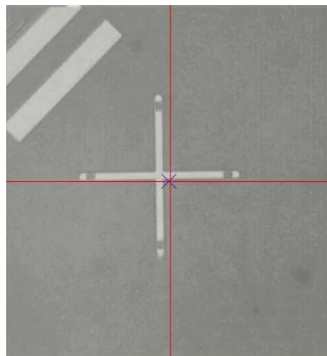


類別定義(SubType)

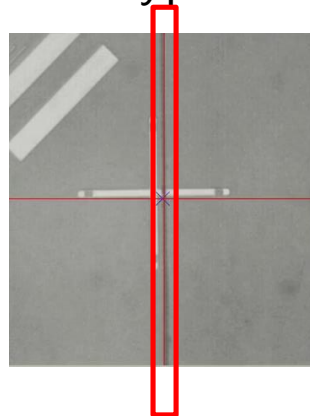
e.g.Type1



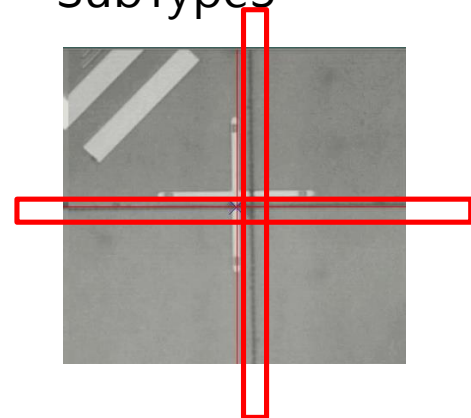
SubType1



SubType2



SubType3

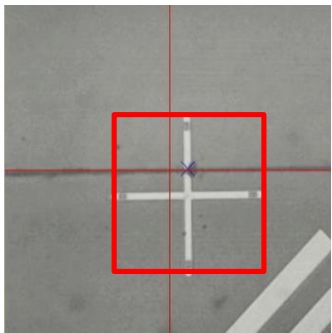


資料前處理(影像處理)



資料蒐集

特徵顯現(去除紅線取特徵)



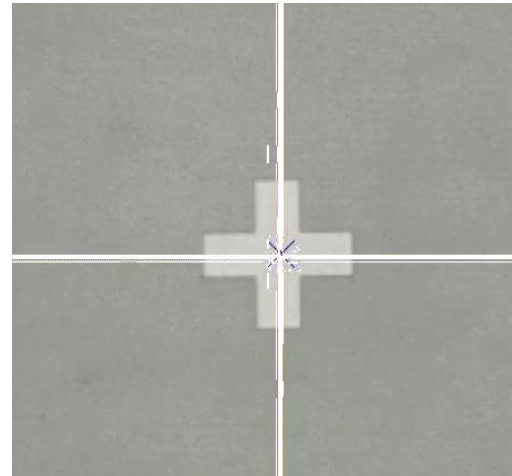
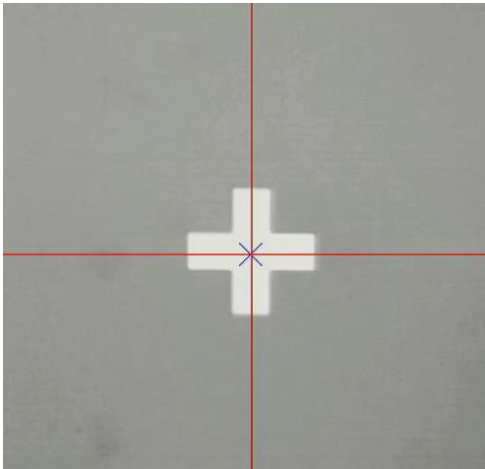
資料前處理(影像處理)



資料蒐集



特徵顯現(去除紅線取特徵)

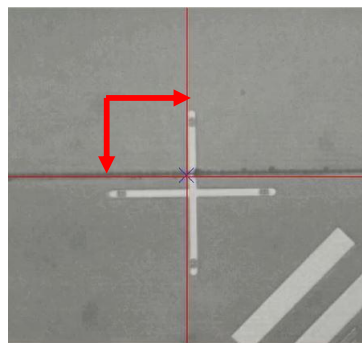


How to modify 紅線影響



資料蒐集

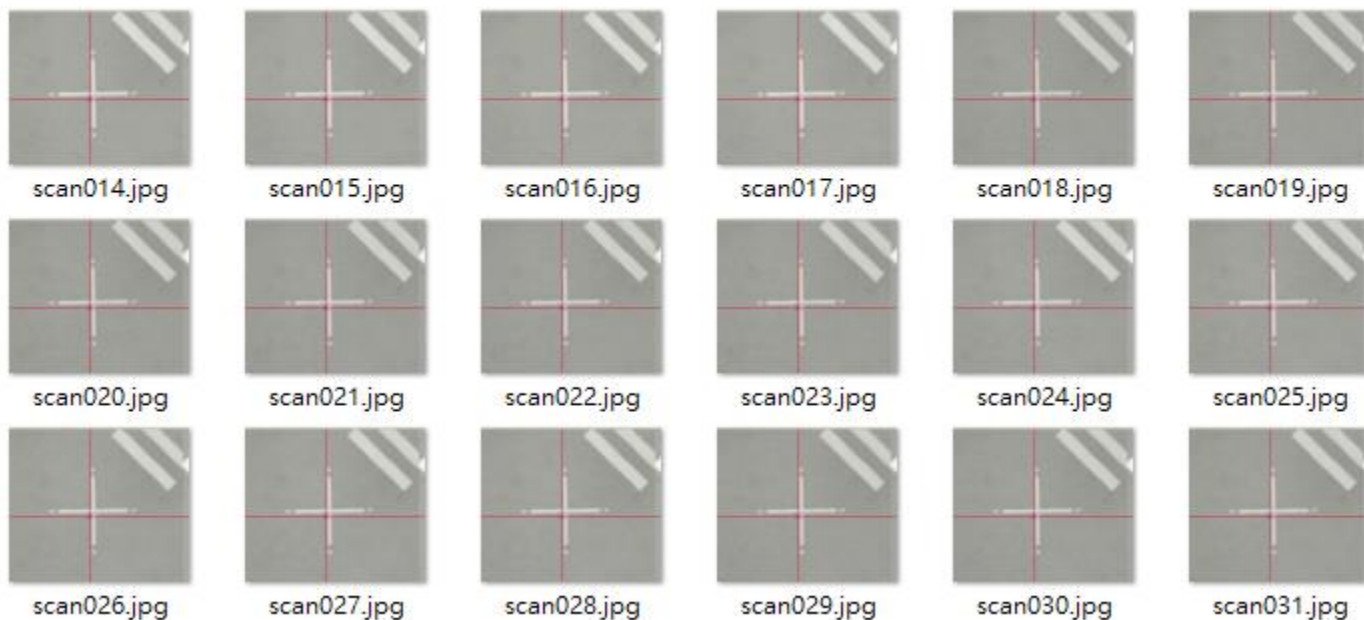
特徵顯現(去除紅線取特徵)



資料前處理(影像比對)

資料蒐集

重複截圖問題

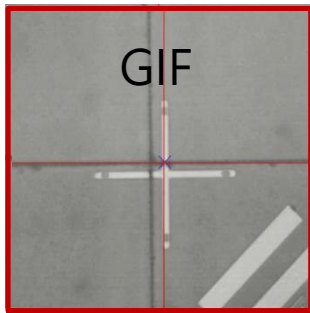


How to modify 影像重複

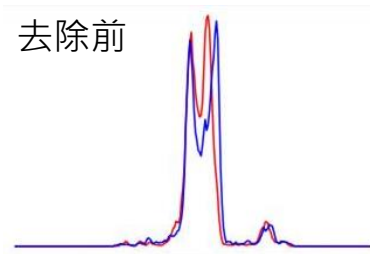


資料蒐集

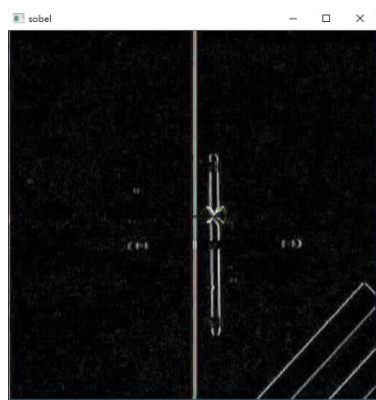
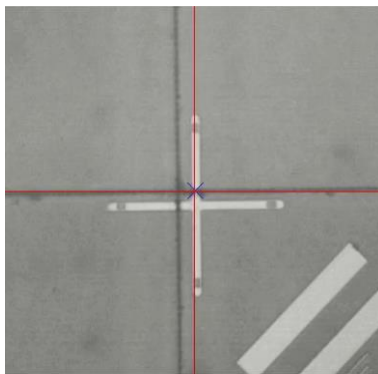
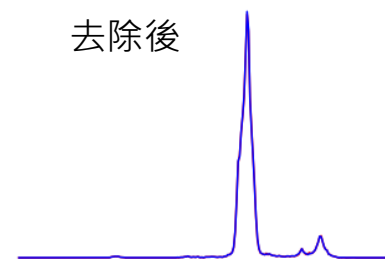
特徵顯現(去除機台光影問題)



去除前



去除後



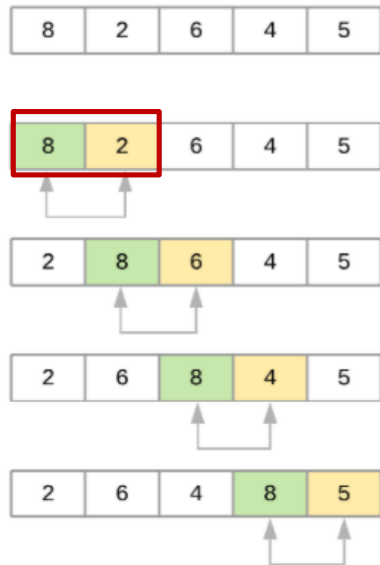
How to modify 影像重複



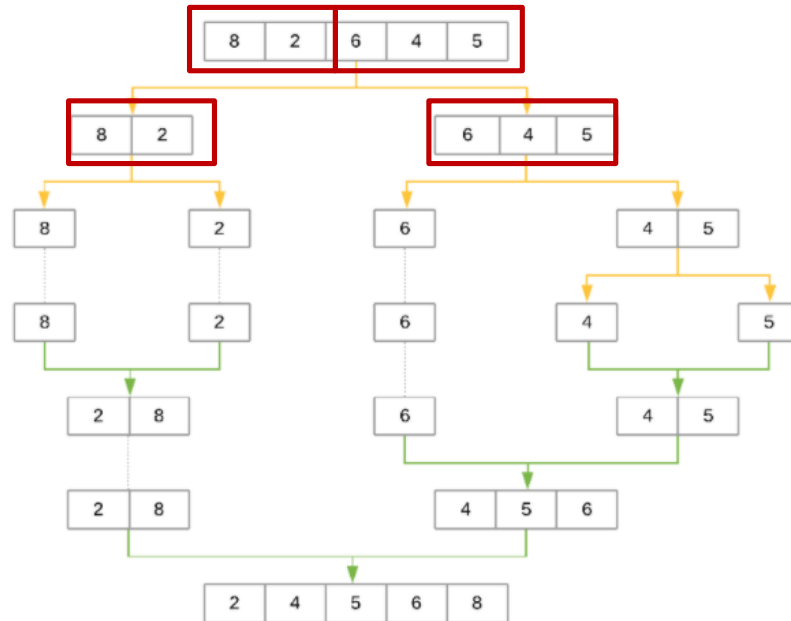
資料蒐集

兩兩比對

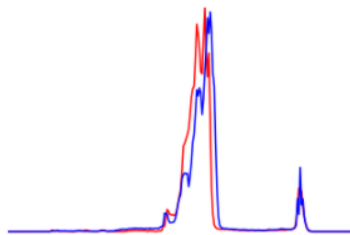
BubbleSort(Type1.2.3.4)



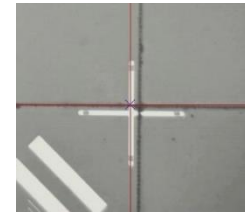
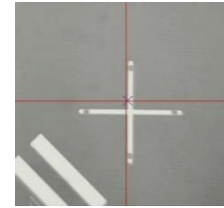
MergeSort(Type1、Type2、Type3、Type4)



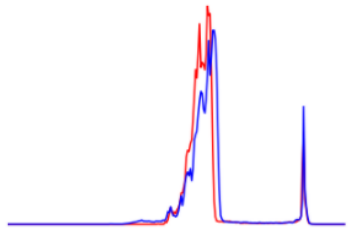
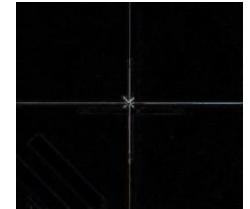
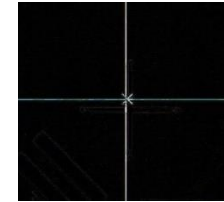
比較實驗參數



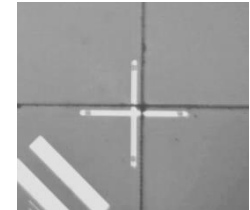
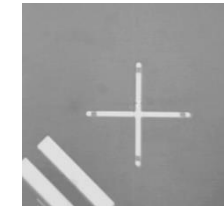
原始照片 0.52018



濾波A 0.5857



去紅線 0.69239



濾波B 0.5742



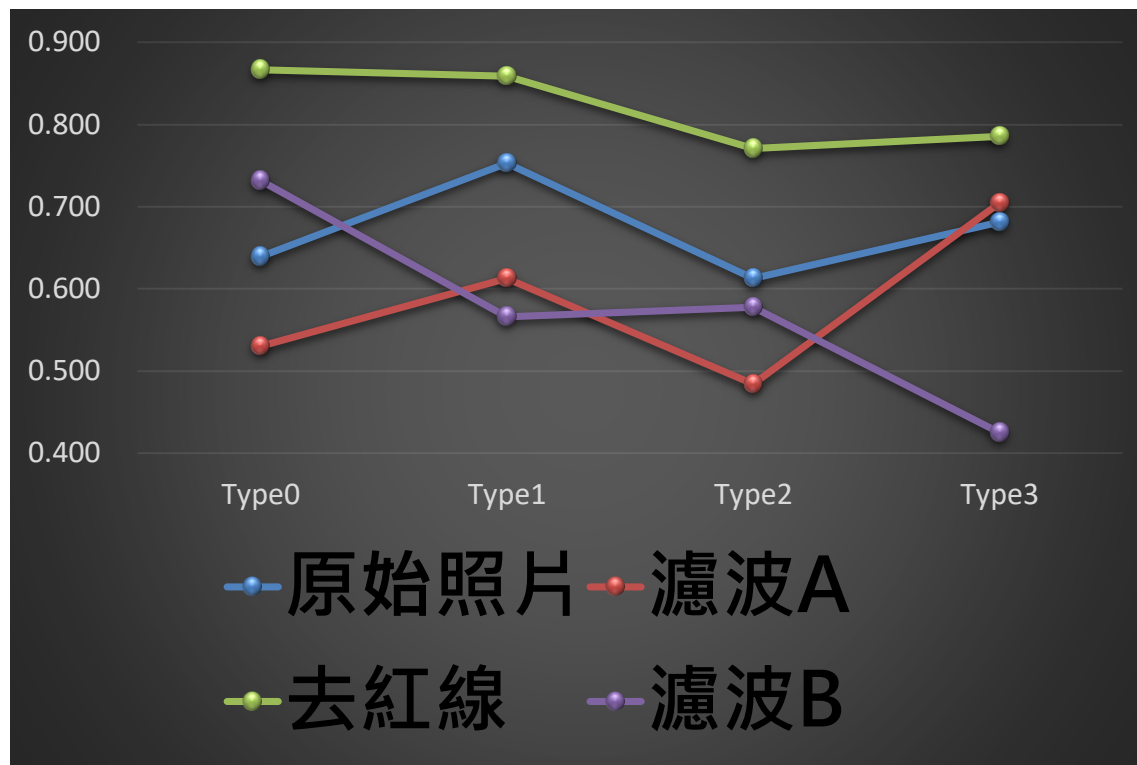
資料前處理(影像比對)



資料蒐集

兩兩比對

	原始照片	濾波A	去紅線	濾波B
Type0	0.639	0.53	0.867	0.732
Type1	0.753	0.613	0.859	0.566
Type2	0.613	0.484	0.771	0.578
Type3	0.681	0.705	0.786	0.425
AVG	0.6715	0.59425	0.82075	0.57525



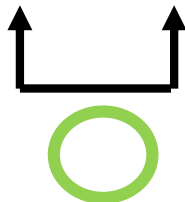
資料前處理(影像處理)



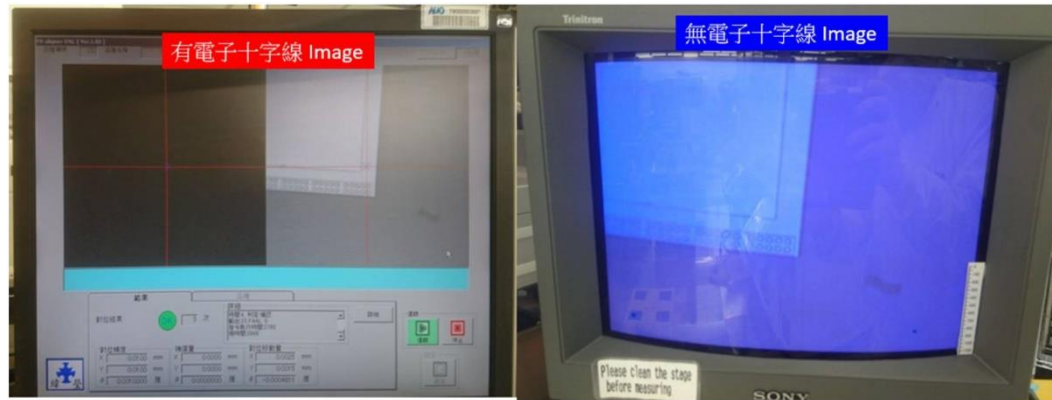
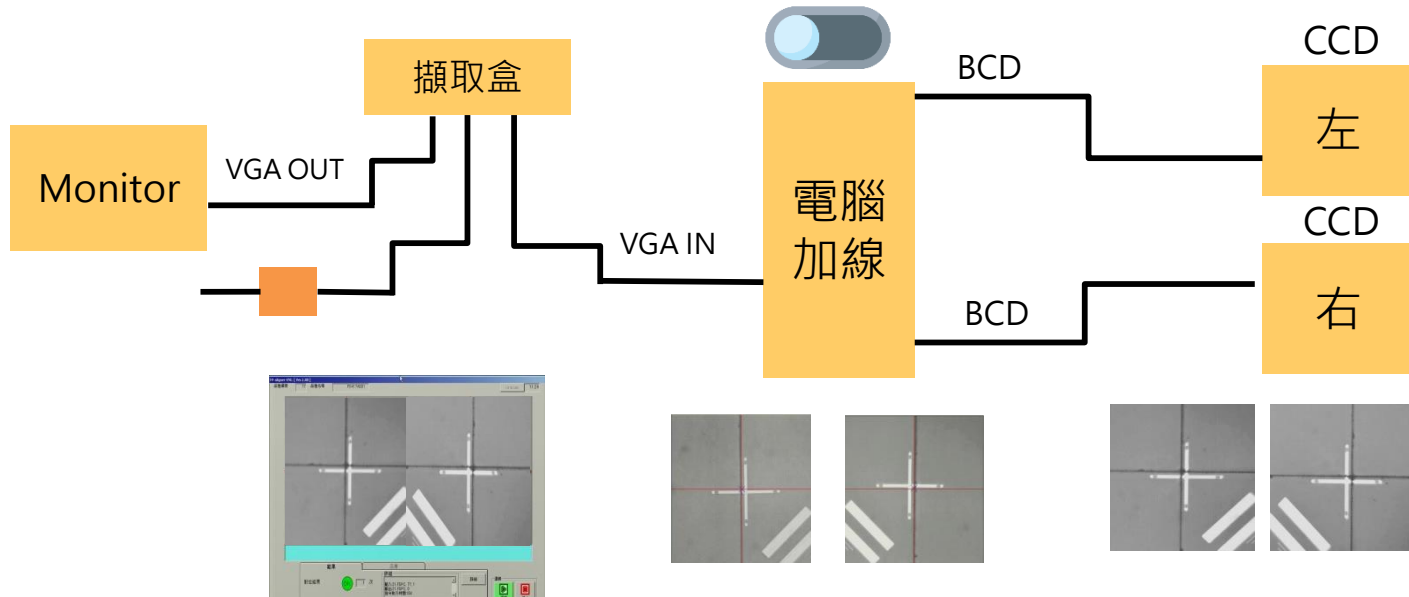
資料蒐集



兩兩比對



X-ray Monitor 切割對位線去除



資料前處理(影像處理)



資料蒐集



比對優化

ResultA OK-相同Type比對數值越高越好

ERROR-同ResultA<同ResultB

ERROR-全ResultA 下限<全ResultB 上限

ResultB OK-不同Type比對數值越低越好

ERROR-同ResultB>同ResultA

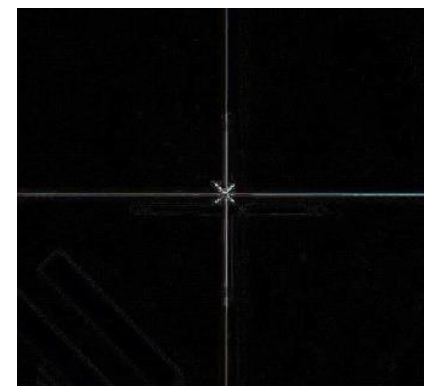
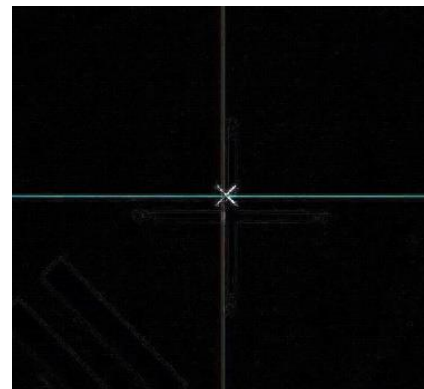
ERROR-全ResultB 上限>全ResultA 下限

3/4Laplacian濾波

門檻0.613

25%

	Type0	Type1	Type2	Type3
Type0_O	0.530264	0.5413052	0.5569659	0.589428
Type1_O	0.556322	0.6131818	0.6138076	0.632124
Type2_O	0.586149	0.5752244	0.4846446	0.635698
Type3_O	0.585752	0.6910311	0.5953789	0.70054



資料前處理(影像處理)



資料蒐集



比對優化

3/11去紅線				
門檻0.777835				
	Type0	Type1	Type2	Type3
Type0_O	0.88045	0.7487912	0.7605826	0.739387
Type1_O	0.780321	0.8607659	0.8080678	0.767536
Type2_O	0.772589	0.8494423	0.7783511	0.710014
Type3_O	0.702587	0.7851074	0.7106963	0.793309

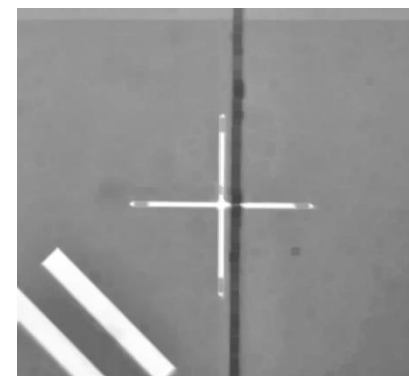
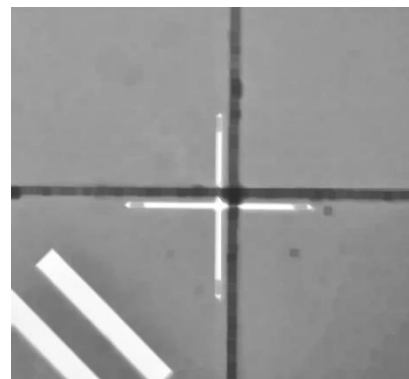
56%

3/15加濾波器				
門檻0.79609				
	Type0	Type1	Type2	Type3
Type0_O	0.90648	0.7783787	0.7871182	0.746157
Type1_O	0.806052	0.8923589	0.8405786	0.778374
Type2_O	0.806931	0.8754532	0.7960945	0.729517
Type3_O	0.729952	0.8035682	0.7448337	0.824042

56%

3/18二次濾波+疊圖				
門檻0.73355				
	Type0	Type1	Type2	Type3
Type0_O	0.852121	0.6461788	0.6972363	0.628418
Type1_O	0.681473	0.8059641	0.7264466	0.695532
Type2_O	0.708488	0.7899912	0.7520309	0.654608
Type3_O	0.563003	0.7151212	0.6191027	0.733355

93%



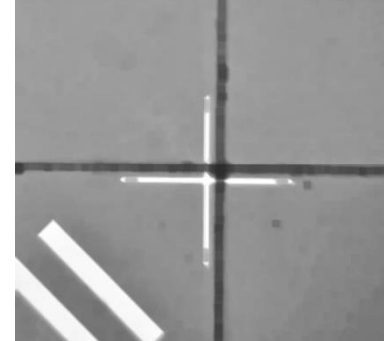
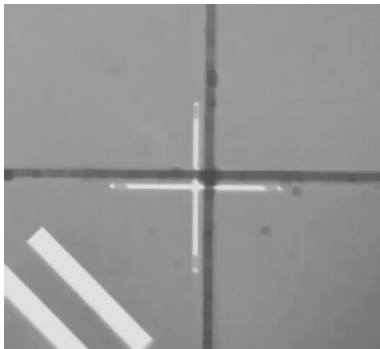
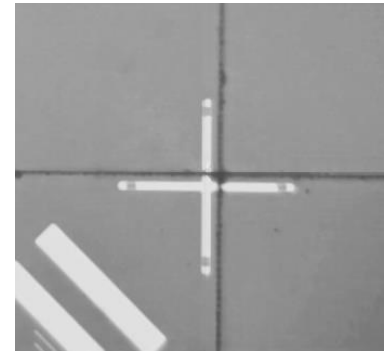
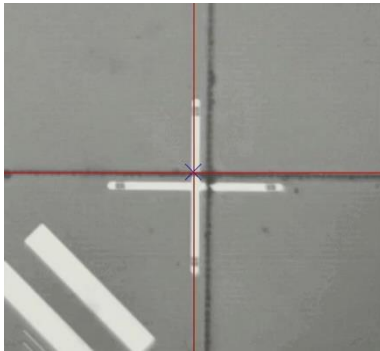
資料前處理(影像處理)



資料蒐集



比對優化



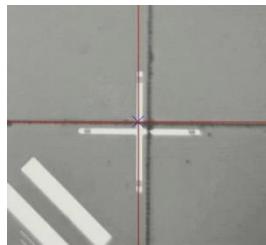
資料前處理(R1417AS01)



資料蒐集

判別異常圖片

Original



Region of Interest

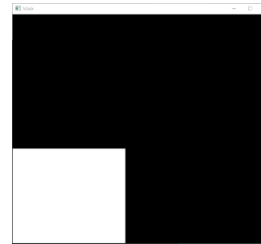
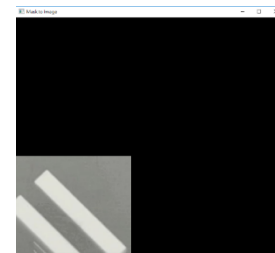
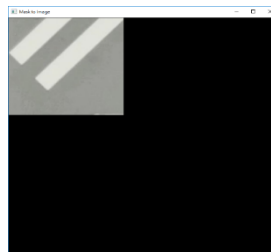


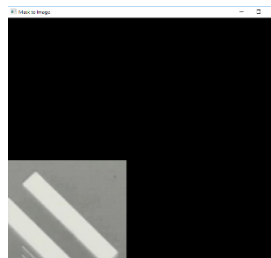
Image Mask



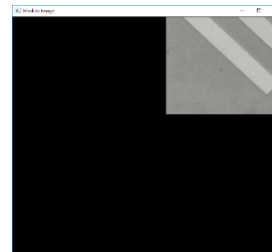
[[400,350],[0,350],
[0,0],[400,0]]



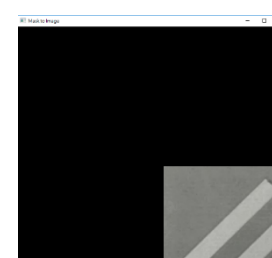
[[400,900],[0,900],
[0,500],[400,500]]



[[950,400],[500,400],
[500,0],[950,0]]



[[950,900],[500,900],
[500,500],[950,500]]



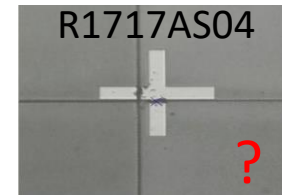
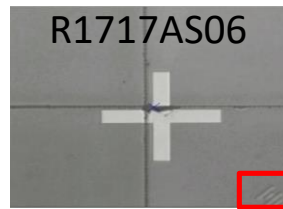
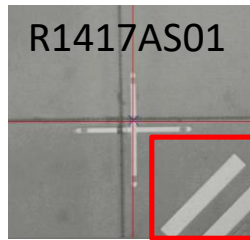
資料重新取樣



資料蒐集



重新取樣



Model	尺規	切割次數	切割頻率
R1417AS01	368*442	1次切	4月2次
R1717AS04	500*500 447*447	2次切	每天
R1717AS06	500*500 441*441	2次切	4月5次
R1714AS02	438*363	1次切	4月4次

原取樣 R1417AS01 產出太少
故去對位紅線重新取樣，要更改取其他Model

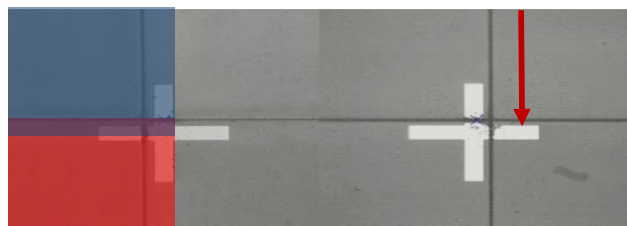
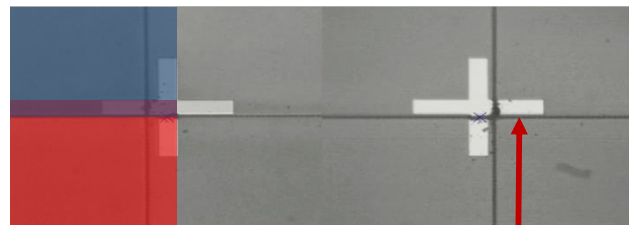
資料前處理(影像擷取)



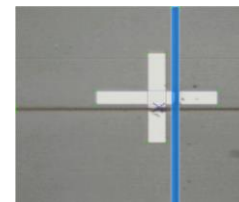
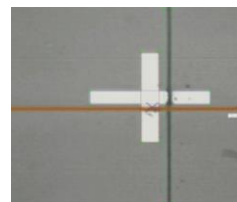
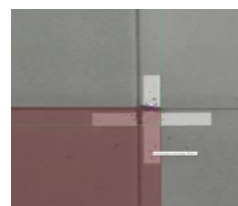
資料蒐集



重新取樣



R1717AS04原始圖像



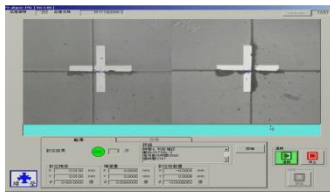
R1717AS04特徵圖像

資料前處理(R1717AS04)



資料蒐集

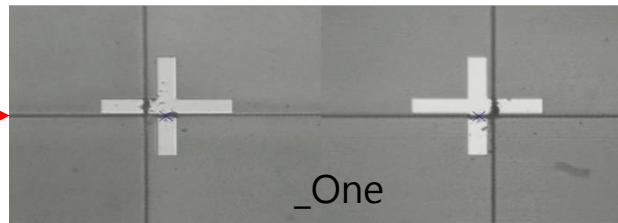
重新取樣



0:48

15-12-50_Y3VA

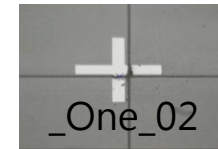
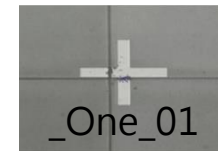
0:38



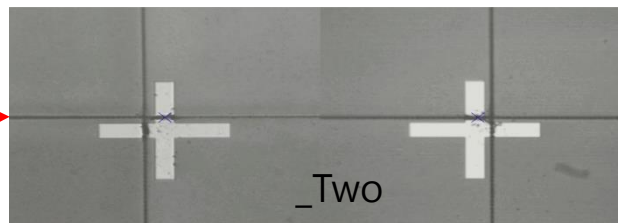
右下

左下

Py切割



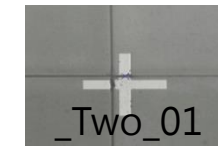
0:45



右上

左上

Py切割

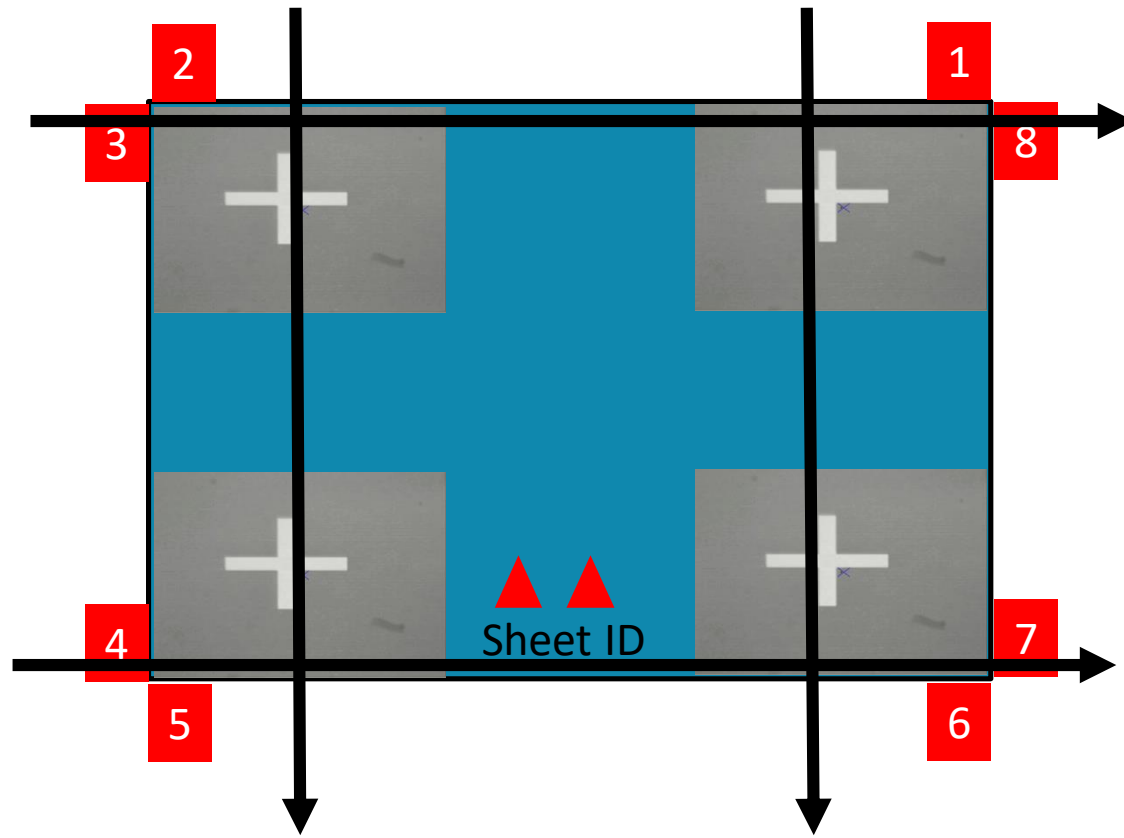


資料前處理(R1717AS04)



資料蒐集

重新取樣





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