Assignment 1—Group:

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6th September 2018

Abstract

Abstract text goes here, justified and in italics. The abstract would normally be one paragraph long.

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This template should be used as a starting point for your report.

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Your conclusion goes at the end, followed by References, which must follow the Vancouver Style (see: www.icmje.org/index.html). References begin below with a header that is centered. Only the first word of an article title is capitalized in the References.

A Appendix

Algorithm 1: The Levenberg–Marquardt algorithm iteratively finds optimal macroscale Robin boundary conditions.

```
1  %A=imread('C:\Users\chenc\OneDrive - UNSW\machine learning\
       assignment 1\data\CroppedYaleB\yaleB01\yaleB01_P00A+000E+00.
       pgm');
2  red=3;
3  k=40;
4
5  imagefiles = dir('data/ORL/*/*.pgm');
6  imagefiles2=struct2cell(imagefiles);
7  imagefiles=imagefiles((~endsWith(imagefiles2(1,:),'Ambient.pgm'))
       ');
8  imagefiles2=struct2cell(imagefiles);
9  A=imread(strcat(imagefiles(1).folder,'\',imagefiles(1).name));
10 if size(A,1)==112
11     A=A(1:111,1:90);
```

```
12  end
13  A_list=zeros(size(A,1)/red,size(A,2)/red,red);
14  nfiles = length(imagefiles);     % Number of files found
15  matrix_image=zeros(prod(size(A))/red^2,nfiles);
16  temp=struct2cell(imagefiles);
17  names=temp(1,:)
18  for ii=1:nfiles
19      currentfilename = imagefiles(ii).name;
20      currentfilename=strcat(imagefiles(ii).folder,'\',
            currentfilename);
21      currentimage = imread(currentfilename);
22      if abs(size(A,1)-112)<=1
23       currentimage=currentimage(1:111,1:90);
24      end
25
26      for i=1:red
27       A_list(:,:,i)=currentimage(i:red:end,i:red:end);
28      end
29      A2=uint8(mean(A_list,3));
30      matrix_image(:,ii) = A2(:);
31  end
32
33  [w h]=NeNMF(matrix_image,k);
34  idx = kmeans(h',k)
35  Y_pred=zeros(size(matrix_image,2),1)
36  namess=str2mat(string(imagefiles2(2,:))')
37  namess=str2num(namess(:,end-1:end))
38  for ii=unique(idx)'
39      ind= (idx==ii);
40      Y_pred(ind)=mode(namess(ind,:));
41  end
42  nmi(Y_pred,namess)
```