CogSci 109: Lecture 3

Data I/O, matlab syntax, basic visualization

Sept 28, 2006

Announcements

- Homework 0.2 has been posted at the website
  - **http://maelabs.ucsd.edu/alex/pages/cogsci109**
- Check out the posted office hours for each TA and for me
  - **Office hours for me right after class today for 2hrs, depending on demand (muir woods coffee shop)**
- You can IM me at **tcdsensei** with questions and discussions about the class
- Learning the unix operating system book

Getting Matlab

- Student edition $100 at the bookstore
  - **Has limitations, but will work for most of what we're doing quite well**
- Running matlab remotely on a machine that doesn't have it installed
  - **Tutorial on the website for getting x11 and running matlab**

About data files

- Extension of what we talked about last time
- Data must be recorded and stored for later retrieval
- Data files are a way to do this

ASCII Files

- American Standard Code for Information Interchange
- Any word processor, straight text
  - **M-files are ASCII text files, so any word processor can create them,**
    - As long as you are saving as ASCII text
    - Word has its own format, but can create ASCII text files
- Matlab can load and save m-files and standard text files (look for the extension on the end of the file name, ie “demo.m” or “data.txt”)
- Often you will be dealing with data, either in survey format, or in files which come from data acquisition systems (stored in text or binary files)

How to load text files in Matlab

- *Import wizard* menu (also works for matlab binary files)
  - **Demo**
- *M=xlsread('filename')*
  - **Reads an excel spreadsheet file and stores it into a matrix of your choosing (here it's M)**
- *Load filename .ext*
  - **loads the data in the ASCII text file *filename.ext* (where *.ext* is the extension of the filename, such as .txt)**

Saving files in ASCII format (with Matlab)

- *Save filename -ASCII*
  - **Saves files in ASCII single precision format**
  - **Numbers are represented by 1.249E+002 format for 1.249x10^2**
  - The range for single is:
    - -3.40282e+038 to -1.17549e-038 and
    - 1.17549e-038 to 3.40282e+038
- *Save filename -double*
  - ***Double precision format***
  - ***1.249D+002***
  - The range for double is:
    - -1.79769e+308 to -2.22507e-308 and 2.22507e-308 to 1.79769e+308
- *Dlmwrite('my.data.out',data, ';')* Delimited files, data separated by some character

ASCII data files

- Typically have a header of text
- Then columns of data representing each variable

```
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===settings===

  database name M, # of files: 50, stereo: 1, scale: 0.603774, full screen: 1, vision: no

121.0000   119.0000   123.0000   152.0000   98.0000   84.0000   85.0000   77.0000   84.0000   85.0000
121.0000   118.0000   123.0000   152.0000   98.0000   84.0000   85.0000   77.0000   84.0000   85.0000
121.0000   118.0000   123.0000   152.0000   98.0000   84.0000   85.0000   77.0000   84.0000   85.0000
121.0000   118.0000   123.0000   152.0000   98.0000   84.0000   85.0000   77.0000   84.0000   85.0000
121.0000   118.0000   123.0000   152.0000   98.0000   84.0000   85.0000   77.0000   84.0000   85.0000
121.0000   118.0000   123.0000   152.0000   98.0000   84.0000   85.0000   77.0000   84.0000   85.0000
121.0000   118.0000   123.0000   151.0000   98.0000   84.0000   85.0000   77.0000   84.0000   85.0000
121.0000   118.0000   123.0000   151.0000   98.0000   84.0000   85.0000   77.0000   84.0000   85.0000
121.0000   118.0000   123.0000   151.0000   98.0000   84.0000   85.0000   77.0000   83.0000   85.0000
121.0000   118.0000   123.0000   151.0000   98.0000   84.0000   85.0000   77.0000   83.0000   85.0000
121.0000   118.0000   123.0000   151.0000   98.0000   84.0000   85.0000   77.0000   83.0000   85.0000
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121.0000   118.0000   123.0000   151.0000   98.0000   84.0000   85.0000   77.0000   83.0000   85.0000
121.0000   118.0000   123.0000   151.0000   98.0000   84.0000   85.0000   77.0000   83.0000   85.0000
```

Binary files and .mat files

- A more efficient way to store files is binary format
  - **Smaller**
  - **Less platform independent - ie need to know exactly what the format is to read the file**
  - **Matlab stores a binary format with the extension .mat**
  - **Can't load these files into just any text editor like you can with ASCII**

Loading binary files in Matlab

- *Load filename*
  - **Loads all workspace variables from the file filename.mat**
  - **They appear as the same names of variables as when they were stored in the file**

Saving binary .mat files in Matlab

- *Save filename*
  - **Saves all the workspace variables in the file filename.mat**
  - **Saves in the current workspace directory**
- *Save filename variable1 variable2…*
  - **Saves only the variables you choose from the workspace into the file**

Matlab syntax demo

- A data generating script
- <to matlab!!!>

Displaying your data

- Numerically in the command window
- Plotting with matlab
  - **2D plot**
  - **Charts**
  - **pcolor**
  - **Subplot**
  - **Formatting plots**