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電腦輔助檢測與診斷作業

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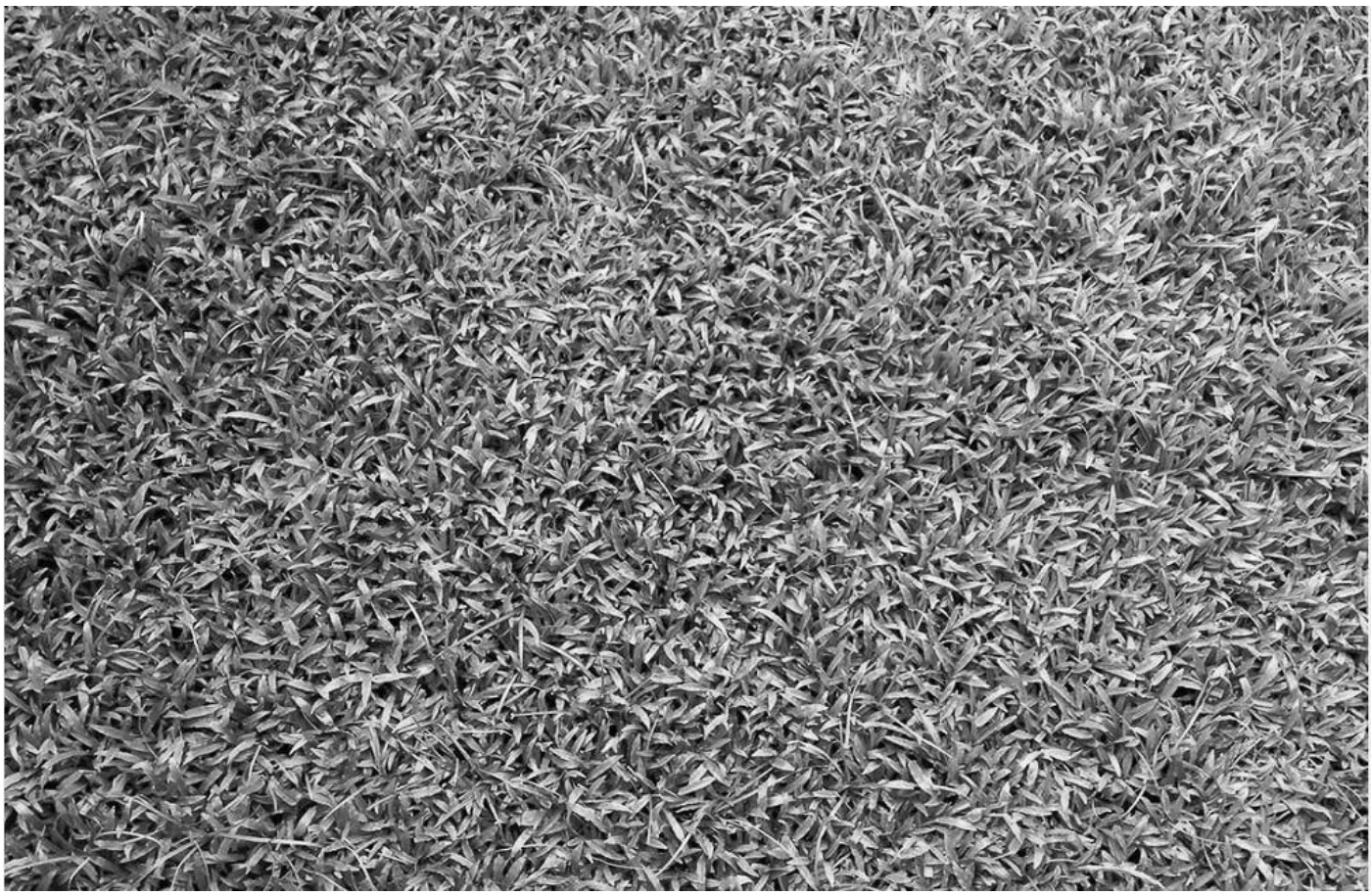
b.



rand('seed', 2)

GRNN

```
EVAL_Train =

    0.3500    0.2667    0.4333    0.2909


EVAL_Test =

    0.2750    0.2000    0.3500    0.2162
```

GRNN

```
clear all;close all;
tempa=imread('grass.bmp');
temp=tempa(:,:,1:3)
figure;imshow(temp);
temp1=double(rgb2gray(temp));
[m, n]=size(temp1);
figure;imshow(temp1,[]);
%%%%%%%%%%%%%%% Image Generation Parameters
width = 64; height=64;numberOfImage=200;
%%%%%%%%%%%%%%%%%%%%%%
```

```
Partition1=ceil(0.6*numberOfImage);
Partition2=ceil(0.2*numberOfImage);
Partition3=ceil(0.2*numberOfImage);
%%%%%%%%%%%%%%%%%%%%%%%
rand('seed', 2);
Feature1=[];
for i=1:numberOfImage
a=ceil(rand*(m-height));
b=ceil(rand*(n-width));
hold on; plot([b b b+width b+width b],[a a+height a+height a a],'r','LineWidth', 3);
temp2=temp1(a:a+height-1, b:b+width-1);
feature=gfeature(double(temp2),'0');
Feature1=[Feature1, feature];
end
%%%%%%%%%%%%%%%%%%% Start the 2nd Image**********
tempa=imread('wood.bmp');
temp=tempa(:,:,1:3)
figure;imshow(temp);
temp1=double(rgb2gray(temp));
[m, n]=size(temp1);
figure;imshow(temp1,[]);
Feature2=[];
for i=1:numberOfImage
a=ceil(rand*(m-height));
b=ceil(rand*(n-width));
hold on; plot([b b b+width b+width b],[a a+height a+height a a],'b','LineWidth', 3);
temp2=temp1(a:a+height-1, b:b+width-1);
feature=gfeature(double(temp2),'0');
Feature2=[Feature2, feature];
end
% End Feature Extraction
P1=Feature1(:,1:Partition1);
P2=Feature2(:,1:Partition1);
P_Tr=[P1 P2];
T_Tr=[zeros(1,Partition1) ones(1, Partition1)];
P1=Feature1(:,Partition1+1:Partition1+Partition2);
P2=Feature2(:,Partition1+1:Partition1+Partition2);
P_Te=[P1 P2];
T_Te=[zeros(1,numberOfImage-(Partition1+Partition3)), ones(1,numberOfImage-
(Partition1+Partition3))];
P1=Feature1(:,Partition1+Partition2+1:numberOfImage);
```

```
P2=Feature2(:,Partition1+Partition2+1:numberOfImage);
P_Vali=[P1 P2];
T_Vali=[zeros(1,numberOfImage-(Partition1+Partition2)), ones(1,numberOfImage-
(Partition1+Partition2))];
%%%%%% Train GRNN
%
pause
%
A_Tr=[];
A_Te=[];
A_Vali=[];
x=[0.1:0.1:10];
for Sigma=0.1:0.1:10
net=newgrnn(P_Tr,T_Tr,Sigma);
out=sim(net,P_Tr);
accuracyTr=(length(T_Tr)-sum(abs(T_Tr-out)>0.5))/length(T_Tr);
A_Tr=[A_Tr accuracyTr];
out=sim(net,P_Te);
accuracyTe=(length(T_Te)-sum(abs(T_Te-out)>0.5))/length(T_Te);
A_Te=[A_Te accuracyTe];
out=sim(net,P_Vali);
accuracyVali=(length(T_Vali)-sum(abs(T_Vali-out)>0.5))/length(T_Vali);
A_Vali=[A_Vali accuracyVali];
end
figure;plot(x, A_Tr,'b-');hold on;plot(x, A_Te,'r');plot(x, A_Vali,'k');plot(x,
A_Tr+A_Te+A_Vali,'g');
%%
pause
%%
%-p°âAccuracy, Sensitivity, Specificity, F-measure
Sigma=4;
net=newgrnn(P_Tr,T_Tr,Sigma);
save('ImageClassification.mat');

load('ImageClassification.mat', 'net','height','width');
out_Tr=sim(net,P_Tr);
out_Te=sim(net,P_Te);
out_Vali=sim(net,P_Vali);
EVAL_Train = Evaluate(T_Tr,out_Tr)
EVAL_Test = Evaluate(T_Te,out_Te)
EVAL_Vali = Evaluate(T_Te,out_Vali)
```

```
%%
pause
%%
%%Test Grnn
tempa=imread('grass.bmp');
temp=tempa(:,:,1:3)
temp1=double(rgb2gray(temp));
tempb=imread('wood.bmp');
temp=tempb(:,:,1:3)
temp2=double(rgb2gray(temp));
I=[temp1 temp1;temp1 temp1;temp2 temp2;temp2 temp2];
figure;imshow(I,[])
while pause
    disp('Select a test point')
[b,a]=ginput(1);
b=round(b);a=round(a);
N1=I(a:a+height-1,b:b+width-1);
F=gfeature(double(N1),'0');
out1=sim(net,F);
hold on;
if out1 > 0.5
  plot([b b b+width b+width b],[a a+height a+height a a], 'b:','LineWidth', 3)
else
  plot([b b b+width b+width b],[a a+height a+height a a],'r:','LineWidth',3)
end
end
```

BPNN

rng(2)

```
EVAL_Train =

    0    0    0  NaN


EVAL_Test =

    0    0    0  NaN
```

BPNN

```
clear all;close all;
temp=imread('grass.bmp');
figure;imshow(temp);
temp1=double(rgb2gray(temp));
[m, n]=size(temp1);
figure;imshow(temp1,[]);
%%%%%%%%%%%%%%% Image Generation Parameters
width = 64; height=64;numberOfImage=100;
%%%%%%%%%%%%%%%%%%%%%%
Partition1=ceil(0.6*numberOfImage);
Partition2=ceil(0.2*numberOfImage);
Partition3=ceil(0.2*numberOfImage);
%%%%%%%%%%%%%%%%%%%%%%%%
rng(2);
Feature1=[];
for i=1:numberOfImage
a=ceil(rand*(m-height));
b=ceil(rand*(n-width));
hold on; plot([b b b+width b+width b],[a a+height a+height a a],'r','LineWidth', 3);
temp4=temp1(a:a+height-1, b:b+width-1);
feature=gfeature(double(temp4),'0');
Feature1=[Feature1, feature];
end
%%%%%%%%%%%%%%%%%%% Start the 2nd Image**********
temp=imread('wood.bmp');
figure;imshow(temp);
temp1=double(rgb2gray(temp));
[m, n]=size(temp1);
```

```
figure;imshow(temp1,[]);
Feature2=[];
for i=1:numberOfImage
a=ceil(rand*(m-height));
b=ceil(rand*(n-width));
hold on; plot([b b b+width b+width b],[a a+height a+height a a],'b','LineWidth', 3);
temp4=temp1(a:a+height-1, b:b+width-1);
feature=gfeature(double(temp4),'0');
Feature2=[Feature2, feature];
end
% End Feature Extraction
P1=Feature1(:,1:Partition1);
P2=Feature2(:,1:Partition1);
P_Tr=[P1 P2];
T_Tr=[zeros(1,Partition1) ones(1, Partition1)];
P1=Feature1(:,Partition1+1:Partition1+Partition2);
P2=Feature2(:,Partition1+1:Partition1+Partition2);
P_Te=[P1 P2];
T_Te=[zeros(1,numberOfImage-(Partition1+Partition3)), ones(1,numberOfImage-
(Partition1+Partition3))];
P1=Feature1(:,Partition1+Partition2+1:numberOfImage);
P2=Feature2(:,Partition1+Partition2+1:numberOfImage);
P_Vali=[P1 P2];
T_Vali=[zeros(1,numberOfImage-(Partition1+Partition2)), ones(1,numberOfImage-
(Partition1+Partition2))];
%
pause
%
E_Tr=[];
E_Te=[];
E_Vali=[];
x=[1:1:40];
for node=1:1:40
net=newff(P_Tr,T_Tr,node);
out_Tr=sim(net,P_Tr);
err_Tr=immse(T_Tr,out_Tr);
E_Tr=[E_Tr err_Tr];
out_Te=sim(net,P_Te);
err_Te=immse(T_Te,out_Te);
E_Te=[E_Te err_Te];
out_Vali=sim(net,P_Vali);
```

```
err_Vail=immse(T_Te,out_Te);
E_Vali=[E_Vali err_Vail];
end
figure;plot(x, E_Tr,'b-');hold on;plot(x, E_Te,'r');plot(x, E_Vali,'k');plot(x,
E_Tr+E_Te+E_Vali,'g');
%%
pause
%%
%node=2®É¡Aerror³Ì§C
node=2;
net=newff(P_Tr,T_Tr,node);


out_Tr=sim(net,P_Tr);
out_Te=sim(net,P_Te);
out_Vali=sim(net,P_Vali);
EVAL_Train = Evaluate(T_Tr,out_Tr)
EVAL_Test = Evaluate(T_Te,out_Te)
EVAL_Vali = Evaluate(T_Te,out_Vali)
```