



# UPPSALA UNIVERSITET

Computer-Assisted Image Analysis I

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# 1 Observed Result

Average Precision: 0.977500 and Elapsed Time: 9.374637 seconds

## 2 Code

```
1 function S = myclassifier(im)
2
3 %This classifier is not state of the art... but should give you an
   idea of
4 %the format we expect to make it easy to keep track of your scores.
   Input
5 %is the image, output is a 1 x 3 vector of the three numbers in the
   image
6 %
7 %This baseline classifier tries to guess... so should score about
   (3^3)^-1
8 %on average, approx. a 4% chance of guessing the correct answer.
9 %
10
11 % Removing noise
12 filim = medfilt2(im, [7,7]);
13 thrs = graythresh(filim);
14 im = ~im2bw(filim,thrs);
15 im = bwareaopen(im,30);
16
17 % Segmenting and labeling
18 [L Ne] = bwlabel(im);
19
20 result = [NaN,NaN,NaN];
21 indx = 1;
22 workwithlabel = 0;
23
24 % Check if objects are joined.
25 if Ne == 2
26
27     [r,c] = find(L==1);
28     im1=im(min(r):max(r),min(c):max(c));
29     img1=imresize(im1,[28 28]);
30 %     figure;
31 %     imshow(img1);
32
33     Idist = bwdist(~img1);
34     Idist = -Idist;
35     L1= watershed(Idist);
36     L1(~img1) = 0;
37     rgb = label2rgb(L1, 'jet', [.5 .5 .5]);
38
```

```

39 CC = bwconncomp(L1);
40 ctr1 = CC.NumObjects;
41
42
43 [r,c] = find(L==2);
44 im2=im(min(r):max(r),min(c):max(c));
45 img2=imresize(im2,[28 28]);
46 %     figure;
47 %     imshow(img2);
48
49 Idist = bwdist(~img2);
50 Idist = -Idist;
51 L2= watershed(Idist);
52 L2(~img2) = 0;
53 rgb = label2rgb(L2, 'jet', [.5 .5 .5]);
54
55 CC = bwconncomp(L2);
56 ctr2 = CC.NumObjects;
57
58 if ctr1 > ctr2
59     I1 = img1(:, 1 : end/2);
60     I2 = img1(:, end/2+1 : end );
61     indx = 1;
62     workwithlabel = 2;
63
64 else
65     I1 = img2(:, 1 : end/2);
66     I2 = img2(:, end/2+1 : end );
67     indx = 2;
68     workwithlabel = 1;
69 end
70
71 img3=imresize(I1,[28 28]);
72 %     figure;
73 %     imshow(img3);
74 foundwhite = 0;
75 ctr3= 0;
76 for i = 1 : 28
77     for j = 20
78         if img3(i,j) == 1 && foundwhite == 0
79             ctr3 = ctr3 + 1;
80             foundwhite = 1;
81         elseif img3(i,j) == 0
82             foundwhite = 0;
83         end
84     end
85 end
86 if ctr3 == 3
87     result(indx) = 2;

```

```

88     elseif ctr3 == 2
89         result(indx) = 0;
90     else
91         result(indx) = 1;
92     end
93
94     indx = indx + 1;
95     img4=imresize(I2,[28 28]);
96 %     figure;
97 %     imshow(img4);
98     foundwhite = 0;
99     ctr4= 0;
100    for i = 1 : 28
101        for j = 20
102            if img4(i,j) == 1 && foundwhite == 0
103                ctr4 = ctr4 + 1;
104                foundwhite = 1;
105            elseif img4(i,j) == 0
106                foundwhite = 0;
107            end
108        end
109    end
110    if ctr4 == 3
111        result(indx) = 2;
112    elseif ctr4 == 2
113        result(indx) = 0;
114    else
115        result(indx) = 1;
116    end
117 end
118
119 indx = 1;
120
121 startwith = 1;
122
123 if Ne == 2
124     startwith = 2;
125     if workwithlabel == 1
126         indx = 1;
127     else
128         indx = 3;
129     end
130 end
131
132 for n=startwith:Ne
133
134     if Ne == 2
135         [r,c] = find(L==workwithlabel);
136     else

```

```

137         [r,c] = find(L==n);
138     end
139     n1=im(min(r):max(r),min(c):max(c));
140     img=imresize(n1,[28 28]);
141     %         figure;
142     %         imshow(img);
143     foundwhite = 0;
144     ctr= 0;
145     for i = 1 : 28
146         for j = 20
147             if img(i,j) == 1 && foundwhite == 0
148                 ctr = ctr + 1;
149                 foundwhite = 1;
150             elseif img(i,j) == 0
151                 foundwhite = 0;
152             end
153         end
154     end
155     if ctr == 3
156         result(indx) = 2;
157     elseif ctr == 2
158         result(indx) = 0;
159     else
160         result(indx) = 1;
161     end
162     indx = indx + 1;
163 end
164 S = result(:,1:3);
165 end

```