Matlab Notes

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Computer Vision (CS 461)

Matlab Basics

- Starting, stopping, help, demos, math, & variables
- Matrix definition and indexing

```
>> A = [ 1  2  3 ; 4  5  6 ; 7  8  9 ]    or   [ 1 2 3 ; 4 5 6 ; 7 8 9 ]
>> A(3,2)
>> A(3,:)
>> A(3,1:2) = [ 0  0 ]
>> A'
>> A(2,:) = A(:,1)'
>> size(A)
```

Matlab Built-Ins

- for, if, while, switch -- execution control
- who, whos, clear -- variable listing and removing
- save, load <file> -- saving or restoring a workspace
- diary <file> -- start recording to a file
  diary off ; diary on
- path, addpath -- display or add to search path
- close, close all, clc -- close windows, clear console
- double vs. uint8 -- data casting functions
- zeros(x,y,…) -- creates an all-zero x by y … matrix used for basic memory allocation

Images in Matlab (& Functions)

Images in Matlab are really matrices. The image toolbox is a special set of functions for representing matrices.

Images are either stored as uint (typically 0 to 255) or as doubles (typically ranging from 0 to 1). Take care to normalize images to this range (some functions do this automatically).

Color images are three-dimensional matrices indexed as row, column, image-band

Images in Matlab (& Functions)

Built-in functions:

A =imread(<filename>, <type>) -- pull from file

imwrite(A, <filename>, <type>) -- write to file

imagesc(A) -- display image

imshow(A) --- better way to display

Types

'tif'
'jpg'
'bmp'
'png'
'hdf'
'pcx'
'xwd'

single-quoted strings

Image ⟷ Matrix

Matlab matrix A

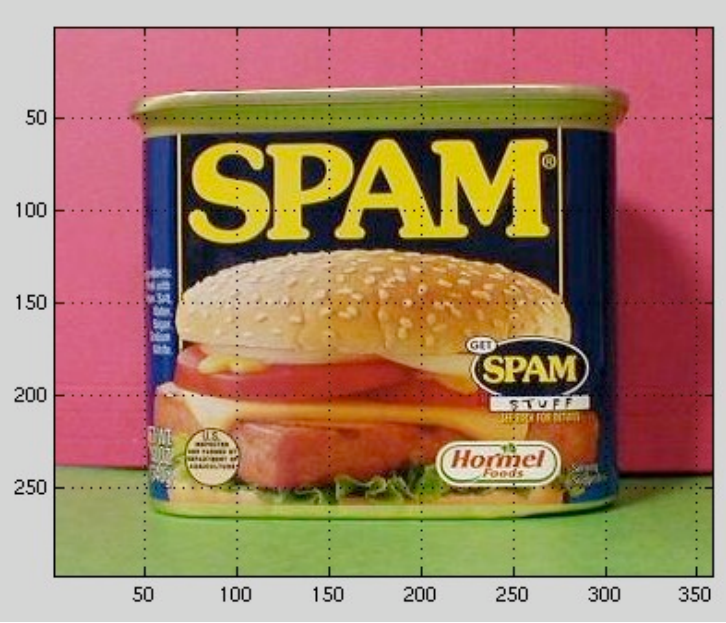
size(A)

A(1:10,1:10,:)

A(200, 50:300, 3)

The large "M"

The spam's location



Matlab Built-Ins

- F = fft2(A) -- Fourier transform: F is A's frequencies
- A = ifft2(F) -- inverse Fourier: A is F's image
- F2 = fftshift(F) -- places the coordinate system at center

- diary <file> -- start recording to a file diary off ; diary on
- keyboard -- give control back to user until return
- double vs. uint8 -- data casting functions
- zeros(x,y,…) -- creates an all-zero x by y … matrix
  used for basic memory allocation

See the CS153 reference page for more matlab links.