



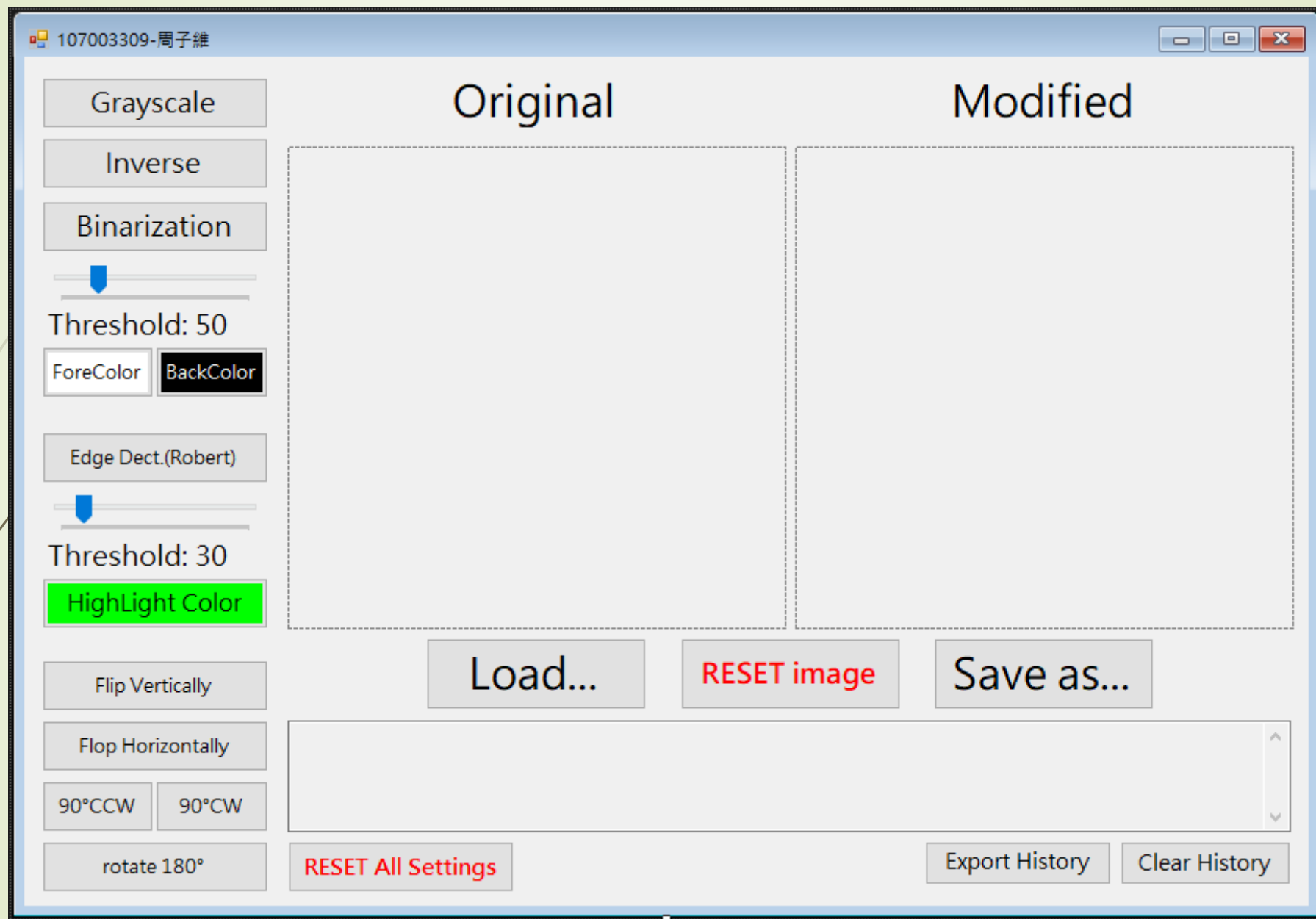
# 影像處理 - 期末報告

107003309 藥五甲 周子維

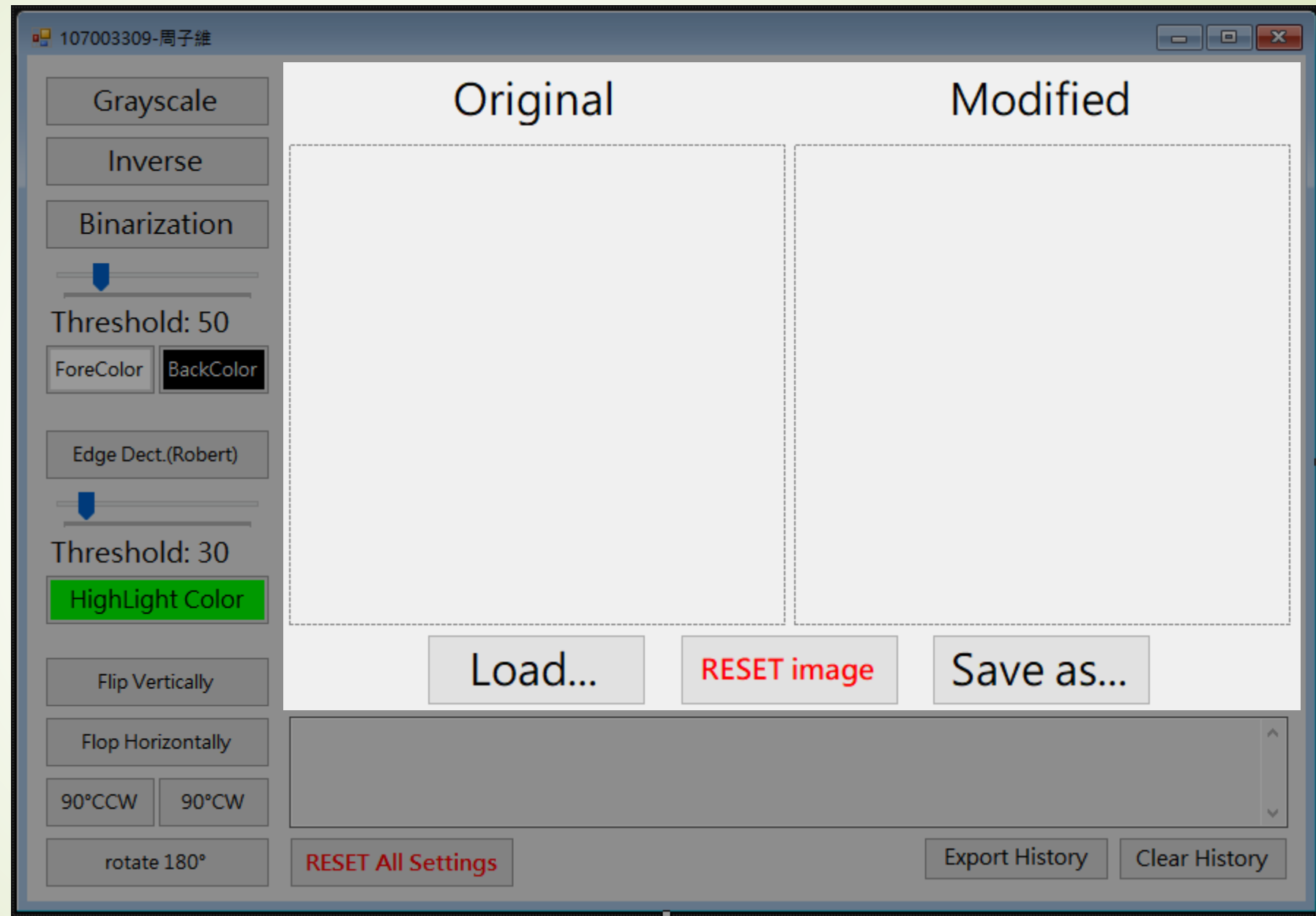
報告日期：2023/06/05 (Mon.)



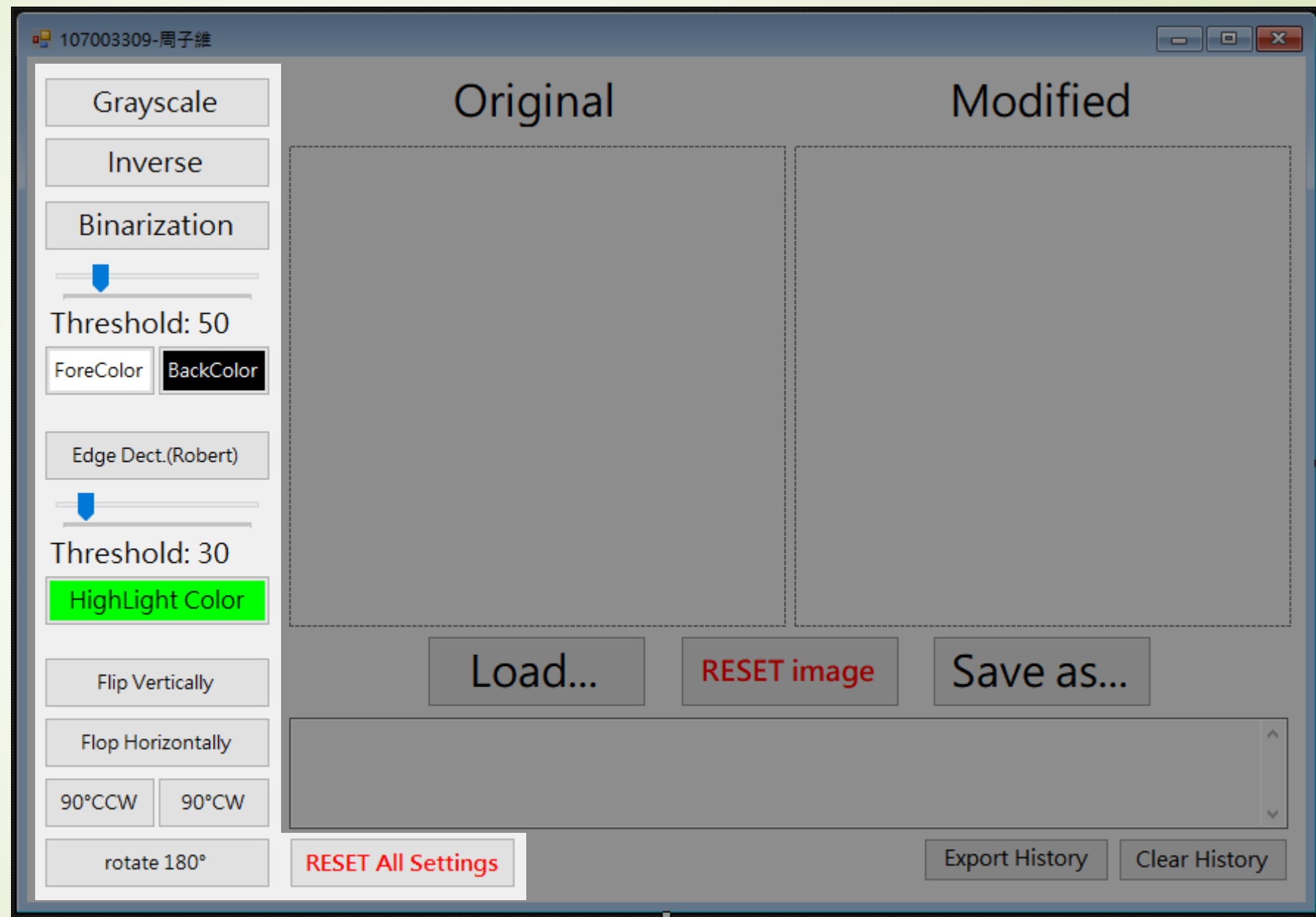
# GUI-圖形化介面介紹



# 圖片顯示&儲存

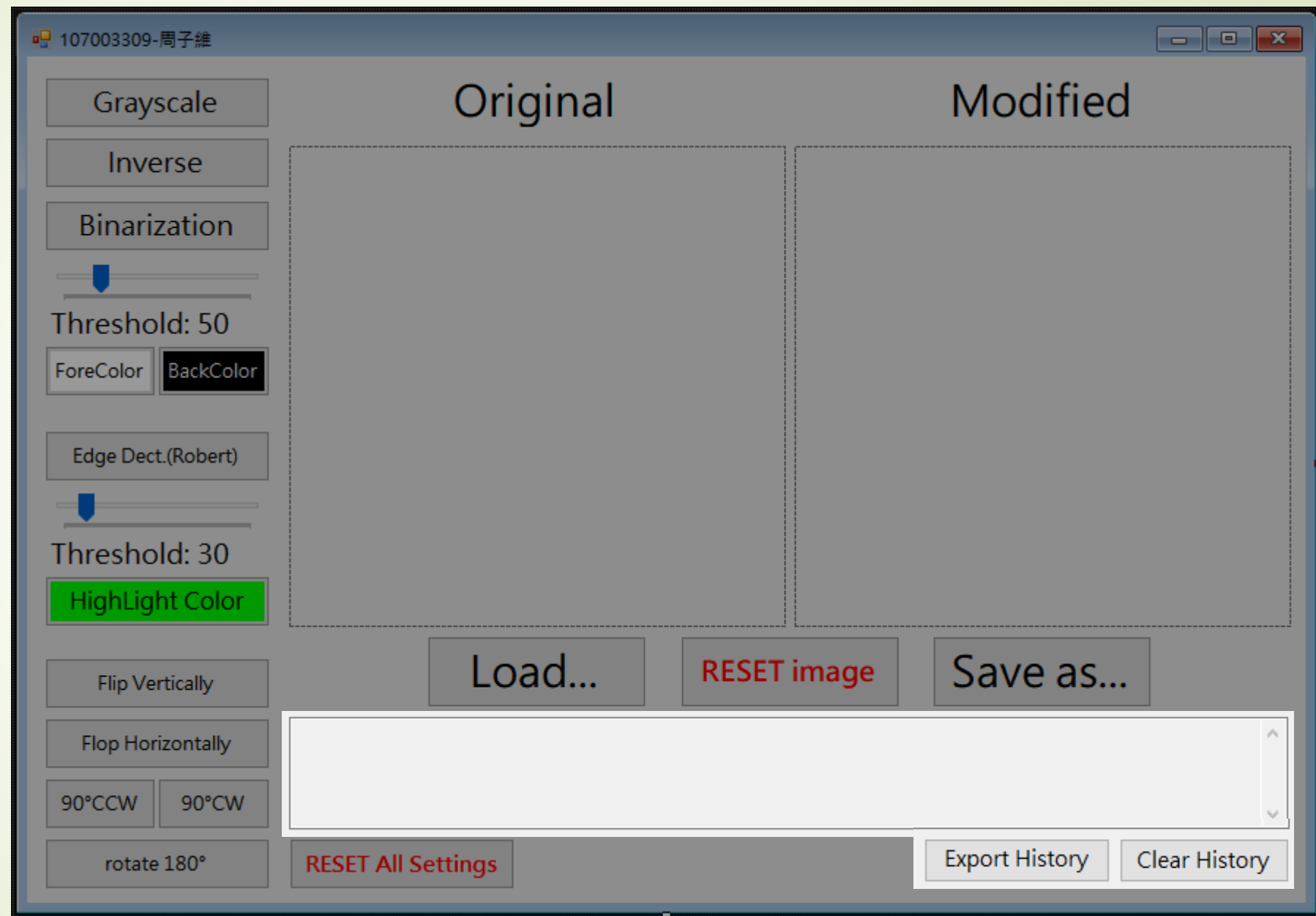


# 主要功能區

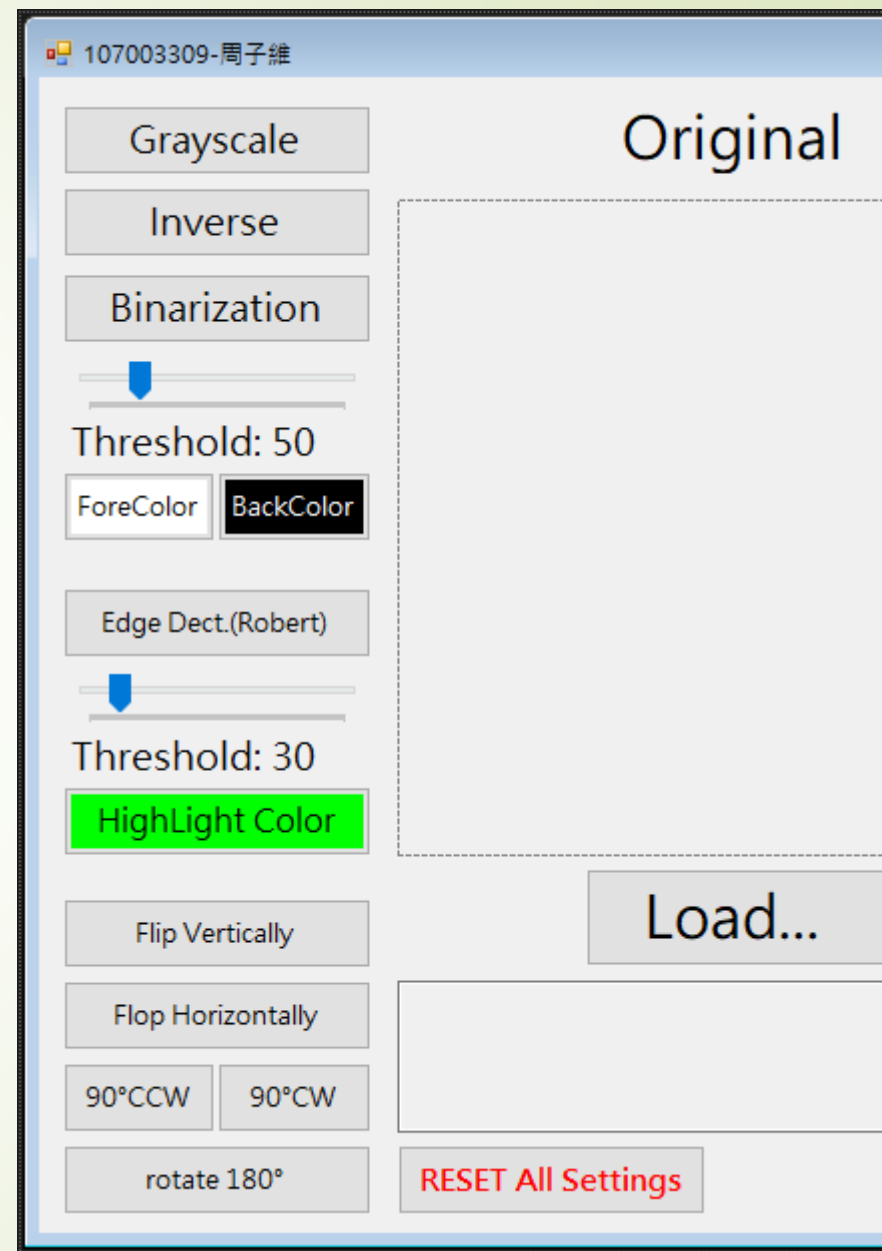


# Verbose Log

→紀錄操作

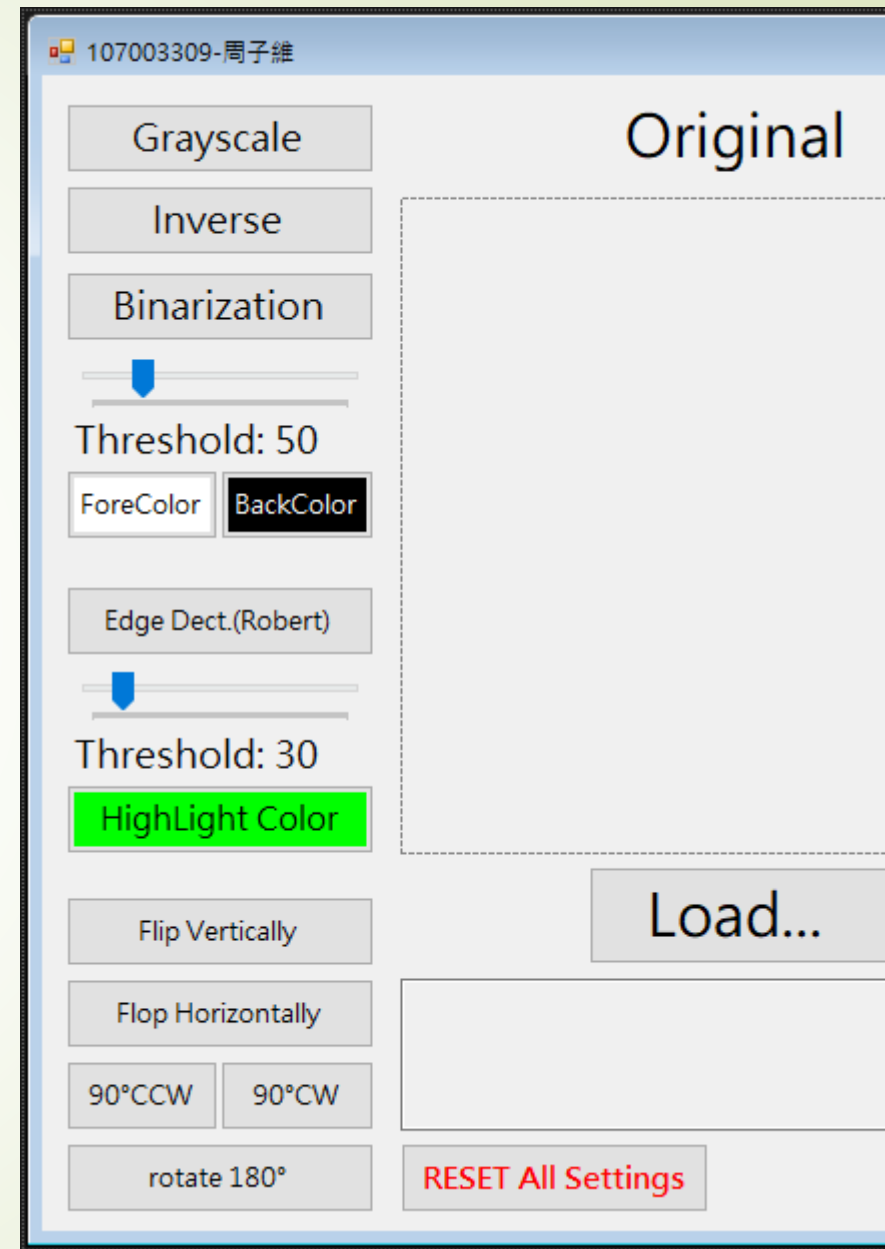


## 主要功能區



# 主要功能區

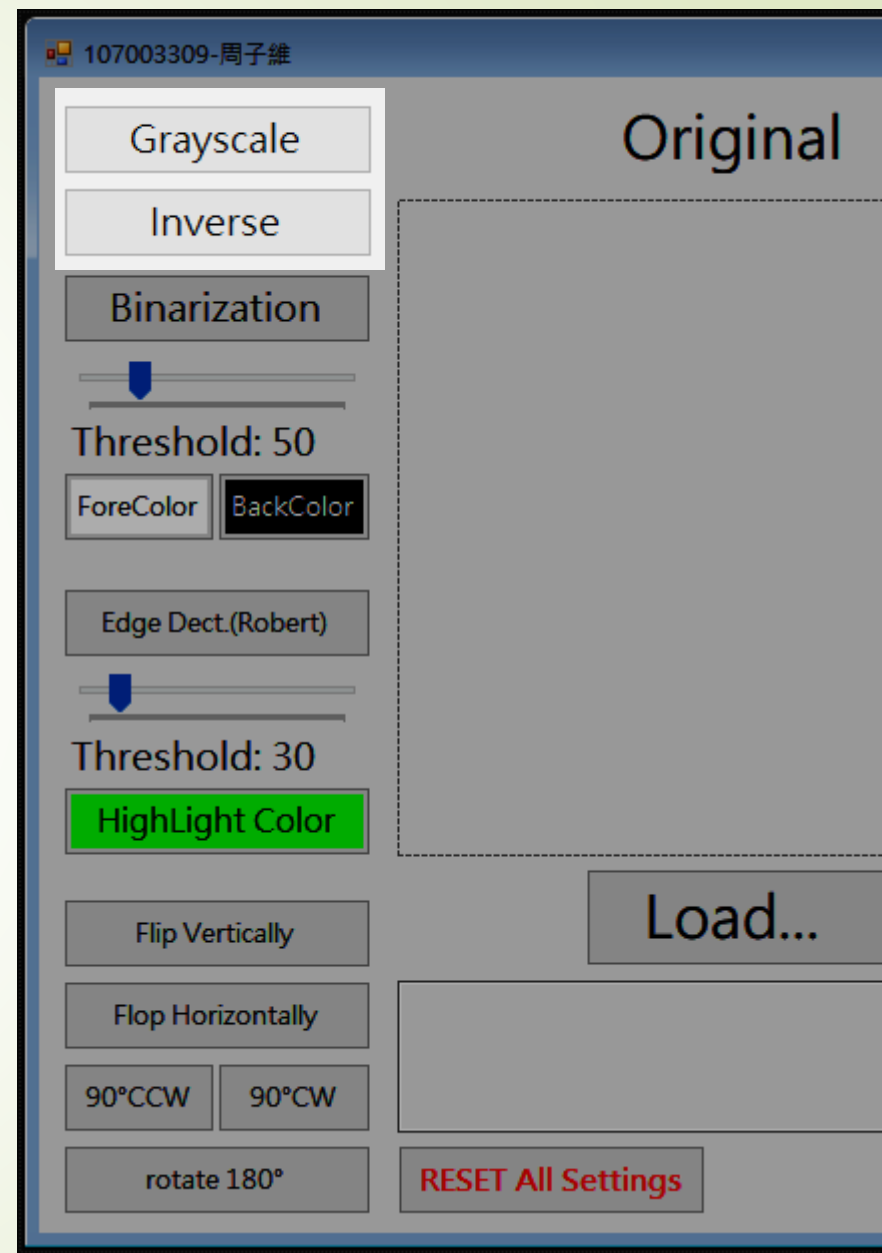
- 色彩變換(按下即生效，無其他設定)
  - Gray Scale(灰階)
  - Inverse color(色彩反轉)
- 色調強化 ( track Bar 調整 threshold、自定義色彩)
  - Binarization(影像二值化)
  - Robert(影像邊緣偵測)
- 旋轉鏡像(按下即生效，無其他設定)
  - Flip Vertically(上下翻轉)
  - Flop Horizontally(左右翻轉)
  - 90 deg Clockwise rotation(順時針旋轉90度)
  - 90 deg Counter-Clockwise rotation(逆時針旋轉90度)
  - Rotate 180 deg(旋轉180度)





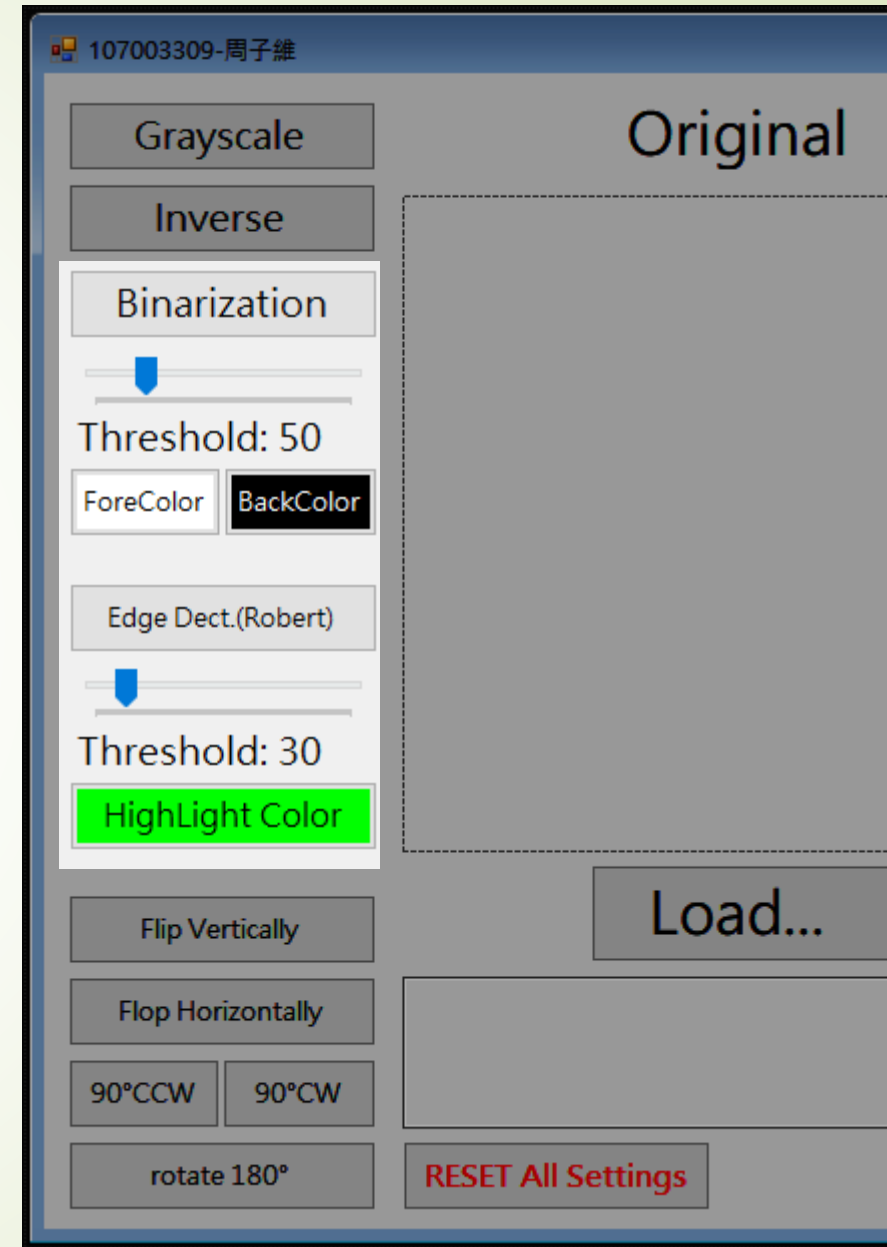
# 主要功能區

- 色彩變換(按下即生效，無其他設定)
  - Gray Scale(灰階)
  - Inverse color(色彩反轉)
- 色調強化 ( track Bar 調整 threshold、自定義色彩)
  - Binarization(影像二值化)
  - Robert(影像邊緣偵測)
- 旋轉鏡像(按下即生效，無其他設定)
  - Flip Vertically(上下翻轉)
  - Flop Horizontally(左右翻轉)
  - 90 deg Clockwise rotation(順時針旋轉90度)
  - 90 deg Counter-Clockwise rotation(逆時針旋轉90度)
  - Rotate 180 deg(旋轉180度)



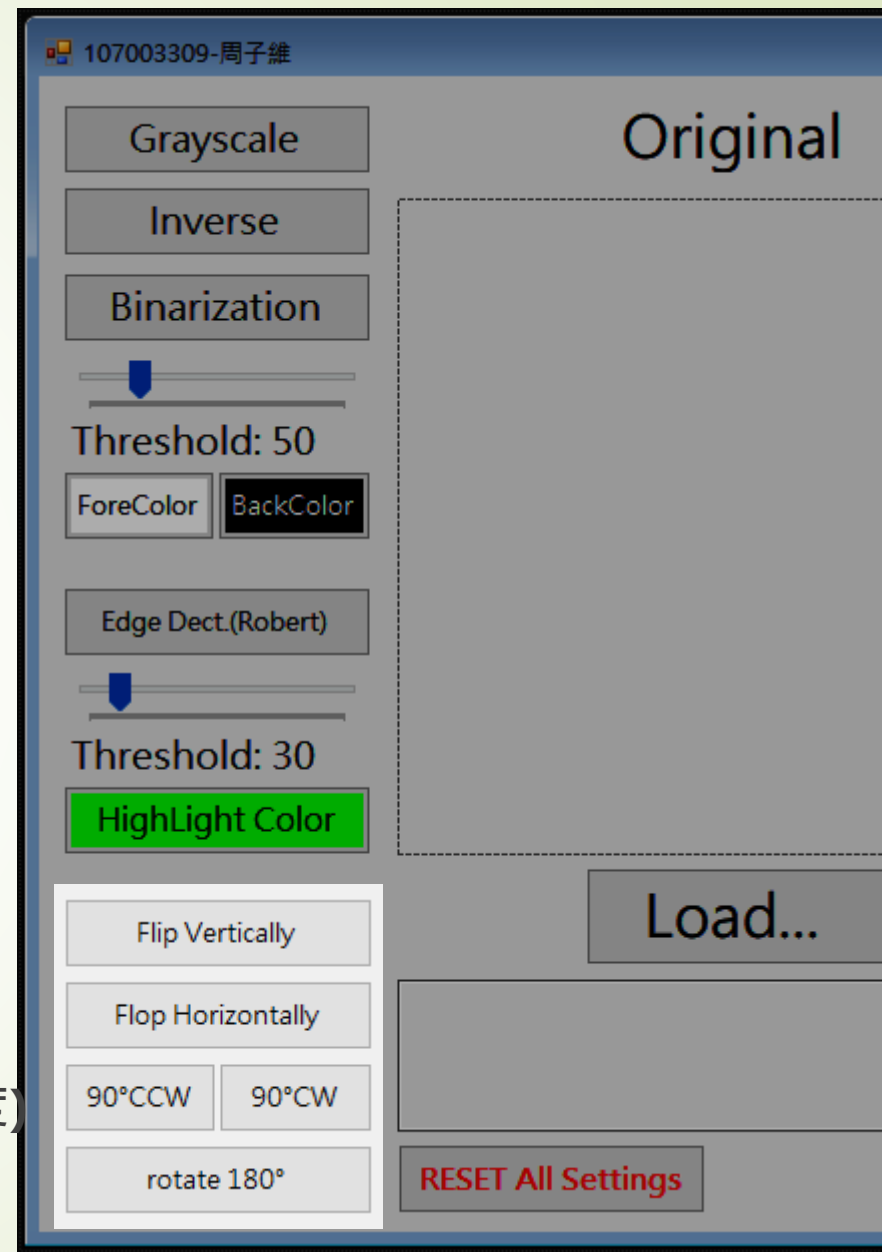
# 主要功能區

- 色彩變換(按下即生效，無其他設定)
  - Gray Scale(灰階)
  - Inverse color(色彩反轉)
- 色調強化 ( **track Bar** 調整 **threshold**、自定義色彩)
  - **Binarization**(影像二值化)
  - **Robert**(影像邊緣偵測)
- 旋轉鏡像(按下即生效，無其他設定)
  - Flip Vertically(上下翻轉)
  - Flop Horizontally(左右翻轉)
  - 90 deg Clockwise rotation(順時針旋轉90度)
  - 90 deg Counter-Clockwise rotation(逆時針旋轉90度)
  - Rotate 180 deg(旋轉180度)



# 主要功能區

- 色彩變換(按下即生效，無其他設定)
  - Gray Scale(灰階)
  - Inverse color(色彩反轉)
- 色調強化 ( track Bar 調整 threshold、自定義色彩)
  - Binarization(影像二值化)
  - Robert(影像邊緣偵測)
- 旋轉鏡像(按下即生效，無其他設定)
  - Flip Vertically(上下翻轉)
  - Flop Horizontally(左右翻轉)
  - 90 deg Clockwise rotation(順時針旋轉90度)
  - 90 deg Counter-Clockwise rotation(逆時針旋轉90度)
  - Rotate 180 deg(旋轉180度)



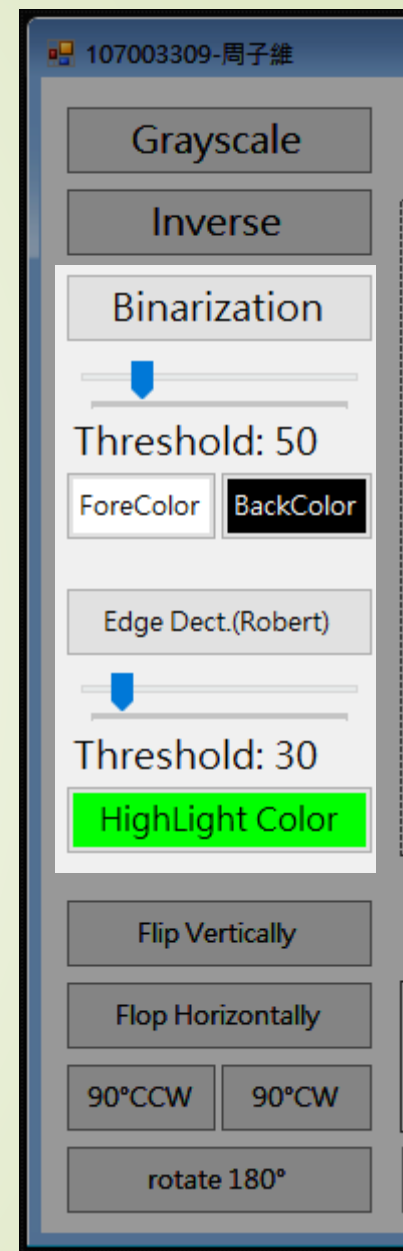
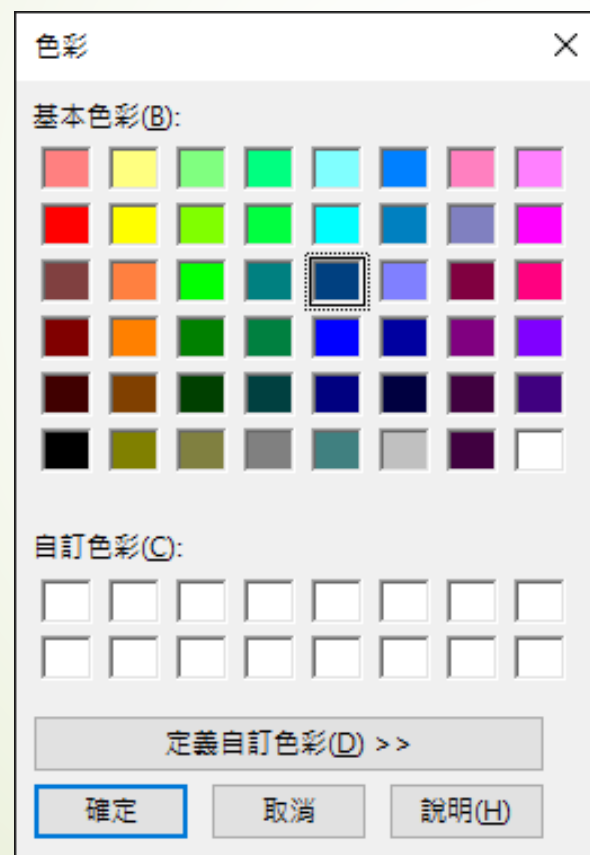
# 主要功能區-自定義色彩

ForeColor BackColor

HighLight Color

ForeColor BackColor

HighLight Color





# Binarization(影像二值化)-自訂色彩

107003309-周子維

Grayscale

Inverse

**Binarization**

Threshold: 116

ForeColor BackColor

Edge Dect.(Robert)

Threshold: 30

HighLight Color

Flip Vertically

Flop Horizontally

90°CCW 90°CW

rotate 180°

Original

Modified

Load... RESET image Save as...

[2023-06-05 07:44:40] Picture LOADED: E:\CMU1112\週1-AB\_影像處理\測試影像 512\_512-20230326\pepper512\_Color.bmp  
(Loaded picture info) {Width=512, Height=512}, File Size: 786 KB  
[2023-06-05 07:44:45] Select Binarization ForeColor... Yellow  
[2023-06-05 07:44:58] Select Binarization BackColor... ff004080  
[2023-06-05 07:45:25] Binarization (threshold: 116, ForeColor: Yellow, BackColor: ff004080) -> processing...  
[2023-06-05 07:45:26] Binarization -> Done!

RESET All Settings

Export History Clear History

# RESET All Settings

Grayscale

Inverse

Binarization

Threshold: 118

ForeColor BackColor

Edge Dect.(Robert)

Threshold: 84

HighLight Color

Flip Vertically

Flop Horizontally

90°CCW 90°CW

rotate 180°

RESET All Settings



```
[2023-06-05 05:56:36] Rotating 90 degrees Clock Wise -> processing...  
[2023-06-05 05:56:36] Rotating 90 degrees Clock Wise -> Done!  
[2023-06-05 05:56:44] Select Edge Detection HighLight Color... ffff8040  
[2023-06-05 05:57:16] Reset all settings
```

Grayscale

Inverse

Binarization

Threshold: 50

ForeColor BackColor

Edge Dect.(Robert)

Threshold: 30

HighLight Color

Flip Vertically

Flop Horizontally

90°CCW 90°CW

rotate 180°



# Verbose Log

記錄使用者操作紀錄

RESET All Settings

Export History

Clear History

## Load(讀取圖片)

Load...

RESET image

Save as...

[2023-06-05 07:53:37] Picture LOADED: E:\CMU1112\週1-AB\_影像處理\測試影像 512\_512-20230326\Lena\_512\_Color.jpg  
(Loaded picture info) {Width=512, Height=512}, File Size: 786 KB

## Save(儲存圖片)

Load...

RESET image

Save as...

[2023-06-05 07:53:37] Picture LOADED: E:\CMU1112\週1-AB\_影像處理\測試影像 512\_512-20230326\Lena\_512\_Color.jpg  
(Loaded picture info) {Width=512, Height=512}, File Size: 786 KB  
[2023-06-05 07:54:44] Picture SAVED: E:\CMU1112\週1-AB\_影像處理\測試影像 512\_512-20230326\output.jpg  
(Saved picture info) {Width=512, Height=512}, File Size: 786 KB



## 無其他設定：Gray Scale、Inverse、Rotate...

```
[2023-06-05 05:38:31] Picture LOADED: E:\CMU1112\週1-AB_影像處理\測試影像 512_512-20230326\pepper512_Color.bmp  
(Loaded picture info) {Width=512, Height=512}, File Size: 786 KB
```

```
[2023-06-05 05:38:44] Grayscale -> processing...
```

```
[2023-06-05 05:38:44] Grayscale -> Done!
```

## 包含其他參數：Binarization、Edge Dect.(Robert)

```
[2023-06-05 07:44:40] Picture LOADED: E:\CMU1112\週1-AB_影像處理\測試影像 512_512-20230326\pepper512_Color.bmp  
(Loaded picture info) {Width=512, Height=512}, File Size: 786 KB
```

```
[2023-06-05 07:44:45] Select Binarization ForeColor... Yellow
```

```
[2023-06-05 07:44:58] Select Binarization BackColor... ff004080
```

```
[2023-06-05 07:45:25] Binarization (threshold: 116, ForeColor: Yellow, BackColor: ff004080) -> processing...
```

```
[2023-06-05 07:45:26] Binarization -> Done!
```

## 顯示使用者選擇色彩

[2023-06-05 08:09:23] Select Binarization BackColor. ff004080

使用者未顯示顏色→顯示目前色彩

[2023-06-05 08:10:19] Select Binarization ForeColor. Cancel (current: White)



# Export Verbose Log History



output\_history.txt - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明

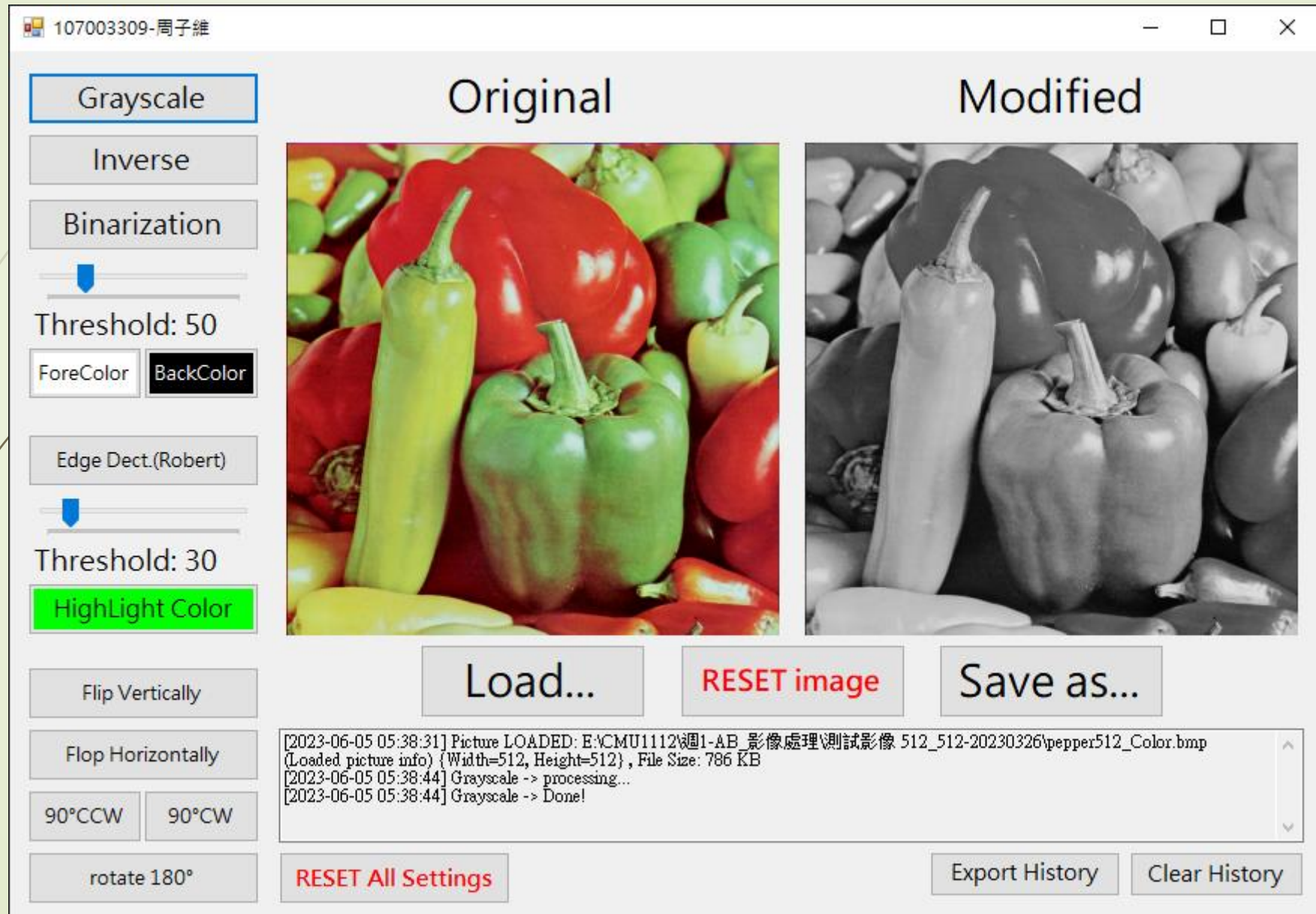
```
[2023-06-05 08:33:14] Picture LOADED: E:\CMU1112\週1-AB_影像處理\測試影像 512_512-20230326\Lena_512_Color.jpg
(Loaded picture info) {Width=512, Height=512} , File Size: 786 KB
[2023-06-05 08:33:40] Flip Vertically -> processing...
[2023-06-05 08:33:41] Flip Vertically -> Done!
[2023-06-05 08:33:45] Rotating 90 degrees ClockWise -> processing...
[2023-06-05 08:33:45] Rotating 90 degrees ClockWise -> Done!
[2023-06-05 08:34:07] Select Edge Detection HighLight Color... Cancel (current: Lime)
[2023-06-05 08:34:16] Robert - Edge Detection (threshold: 76 , HighLightColor: Lime) -> processing...
[2023-06-05 08:34:17] Robert - Edge Detection -> Done!
```

第 1 列, 第 1 行 100% Windows (CRLF) UTF-8



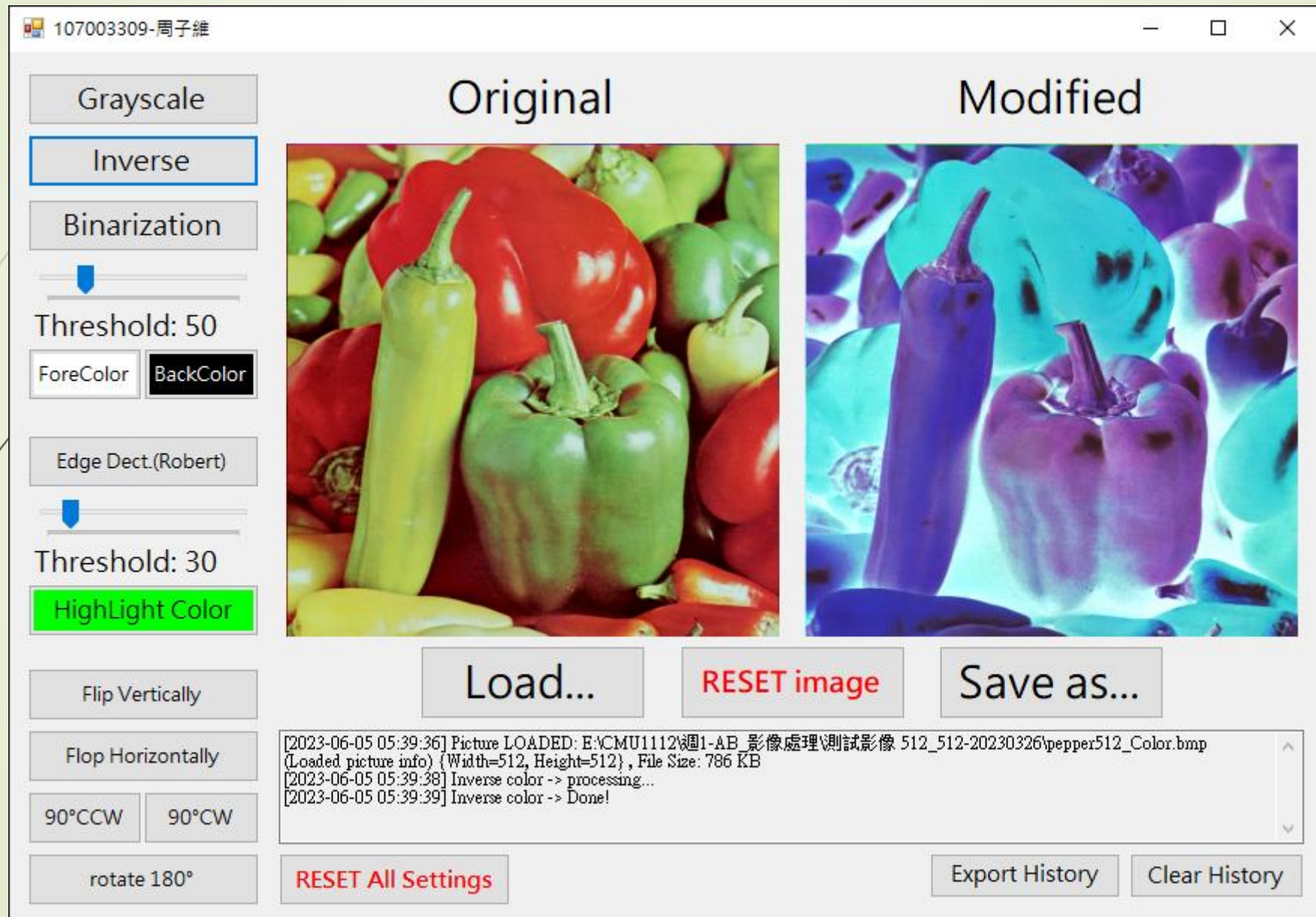
實際操作畫面

# GrayScale(灰階)





# Inverse color(色彩反轉)



# Binarization(影像二值化)-預設色彩

107003309-周子維

Grayscale

Inverse

**Binarization**

Threshold: 116

ForeColor BackColor

Edge Dect.(Robert)

Threshold: 30

HighLight Color

Flip Vertically

Flop Horizontally

90°CCW 90°CW

rotate 180°

Original

Modified

Load... RESET image Save as...

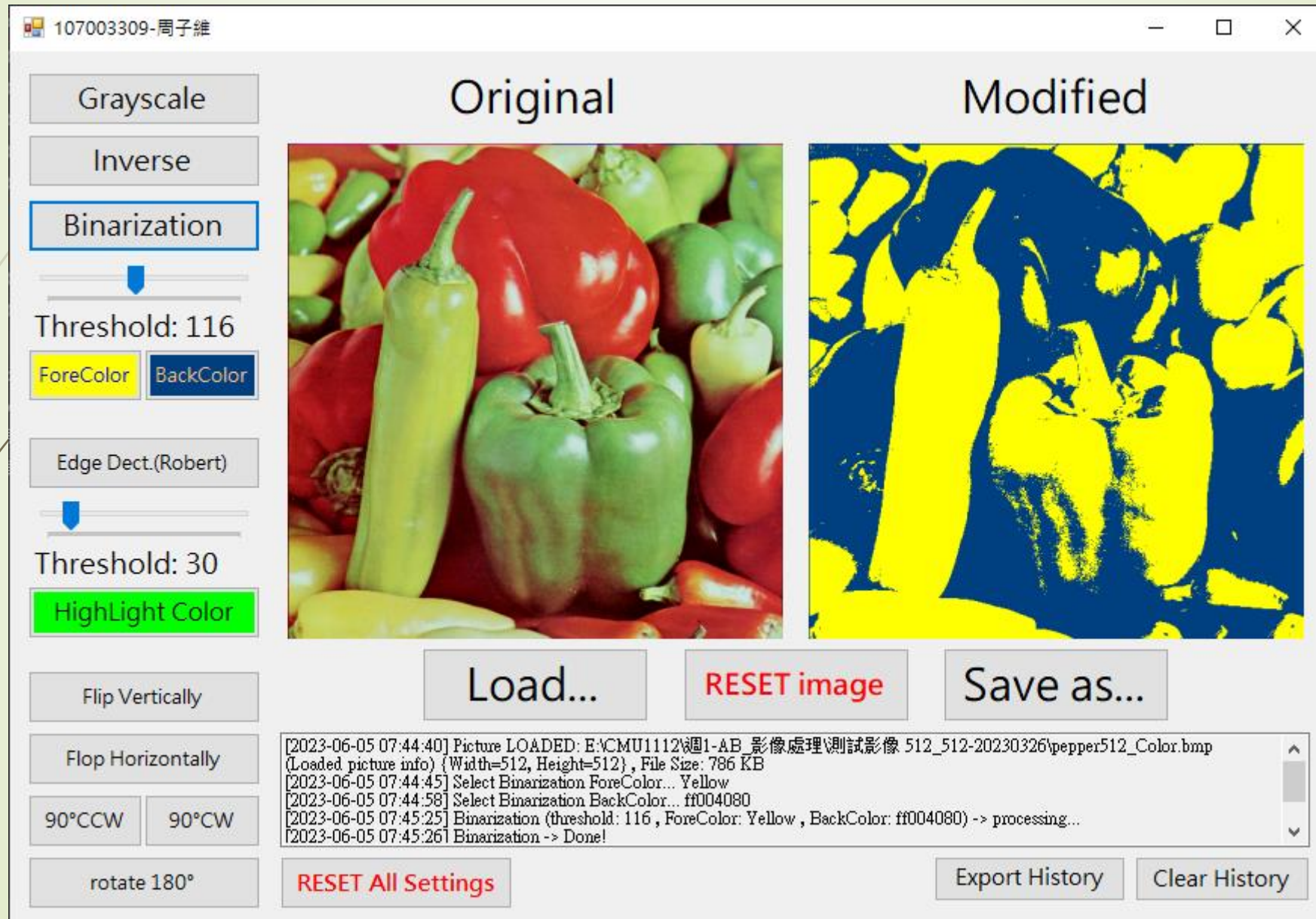
[2023-06-05 07:46:49] Picture LOADED: E:\CMU1112\週1-AB\_影像處理\測試影像 512\_512-20230326\pepper512\_Color.bmp  
(Loaded picture info) {Width=512, Height=512}, File Size: 786 KB  
[2023-06-05 07:46:59] Binarization (threshold: 116, ForeColor: White, BackColor: Black) -> processing...  
[2023-06-05 07:46:59] Binarization -> Done!

RESET All Settings

Export History Clear History

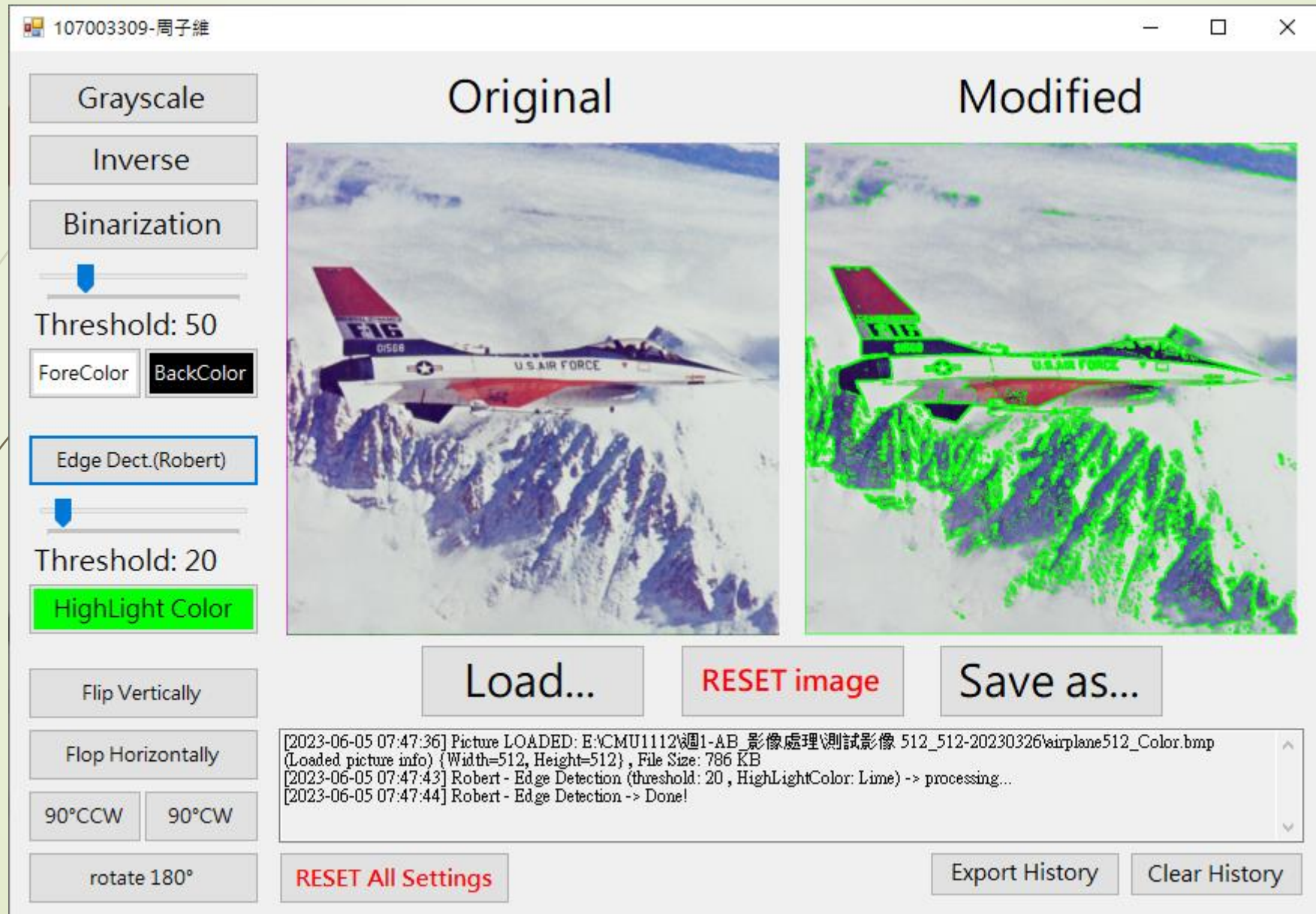


# Binarization(影像二值化)-自訂色彩

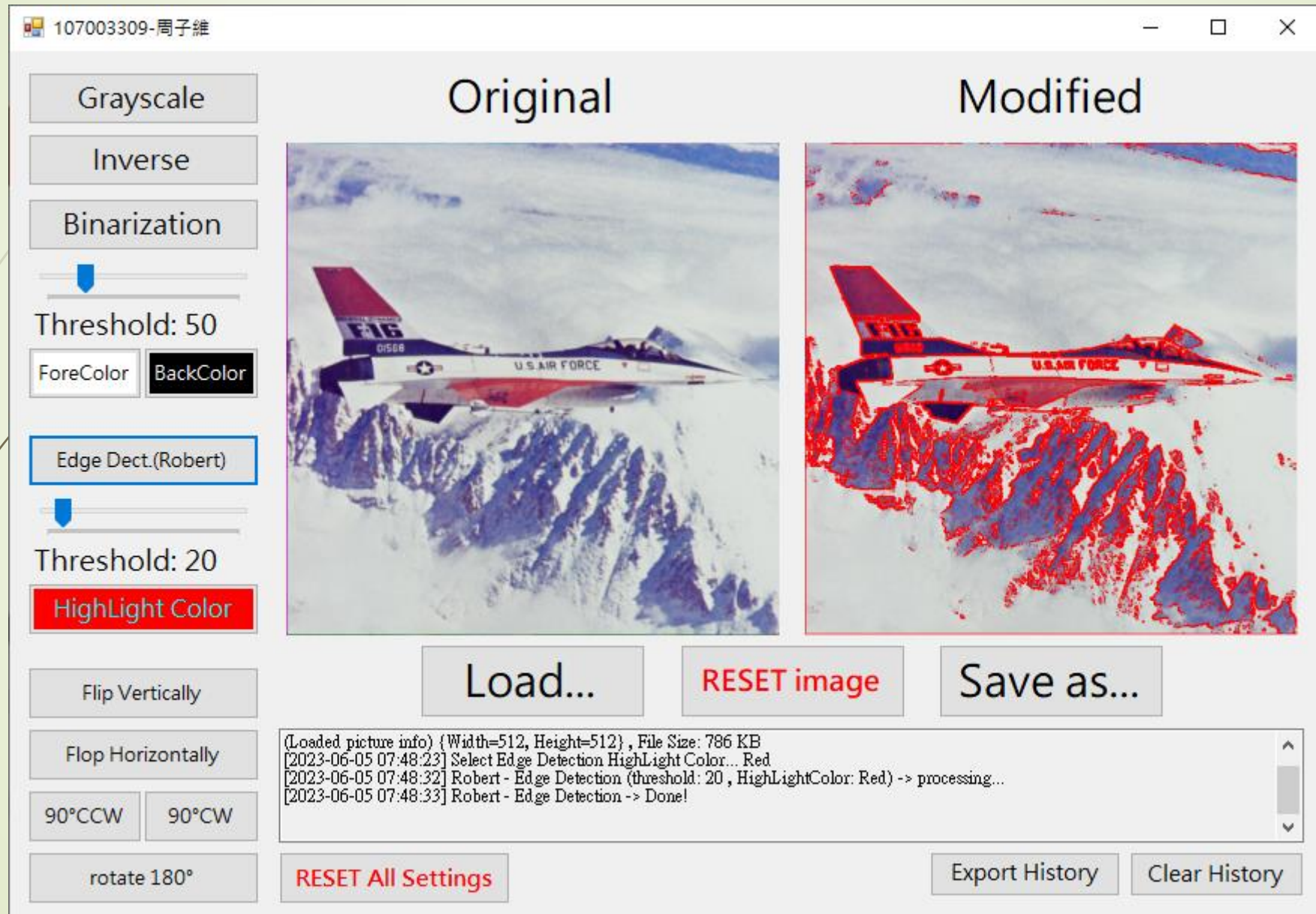




# Robert(影像邊緣偵測)-預設色彩



# Robert(影像邊緣偵測)-自訂色彩





# Flip Vertically(上下翻轉)

107003309-周子維

Grayscale

Inverse

Binarization

Threshold: 50

ForeColor BackColor

Edge Dect.(Robert)

Threshold: 30

HighLight Color

Flip Vertically

Flop Horizontally

90°CCW 90°CW

rotate 180°

Original

Modified

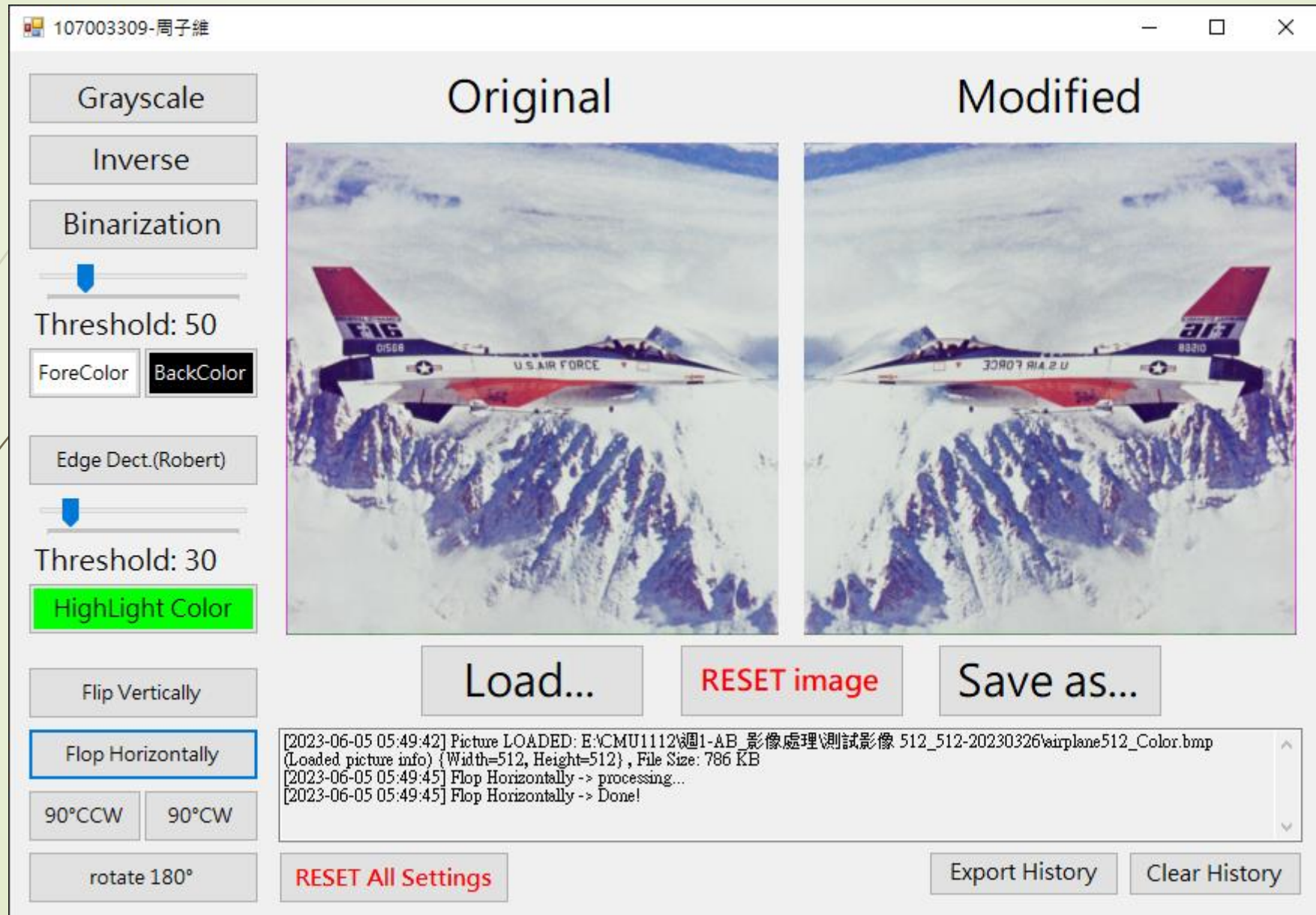
Load... RESET image Save as...

[2023-06-05 05:48:44] Picture LOADED: E:\CMU1112\週1-AB\_影像處理\測試影像 512\_512-20230326\airplane512\_Color.bmp  
(Loaded picture info) {Width=512, Height=512}, File Size: 786 KB  
[2023-06-05 05:48:53] Flip Vertically -> processing...  
[2023-06-05 05:48:53] Flip Vertically -> Done!

RESET All Settings

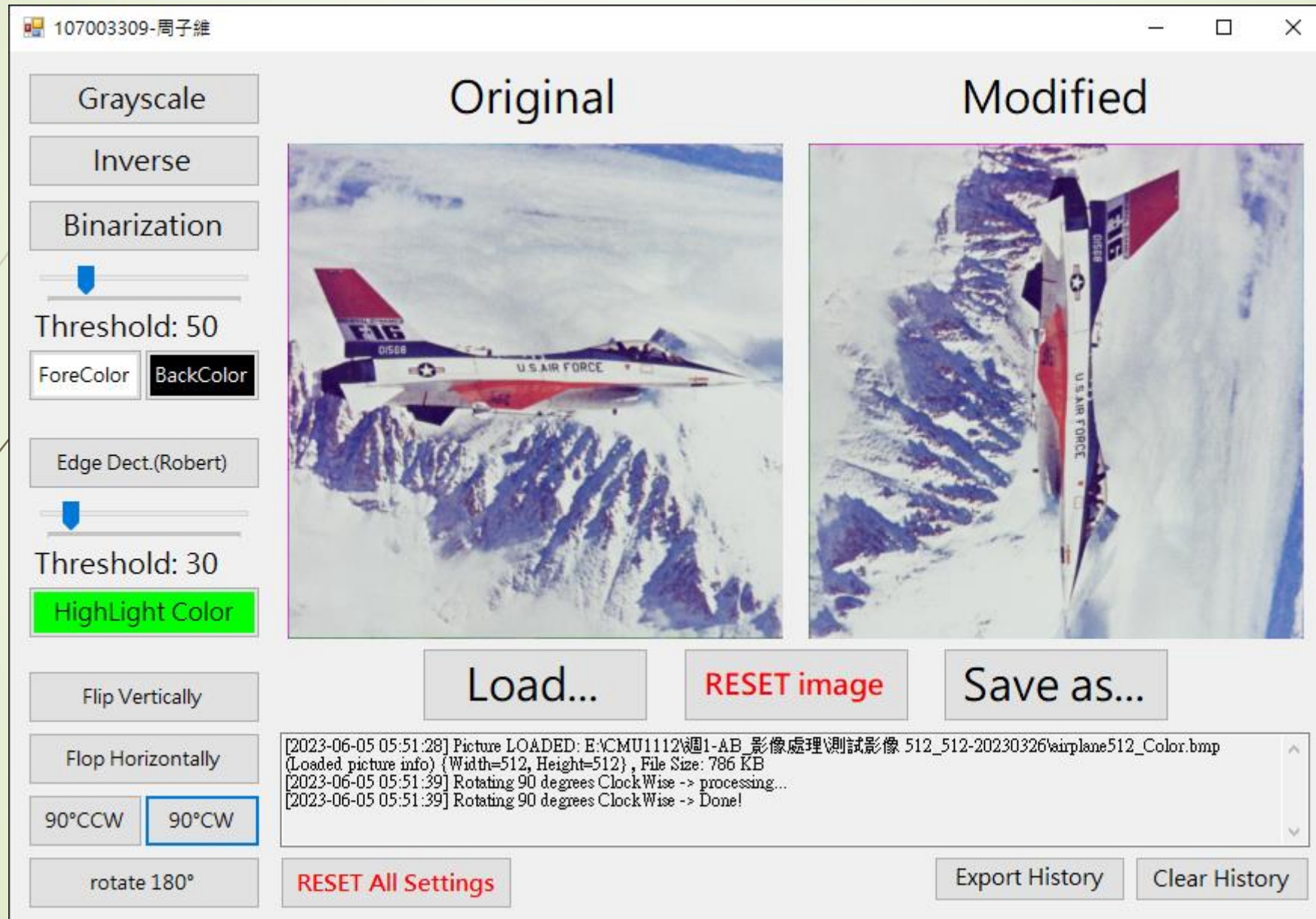
Export History Clear History

# Flop Horizontally(左右翻轉)





# 90 deg Clockwise rotation(順時針旋轉90度)



# 90 deg Counter-Clockwise rotation(逆時針旋轉)

107003309-周子維

Grayscale

Inverse

Binarization

Threshold: 50

ForeColor BackColor

Edge Dect.(Robert)

Threshold: 30

HighLight Color

Flip Vertically

Flop Horizontally

90°CCW 90°CW

rotate 180°

Original

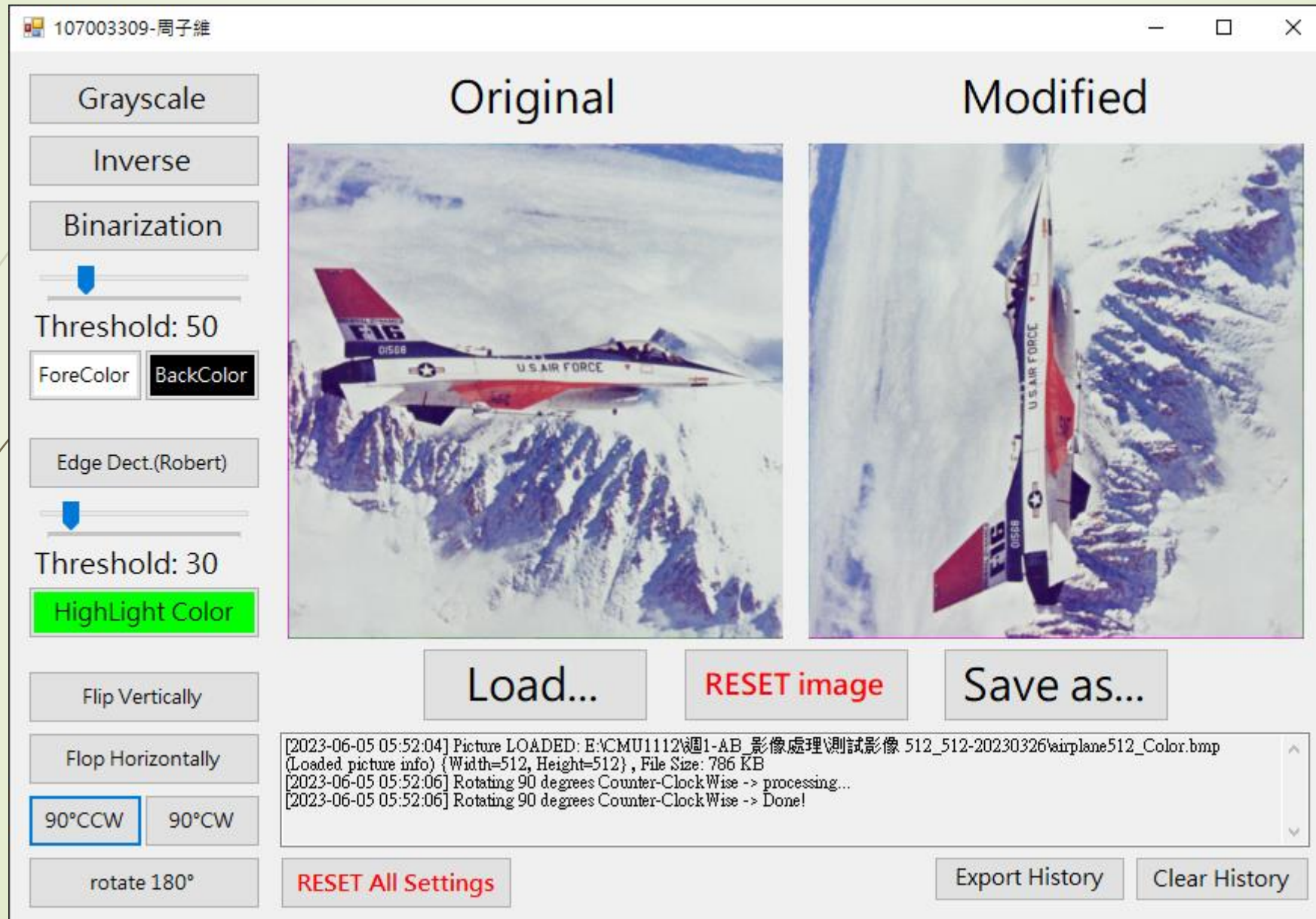
Modified

Load... RESET image Save as...

[2023-06-05 05:52:04] Picture LOADED: E:\CMU1112\週1-AB\_影像處理\測試影像 512\_512-20230326\airplane512\_Color.bmp  
(Loaded picture info) {Width=512, Height=512}, File Size: 786 KB  
[2023-06-05 05:52:06] Rotating 90 degrees Counter-ClockWise -> processing...  
[2023-06-05 05:52:06] Rotating 90 degrees Counter-ClockWise -> Done!

RESET All Settings

Export History Clear History

The screenshot shows a software window titled '107003309-周子維'. On the left is a control panel with buttons for 'Grayscale', 'Inverse', 'Binarization', 'Edge Dect.(Robert)', 'Flip Vertically', 'Flop Horizontally', '90°CCW' (highlighted with a blue border), '90°CW', and 'rotate 180°'. There are also sliders for 'Threshold: 50' and 'Threshold: 30', and color selection boxes for 'ForeColor' and 'BackColor'. The main area is split into two panels: 'Original' and 'Modified'. The 'Original' panel shows a US Air Force F-16 fighter jet flying over a snowy mountain range. The 'Modified' panel shows the same image rotated 90 degrees counter-clockwise. Below the panels are buttons for 'Load...', 'RESET image', and 'Save as...'. At the bottom, there is a log window showing the sequence of operations: 'Picture LOADED', 'Rotating 90 degrees Counter-ClockWise -> processing...', and 'Rotating 90 degrees Counter-ClockWise -> Done!'. A 'RESET All Settings' button is also present at the bottom left, and 'Export History' and 'Clear History' buttons are at the bottom right.



# Rotate 180 deg(旋轉180度)

