MATLAB Exercise 2

Exercise 3
CSC872
Pattern Analysis and Machine Intelligence

Platforms

• MATLAB
  – MathWorks: http://www.mathworks.com/

• MATLAB clones
  – Octave: http://www.gnu.org/software/octave/
  – SciLab: http://www.scilab.org/

• Various tutorials available online
**Vectors**

- Create vector: use brackets
- Transpose
- Colon operator, `1:2`
- Accessing elements
- Vector operations: dimensions
  - `size`
  - `length`
  - `mean`
  - `std`
  - `sum`
  - `sort`

**Matrix**

- Create matrix
- Transpose
- Matrix operator: inv, eig etc.
- Vectorization: M(:)
- Matrix operations: `.*`, `./`, `\`, `Ax=b`
- `rand`, `randn`
- `ones`
- `zeros`
- `eye`
- `size`, `length`, `max`, `min`, `diag`
Plotting

- Plot
- Hist
- Mesh
- Surf

Figure

- >> figure
- >> hold
- >> title
- >> xlabel, ylabel
- >> legend
- >> axis
- >> subplot
Print

- >> print

Image

- >> imread, imwrite
- >> imagesc
- >> colormap('gray')
- >> imresize (HERE)
- >> data types
Useful MATLAB Codes

• For I/O
• `dir('string')`
• `Imread('filename')`
• `Imresize(img,0.25)` make it a quarter size
• `size(img)`, returns the size of a matrix
• `vector = Matrix(:)` colon operator to vectorize a matrix
• `dimg = double(img)`: casting the type to double!!
  – This is important because image data is Int type but MATLAB built-in functions expects data to be double type.

Exercise

• Make a random matrix
• Modify the matrix arithmetically
• Create a vector from the matrix
• Sort the vector & plot it in a figure
• Make a plot of tangent curve.
• Make a histogram and display it in a figure
## String

- `>> disp`
- `>> sprintf`

## File I/O

- `>> dir`
- `>> fopen, fclose`
- `>> fprintf, fscanf, fwrite, fread`
Loops/Conditions

• Relationship: > < >= <= == ~=
• For loop
• While loop
• break
• If … elseif … else … end

Script & Function

• M-flies
• Script
• Function
• Comments
• Path (path, Path tool)
• Path tool! ← to open a tool to set path
• >> input
Exercise

• Write a reusable function to
  – Load a color image with specific format from the current directory
  – Display color and bw versions of the same image in a single figure (use subplot)
  – Binarize the image using a user specified threshold
  – Display the result
  – Compute some image statistics (mean, std, etc)
  – Make a plot of the statistics and display it in a figure
  – Save figures in a bitmap image and an eps file.