Social Media and Political Participation

Lab 1[1]

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January 4, 2017

[1] slides modified from Pablo Barberá and Drew Dimmery

Information to access the lab computers:

username your netID (e.g. sk5350)

password `P@ssw0rd` (note the zero instead of an "o")

After logging in, press `Ctrl+Alt+Esc` to change your password.

Today

- Introductions and lab logistics
- First steps in R:
  - What is R?
  - Downloading and installing Rstudio
  - Using R as a calculator
  - Working with R scripts
- Reading and analyzing data using R
- In-class exercise: your first R script

Introductions and class logistics

Hi!

TA: **Sean Kates**

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- Graduate student associate of the SMaPP Lab
- Comparativist, Europeanist, and Oxford Comma Enthusiast
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About the lab sessions

- Six lab sessions, 2pm-4pm
  1. Jan 4. First steps in R
  2. Jan 5. Introduction to statistical analysis using R
  3. Jan 6. Introduction to Twitter and the Twitter API
  4. Jan 9. Introduction to Facebook and Facebook API
  5. Jan 10. Analyzing Facebook and Twitter data I
  6. Jan 11. Analyzing Facebook and Twitter data II
- Office hours: 12pm-2pm, Monday to Friday, on Google Hangout or my office (room 322)

Class logistics

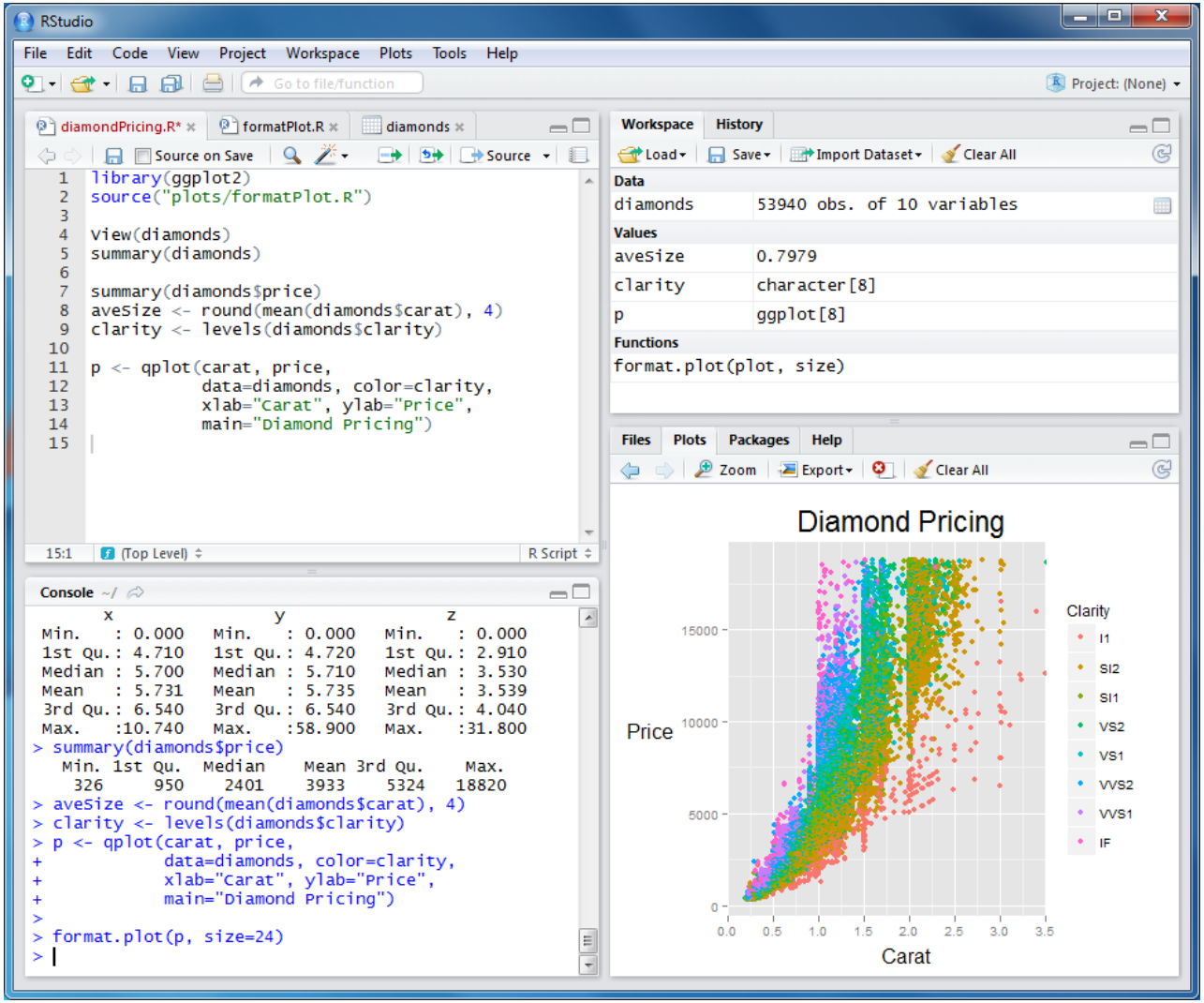
- Each lab session will have three parts:
  1. Introduction to a topic
  2. Interactive R session
  3. In-class exercise and quiz
- You're welcome to bring your own laptop. I can help you installing RStudio. But recommended to use lab computers.
- All materials (slides, code, quiz) are available on NYU Classes, in "Resources" > "Labs" folder
- Ask questions!

First steps in R

What is R?

- R is a free programming language for statistical analysis
- Used by most statisticians and social scientists interested in data analysis, it's becoming the standard in Data Science
- Open-source: highly customizable and easily extensible through "packages".
- Powerful tool to generate elegant and effective plots.
- Command-line interface: steeper learning curve, but allows easy replication of analysis through "scripts".
- Excellent documentation and online help resources.
- RStudio: software that provides a more friendly interface to R.

RStudio


RStudio
File Edit Code View Project Workspace Plots Tools Help
diamondPricing.R* formatPlot.R diamonds
Source on Save Source
1 library(ggplot2)
2 source("plots/formatPlot.R")
4 View(diamonds)
5 summary(diamonds)
7 summary(diamonds$price)
8 aveSize <- round(mean(diamonds$carat), 4)
9 clarity <- levels(diamonds$clarity)
11 p <- qplot(carat, price,
12 data=diamonds, color=clarity,
13 xlab="Carat", ylab="Price",
14 main="Diamond Pricing")
15:1 (Top Level) R Script
Console ~/
x y z
Min. : 0.000 Min. : 0.000 Min. : 0.000
1st Qu.: 4.710 1st Qu.: 4.720 1st Qu.: 2.910
Median : 5.700 Median : 5.710 Median : 3.530
Mean : 5.731 Mean : 5.735 Mean : 3.539
3rd Qu.: 6.540 3rd Qu.: 6.540 3rd Qu.: 4.040
Max. :10.740 Max. :58.900 Max. :31.800
> summary(diamonds$price)
Min. 1st Qu. Median Mean 3rd Qu. Max.
326 950 2401 3933 5324 18820
> aveSize <- round(mean(diamonds$carat), 4)
> clarity <- levels(diamonds$clarity)
> p <- qplot(carat, price,
+ data=diamonds, color=clarity,
+ xlab="Carat", ylab="Price",
+ main="Diamond Pricing")
> format.plot(p, size=24)
Workspace History
Load Save Import Dataset Clear All
Data
diamonds 53940 obs. of 10 variables
Values
aveSize 0.7979
clarity character[8]
p ggplot[8]
Functions
format.plot(plot, size)
Files Plots Packages Help
Zoom Export Clear All
Diamond Pricing
Price
15000
10000
5000
0
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5
Carat
Clarity
I1
SI2
SI1
VS2
VS1
VVS2
VVS1
IF

RStudio

Installation

- Should be installed in all lab computers
- To install it on your laptops, read the document "Installing_RStudio.pdf" in the NYU Classes `Resources` folder.

Four panels

1. Console: where you type R commands interactively and see the output and error messages
2. Workspace: shows all objects (data) in memory
3. Viewer: shows plots produced by R, helps you find files, displays help menus, etc.
4. Script: where you write R code

Working with R scripts

- An `R` script is a text document that contains a list of commands that you wish to execute
- Why should you use scripts instead of typing commands on the console?
  1. Replicability (audit trail)
  2. Creates a library of code examples
  3. Easier to correct errors: fix it and then run script again
- R scripts basics:
  1. Each line contains a different command
  2. Add "comments" using # sign at beginning of line
  3. In RStudio, select block of code you want to execute and then click on "Run" or press `Ctrl+Enter`

Installing and loading packages

- A "package" is a collection of functions that expands the basic functionality of R.
- For example, Rfacebook is a package that allows R to capture Facebook data.
- You need to install them (once) and then load them every time you want to use them:

```
# how to install the Rfacebook package
install.packages("Rfacebook")
# how to load a package
library(Rfacebook)
# an example function
getPage("barackobama", token=my_token, n=100)
```

Getting help

Where to look for help:

1. R manuals: clicking on the "Help" tab on the Viewer panel (bottom-right)
2. Documentation for each function in R

```
# these two commands do the same
?mean
help(mean)
```

3. Online:
   - Stack Overflow
   - CRAN: repository of R packages and documentation
   - Google your problem mentioning "rstats"

First steps in R

- Go to NYU Classes, Resources > Labs > Lab 1, and download the following R scripts to your desktop:
  - `lab1_first_steps.R`
  - `lab1_data_analysis.R`
- Now click on the Start button and type "RStudio". Click on the first result.
- Using the bottom right panel, navigate to the folder where you saved the R scripts and click on them
- We will start interacting with R using the first script, `lab1_first_steps.R`

R resources

- Textbook for first part of lab sessions:
  - "A Beginner's Guide to R", by Alain F. Zuur *et al*, Springr. Available online through NYU library. We will cover the equivalent of chapters 1–3, 5–6 in class.
- How to prepare elegant plots with R.
  - "The R Graphics Cookbook", by Winston Chang. O'Reilly.
- Additional resources:
  - Google R tutorials on Youtube.
  - Drew Dimmery's "Thinking in R"
  - Book: "The Art of R Programming", by Matloff. Available online through NYU library.

Reading and analyzing data

Reading and analyzing data

The R script `lab1_data_analysis.R` shows how to:

- Work with vectors: access specific elements, subset by certain conditions, compute length...
- Use statistical functions: compute the mean, minimum, maximum...
- Do basic calculations with vectors: products, divisions...
- Create and subset data frames
- Import data from a spreadsheet

In-class exercise

In-class exercise: your first R script

Create your own R script (with comments) that:

1. Opens the dataset `lab1_nyu_data.csv`
2. Runs different commands that help you answer the following questions:
   1. How many status updates has NYU Abu Dhabi posted on its page?
   2. What is the **average** number of likes AND comments that its posts receive?
   3. What is the **maximum** number of likes AND comments that its posts receive?
   4. What was the content of the **last** status update of 2014?