2019/11/27

電腦輔助檢測與診斷作業

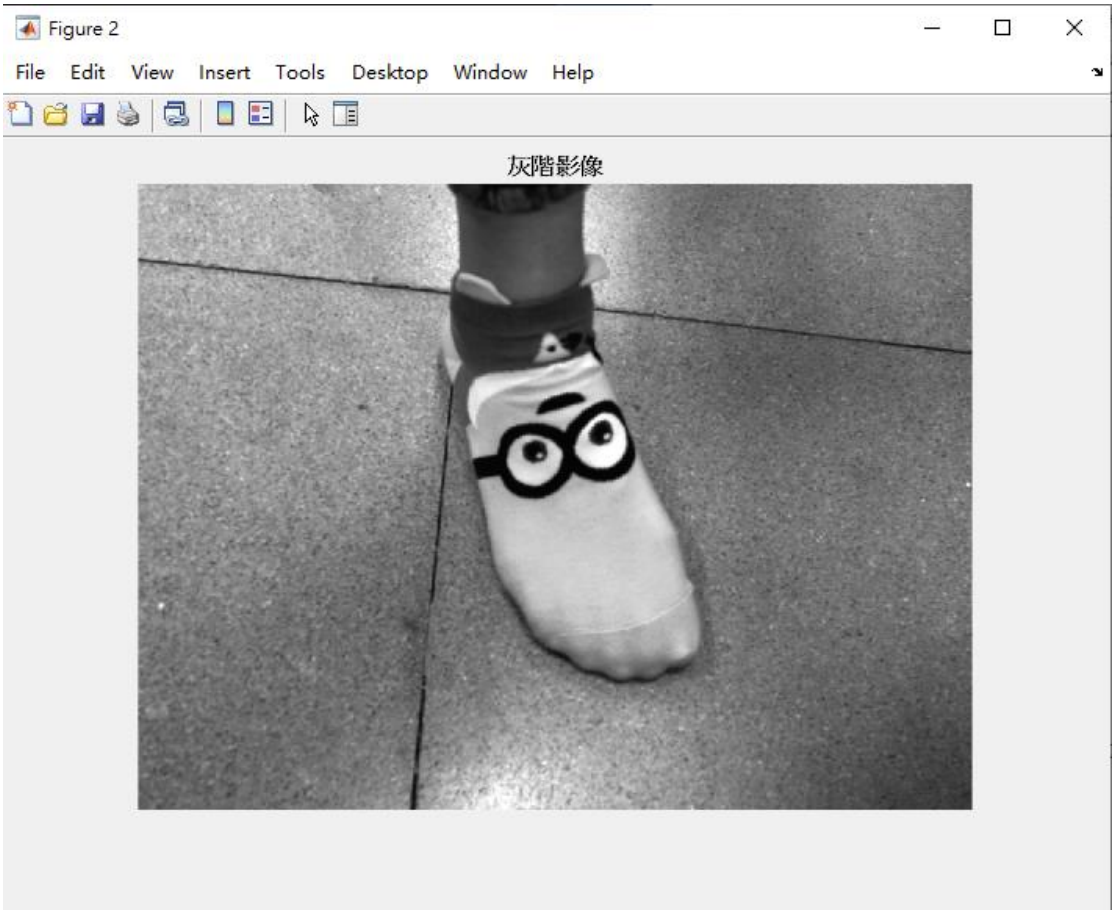
a. B10521130 宋沂芸

B10521131 徐梓翔

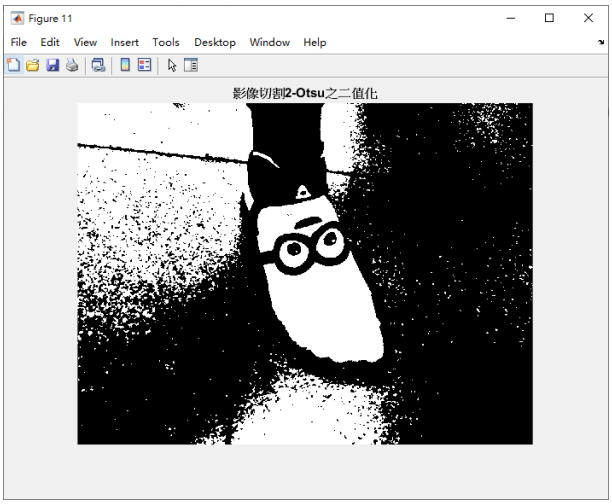
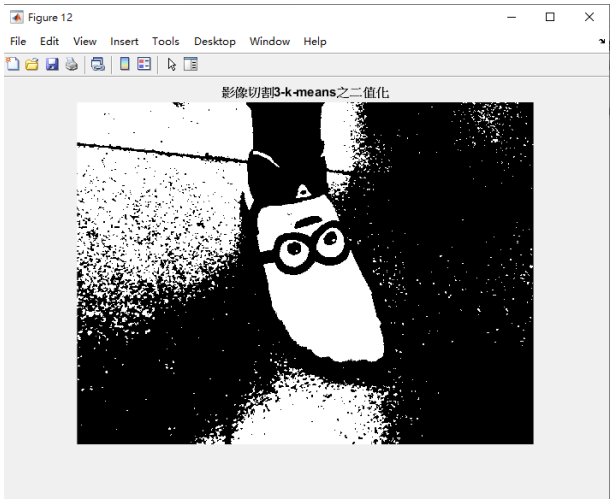
B10521138 洪宜君

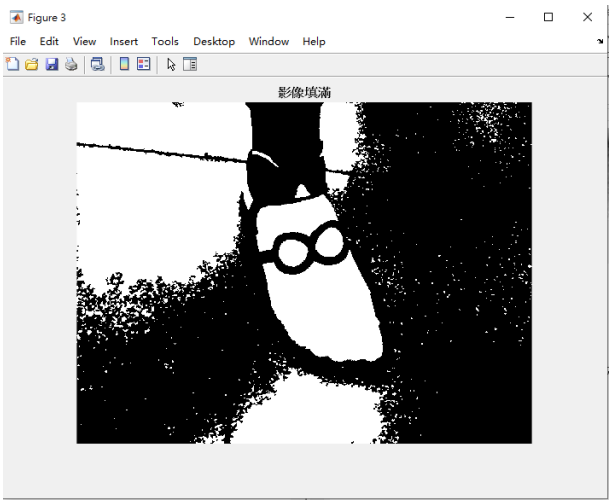
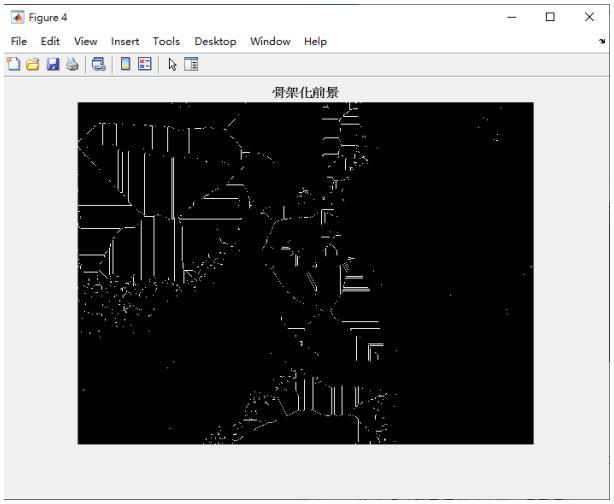
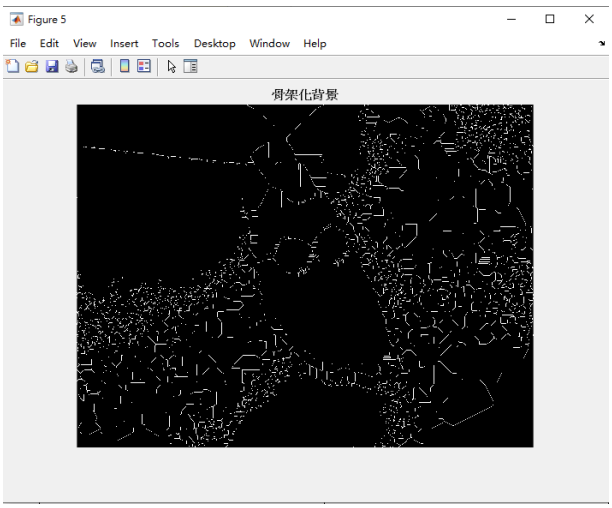
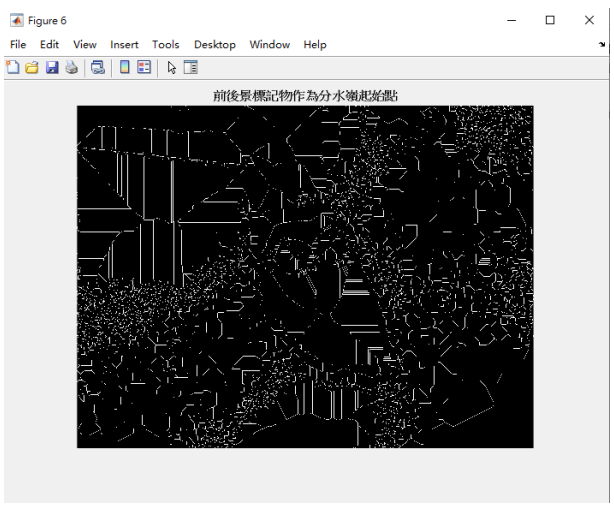
B10521141 蔡昕頤

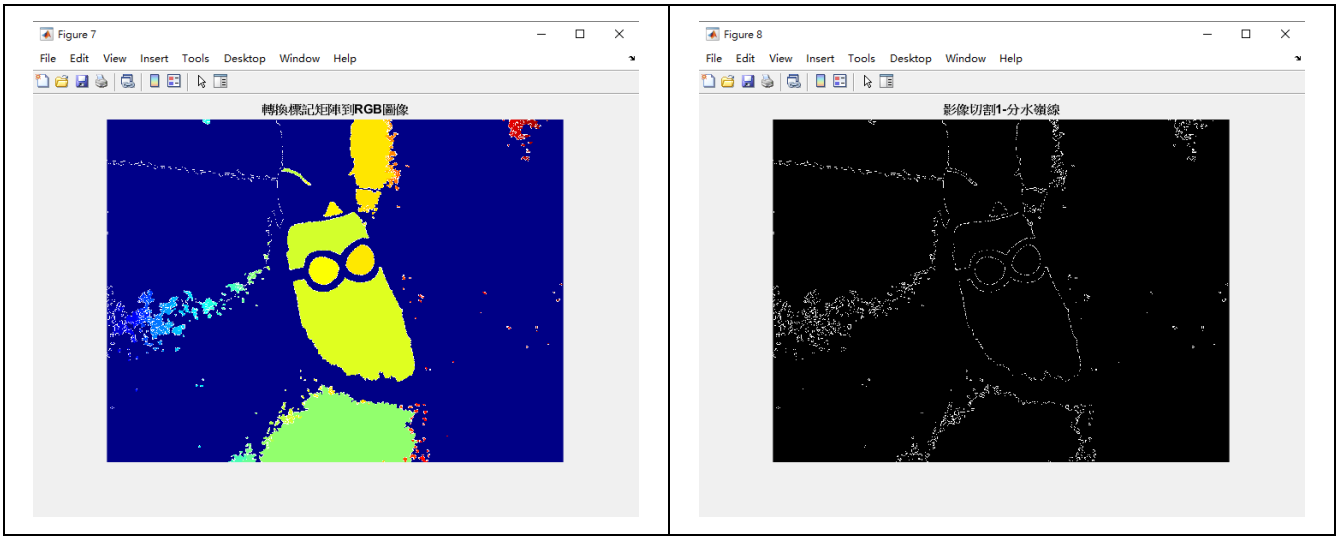
b. i 灰階影像



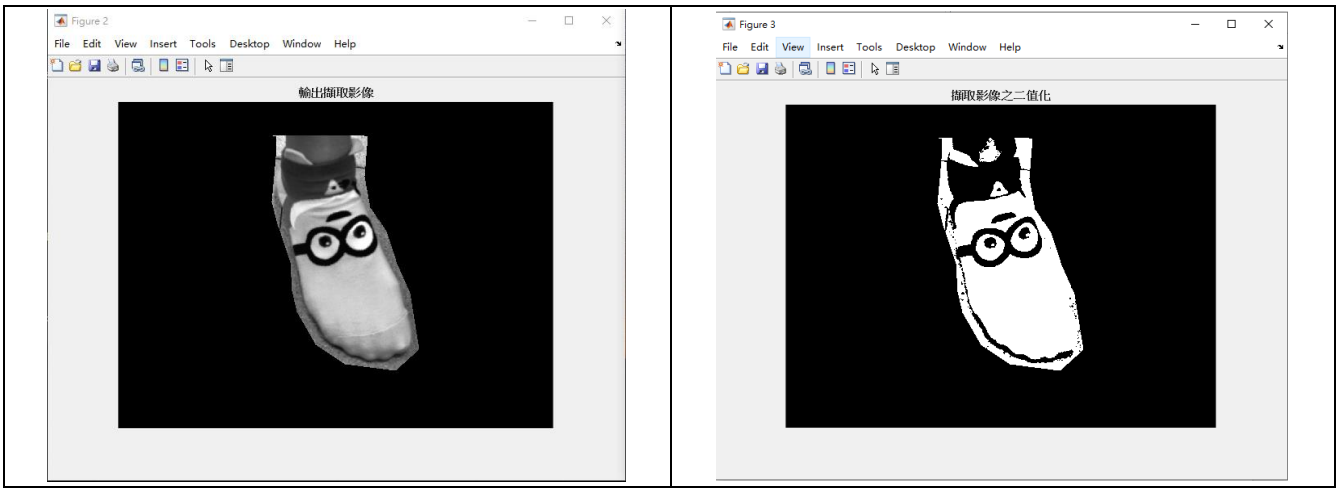
ii Otsu, k-means 及 Mark-controlled Watershed 切割前述影像，並以二值化輸出

Otsu	k-means
	

Watershed	
	
	



iii 應用 ginput 擷取關注區域及 roipoly 計算黃金標準之二值化影像



iv 測試上述三演算法相似度之相異性

Watershed=0.0212

Otsu=0.2301

k-means=0.1205

v Matlab 程式碼

```
A = imread('C:\Users\Tepao_Sung\Desktop\sock.jpg');
%imshow(A);title('原始影像');


%灰階影像
B=rgb2gray(A);
figure;imshow(B);title('灰階影像');
%[y,x]=imhist(B);
%figure;bar(x,y);title('灰階影像直方圖');


%Watershed-影像切割
[m,n]=size(B);
Bdb=double(B);%圖片轉成double精度類型(0~1)
%figure;imshow(Bdb/255);title('灰階影像轉成double');


hy=fspecial('sobel');%利用sobel算子計算梯度影像
hx=hy';
Iy = imfilter(Bdb, hy, 'replicate');
Ix = imfilter(Bdb, hx, 'replicate');
[Ix, Iy]=gradient(Bdb);
gradmag = sqrt(Ix.^2 + Iy.^2);
%figure;imshow(gradmag,[]);title('Sobel算子-梯度影像');


level=graythresh(B);%Otsu切割影像
plabel=imbinarize(B,level);
%figure;imshow(plabel);title('影像強化之二值化');
plabel1=imfill(plabel,'holes');
%figure;imshow(plabel1);title('影像填滿');


plabel2=imerode(plabel1, ones(5));%前景骨架化
plabel3=bwmorph(plabel2,'skel',Inf);
%figure;imshow(plabel3);title('骨架化前景');


back=1-plabel1;%背景骨架化
```

```
back1=imerode(back,ones(5));
back2=bwmorph(back1,'skel',Inf);
%figure;imshow(back2),title('骨架化背景');


%figure;imshow(plabel3|back2);title('前後景標記物作為分水嶺起始點');


gradmag2=imimposemin(gradmag, plabel3|back2);%
%figure;imshow(gradmag2);title('分水嶺分割');
L2 = watershed(gradmag2);
rgb=label2rgb(L2);
%figure;imshow(rgb);title('轉換標記矩陣到RGB圖像');
XX=L2==0;
%figure;imshow(XX),title('影像切割1-分水嶺線');


%應用 Otsu 及 k-means,切割前述影像強化之二值化
C1=graythresh(B);%Otsu
BW1=imbinarize(B,C1);
%figure;imshow(BW1);title('影像切割2-Otsu之二值化');


J=double(B);%k-means
[m,n]=size(B);
X=reshape(J,m*n,1);
[cidx,ctrs]=kmeans(X,2);
rergb=reshape(cidx,m,n);
%figure;imshow(rergb,[]);title('影像切割3-k-means之二值化');


%應用ginput 擷取關注區域
figure;imshow(B);title('ginput 擷取關注區域影像');
[r, c]=ginput;
K=roipoly(B,r,c);
[R,C]=size(K);
for i=1:R
    for j=1:C
        if K(i,j)==1;
            Out(i,j)=B(i,j);
        else
```

```
                Out(i,j)=0;
            end
        end
end
figure;imshow(Out,[]);title('輸出擷取影像');
%L = imread('C:\Users\Tepao_Sung\Desktop\sock_ginput.jpg');
L=uint8(Out);
M = imbinarize(L);
figure;imshow(M);title('擷取影像之二值化');


%計算相似度
S1=sum(sum(M&XX))/sum(sum(M|XX));%Watershed
S2=sum(sum(M&BW1))/sum(sum(M|BW1));%Otsu
S3=sum(sum(M&rergb))/sum(sum(M|rergb));%K-means
```

c. 選擇兩類具代表性紋理分析之影像