numberPlateExtraction.m

```
functionnumberPlateExtraction
%NUMBERPLATEEXTRACTION extracts the characters from the input number plate image.

closeall
[F P]=uigetfile({'*.jpg';'*.bmp'},'Image Selector');
ab=strcat(P,F);
P=ab;
Path = fopen('Path.txt', 'wt');
fprintf(Path,'%s\n',P);
fclose(Path);
f=imread(ab
f=imresize(f,[400 NaN]);
g=rgb2gray(f);
g=medfilt2(g,[3 3]);
se=strel('disk',1);
gi=imdilate(g,se);
ge=imerode(g,se);
gdiff=imsubtract(gi,ge);
gdiff=mat2gray(gdiff);
gdiff=conv2(gdiff,[1 1;1 1]);
gdiff=imadjust(gdiff,[0.5 0.7],[0 1],0.1);
B=logical(gdiff);
```

```
er=imerode(B,strel('line',50,0));
out1=imsubtract(B,er);
F=imfill(out1,'holes');
H=bwmorph(F,'thin',1);
H=imerode(H,strel('line',3,90));
final=bwareaopen(H,100);
Iprops=regionprops(final,'BoundingBox','Image');
 NR=cat(1,Iprops.BoundingBox);
r=controlling(NR);.
if ~isempty(r) .
   I={Iprops.Image};
noPlate=[];
for v=1:length(r)
       N=I{1,r(v)};
letter=readLetter(N);
while letter=='O' || letter=='0'
if v<=3                              letter='O';
else                                 letter='0';
end
break;                          end
noPlate=[noPlate letter];    end
fid = fopen('Plate.txt', 'wt');
fprintf(fid,'%s\n',noPlate);
fclose(fid);
winopen('Plate.txt')
data=strcat('http://localhost/freehtml5phone/Simulation.php?go=',P);
```

```
web(data,'-browser')

else
data=strcat('http://localhost/freehtml5phone/addnew.php?go=',P);

web(data,'-browser')
closeall
end
end
```

controlling.m

```
function r=controlling(NR)
%CONTROLLING determine the array of indices of Bounding boxes of interest.

[Q,W]=hist(NR(:,4));
ind=find(Q==6);

for k=1:length(NR)
   C_5(k)=NR(k,2) * NR(k,4);
end
NR2=cat(2,NR,C_5');
[E,R]=hist(NR2(:,5),20);
Y=find(E==6);
if length(ind)==1
   MP=W(ind);
binsize=W(2)-W(1); .
container=[MP-(binsize/2) MP+(binsize/2)];
   r=takeboxes(NR,container,2);
elseif length(Y)==1
   MP=R(Y);
binsize=R(2)-R(1);
container=[MP-(binsize/2) MP+(binsize/2)];
   r=takeboxes(NR2,container,2.5);
elseifisempty(ind) || length(ind)>1
   [A,B]=hist(NR(:,2),20);
   ind2=find(A==6);
```

```
if length(ind2)==1
        MP=B(ind2);
binsize=B(2)-B(1);
container=[MP-(binsize/2) MP+(binsize/2)];        r=takeboxes(NR,container,1);
else
container=guessthesix(A,B,(B(2)-B(1)));.
if ~isempty(container)
            r=takeboxes(NR,container,1);
elseifisempty(container)
            container2=guessthesix(E,R,(R(2)-R(1)));
if ~isempty(container2)
                r=takeboxes(NR2,container2,2.5);
else
                r=[];
end
end
end
end
end
```

create_templates.m

```
%CREATE TEMPLATES
%Letter
A=imread('A.bmp');B=imread('B.bmp');
C=imread('C.bmp');D=imread('D.bmp');
E=imread('E.bmp');F=imread('F.bmp');
G=imread('G.bmp');H=imread('H.bmp');
I=imread('I.bmp');J=imread('J.bmp');
K=imread('K.bmp');L=imread('L.bmp');
M=imread('M.bmp');N=imread('N.bmp');
O=imread('O.bmp');P=imread('P.bmp');
Q=imread('Q.bmp');R=imread('R.bmp');
S=imread('S.bmp');T=imread('T.bmp');
U=imread('U.bmp');V=imread('V.bmp');
W=imread('W.bmp');X=imread('X.bmp');
Y=imread('Y.bmp');Z=imread('Z.bmp');
Afill=imread('fillA.bmp');
Bfill=imread('fillB.bmp');
Dfill=imread('fillD.bmp');
Ofill=imread('fillO.bmp');
Pfill=imread('fillP.bmp');
Qfill=imread('fillQ.bmp');
Rfill=imread('fillR.bmp');
```

```
%Number
one=imread('1.bmp');  two=imread('2.bmp');
three=imread('3.bmp');four=imread('4.bmp');
five=imread('5.bmp'); six=imread('6.bmp');
seven=imread('7.bmp');eight=imread('8.bmp');
nine=imread('9.bmp'); zero=imread('0.bmp');
zerofill=imread('fill0.bmp');
fourfill=imread('fill4.bmp');
sixfill=imread('fill6.bmp');
sixfill2=imread('fill6_2.bmp');
eightfill=imread('fill8.bmp');
ninefill=imread('fill9.bmp');
ninefill2=imread('fill9_2.bmp');



%*-*-*-*-*-*-*-*-*-*-*-*-*-
letter=[A Afill B Bfill C D Dfill E F G H I J K L M...
    N O Ofill P Pfill Q Qfill R Rfill S T U V W X Y Z];

number=[one two three four fourfill five...
sixsixfill sixfill2 seven eight eightfill nine ninefill ninefill2 zero zerofill];

character=[letter number];

NewTemplates=mat2cell(character,42,[24 24 24 24 24 24 24 24 ...
    24 24 24 24 24 24 24 24 ...
```

```
    24 24 24 24 24 24 24 ...
    24 24 24 24 24 24 24 ...
    24 24 24 24 24 24 24 ...
    24 24 24 24 24 24 24 ...
    24 24 24 24 24 24 24]);
```

```
save ('NewTemplates','NewTemplates')
clearall
```

readLetter.m

```
function letter=readLetter(snap)
loadNewTemplates
snap=imresize(snap,[42 24]);
comp=[ ];
for n=1:length(NewTemplates)
sem=corr2(NewTemplates{1,n},snap);.
comp=[comp sem]; end
vd=find(comp==max(comp));
% Alphabets listings.
ifvd==1 || vd==2
letter='A';
elseifvd==3 || vd==4
letter='B';
elseifvd==5
letter='C';
elseifvd==6 || vd==7
letter='D';
elseifvd==8
letter='E';
elseifvd==9
letter='F';
elseifvd==10
letter='G';
elseifvd==11
letter='H';
elseifvd==12
letter='I';
```

```
elseifvd==13
letter='J';
elseifvd==14
letter='K';
elseifvd==15
letter='L';
elseifvd==16
letter='M';
elseifvd==17
letter='N';
elseifvd==18 || vd==19
letter='O';
elseifvd==20 || vd==21
letter='P';
elseifvd==22 || vd==23
letter='Q';
elseifvd==24 || vd==25
letter='R';
elseifvd==26
letter='S';
elseifvd==27
letter='T';
elseifvd==28
letter='U';
elseifvd==29
letter='V';
elseifvd==30
```

```
letter='W';
elseifvd==31
letter='X';
elseifvd==32
letter='Y';
elseifvd==33
letter='Z';
%*-*-*-*-*
% Numerals listings.
elseifvd==34
letter='1';
elseifvd==35
letter='2';
elseifvd==36
letter='3';
elseifvd==37 || vd==38
letter='4';
elseifvd==39
letter='5';
elseifvd==40 || vd==41 || vd==42
letter='6';
elseifvd==43
letter='7';
elseifvd==44 || vd==45
letter='8';
elseifvd==46 || vd==47 || vd==48
letter='9';
```

```
else
letter='0';
end
end
```

guessthesix.m

```
function container=guessthesix(Q,W,bsize)
for l=5:-1:2
val=find(Q==l);
var=length(val);
ifisempty(var) || var == 1
ifval == 1
index=val+1;
else
index=val;
end
if length(Q)==val
index=[];
end
if Q(index)+Q(index+1) == 6
container=[W(index)-(bsize/2) W(index+1)+(bsize/2)];
break;
elseif Q(index)+Q(index-1) == 6
container=[W(index-1)-(bsize/2) W(index)+(bsize/2)];
break;
end
else
for k=1:1:var
ifval(k)==1
index=val(k)+1;
else
index=val(k);
end
```

```
if length(Q)==val(k)
index=[];
end
if Q(index)+Q(index+1) == 6
container=[W(index)-(bsize/2) W(index+1)+(bsize/2)];
break;
elseif Q(index)+Q(index-1) == 6
container=[W(index-1)-(bsize/2) W(index)+(bsize/2)];
break;
end
end
if k~=var
break;
end
end
end
if l==2
container=[];
end
end
```

takeboxes.m

```
function r=takeboxes(NR,container,chk)
takethisbox=[];
fori=1:size(NR,1)
if NR(i,(2*chk))>=container(1) && NR(i,(2*chk))<=container(2)
takethisbox=cat(1,takethisbox,NR(i,:));
end
end
r=[];
for k=1:size(takethisbox,1)
var=find(takethisbox(k,1)==reshape(NR(:,1),1,[]));
if length(var)==1
      r=[r var];
else
for v=1:length(var)
          M(v)=NR(var(v),(2*chk))>=container(1) &&
NR(var(v),(2*chk))<=container(2);
end
var=var(M);
      r=[r var];
end
end
end
```