GENERAL ASSEMBLY

DATA SCIENCE

CLASS 1: INTRODUCTION AND TOOLS

INTRO TO DATA SCIENCE

WELCOME!

LOGISTICS

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Course Times: 6:30pm-9:30pm, Mondays and Wednesdays (1776)

Office Hours: (choose / preliminary)

Tuesday/Thursday/Friday 7pm in DC

Saturday 9am Orange Line / Arlington

Homework / Projects

0. META-INTRO

I. WHAT IS DATA SCIENCE?

II. THE DATA MINING WORKFLOW

LAB:

III. WORKING AT THE UNIX COMMAND LINE

0. META-INTRO

‣ META-INTRO

LEARNING IS FOR EVERYONE

‣ META-INTRO

LEARNING IS A CONSEQUENCE OF THINKING

‣ META-INTRO

WE ARE ALL STUDENTS

WE ARE ALL TEACHERS

▸ META-INTRO

COMMUNICATE EARLY AND OFTEN

I. WHAT IS DATA SCIENCE?

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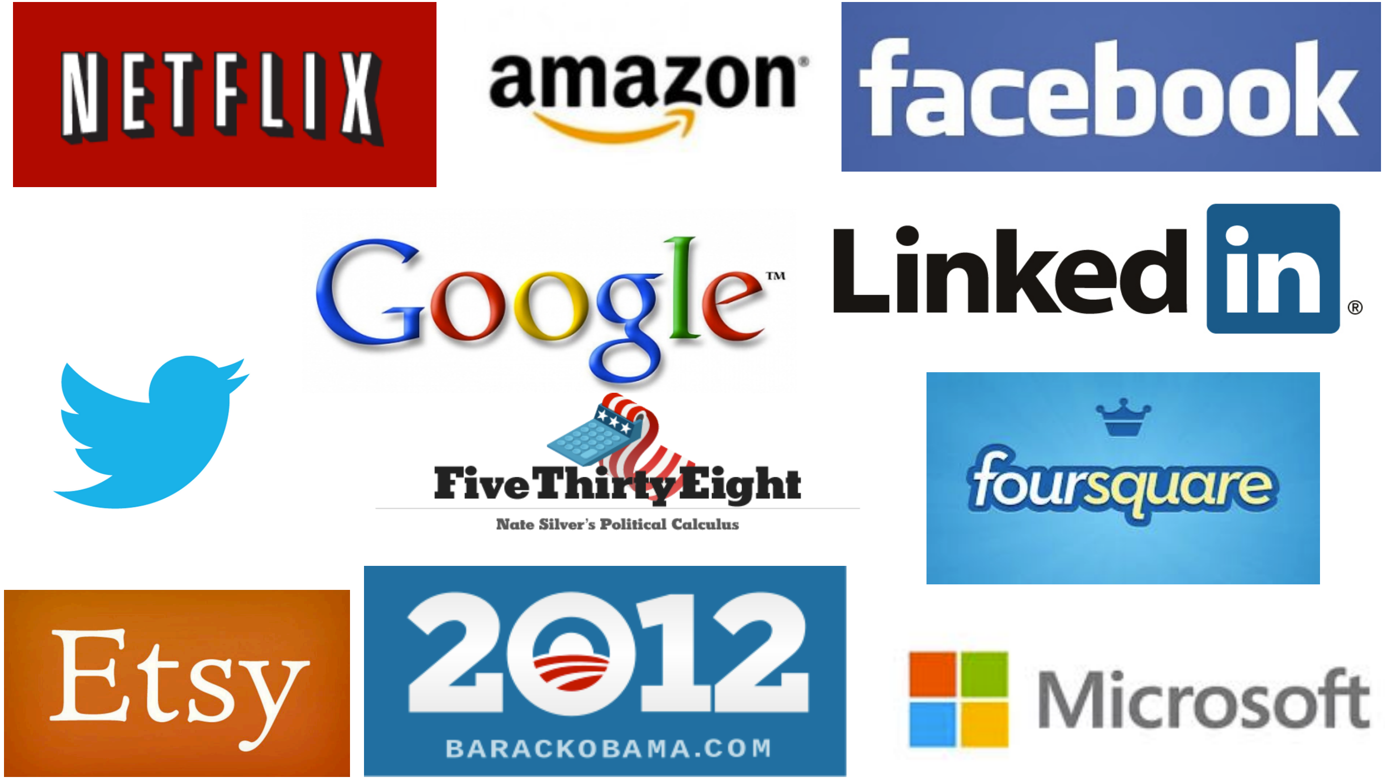
- A set of tools and techniques used to extract useful information from data.
- An interdisciplinary, problem-solving oriented subject.
- The application of scientific techniques to practical problems.
- A rapidly growing field.

WHO USES DATA SCIENCE?



WHO USES DATA SCIENCE?

- Recommending products on amazon.com
- Identifying fraudulent credit card transactions
- Recommending new musical artists
- Prioritize emergency calls in Seattle
- Many more!
- *Collaboration in the open-source arena: The WebKit case*

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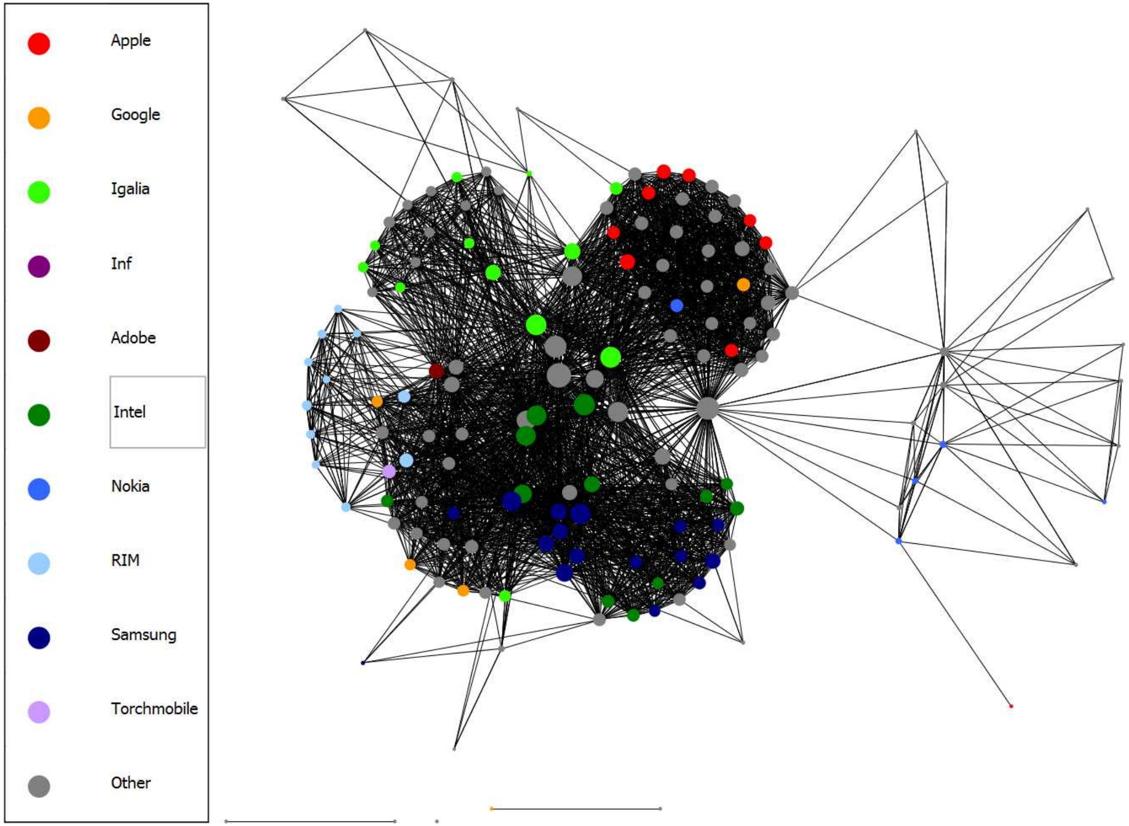


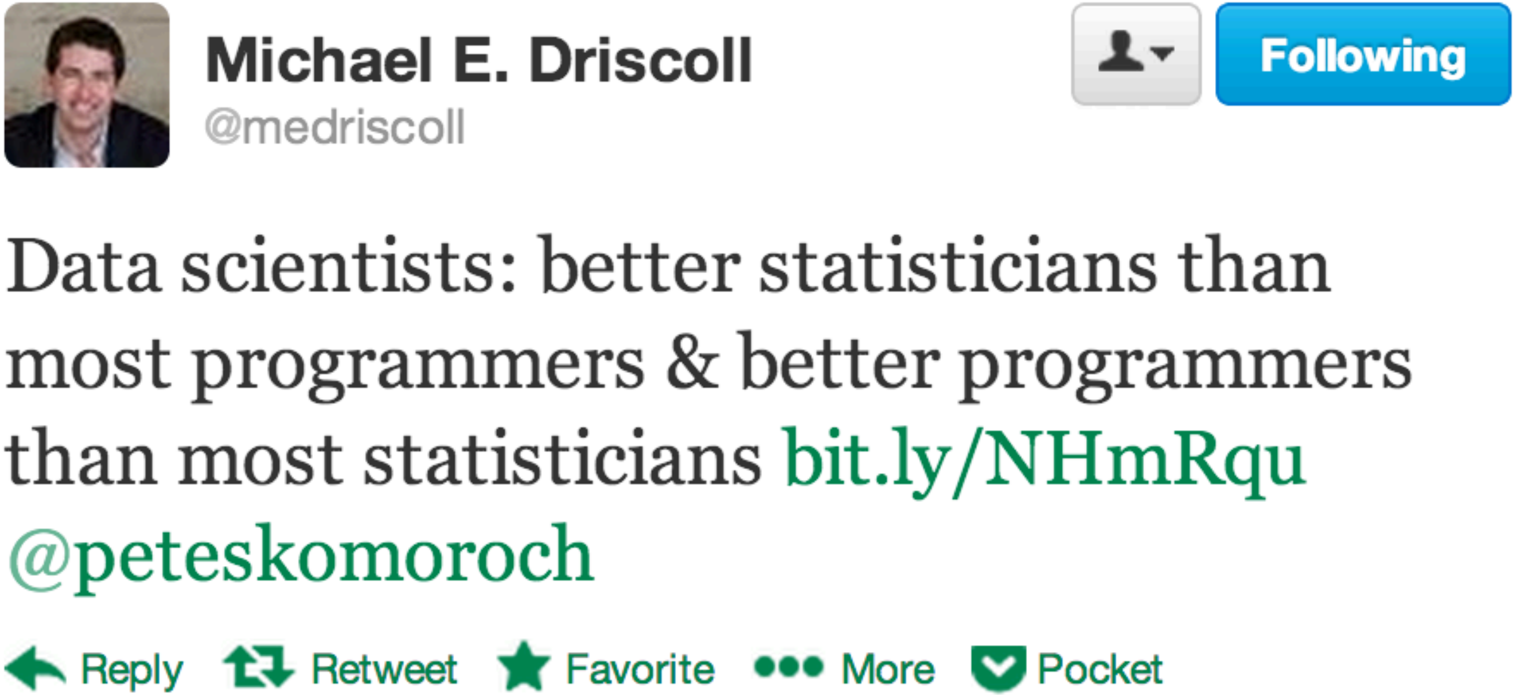
WHO USES DATA SCIENCE?

- Application Presentations!
- https://gadsdc1.hackpad.com/

WHAT MAKES A GOOD DATA SCIENTIST?

- Statistical and machine learning knowledge
- Engineering experience
- Academic curiosity
- Product sense
- Storytelling
- Cleverness

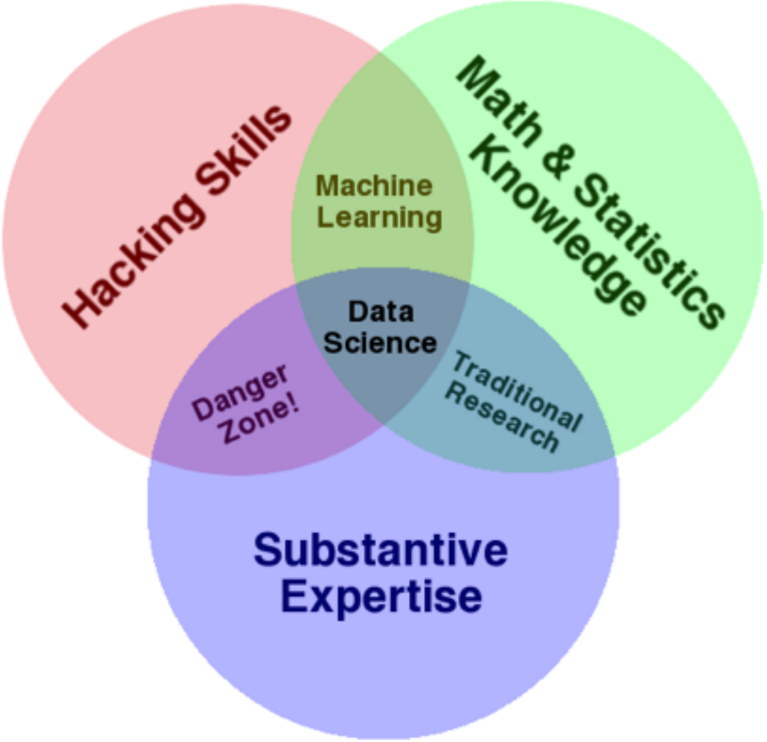
WHAT MAKES A GOOD DATA SCIENTIST?



Michael E. Driscoll
@medriscoll

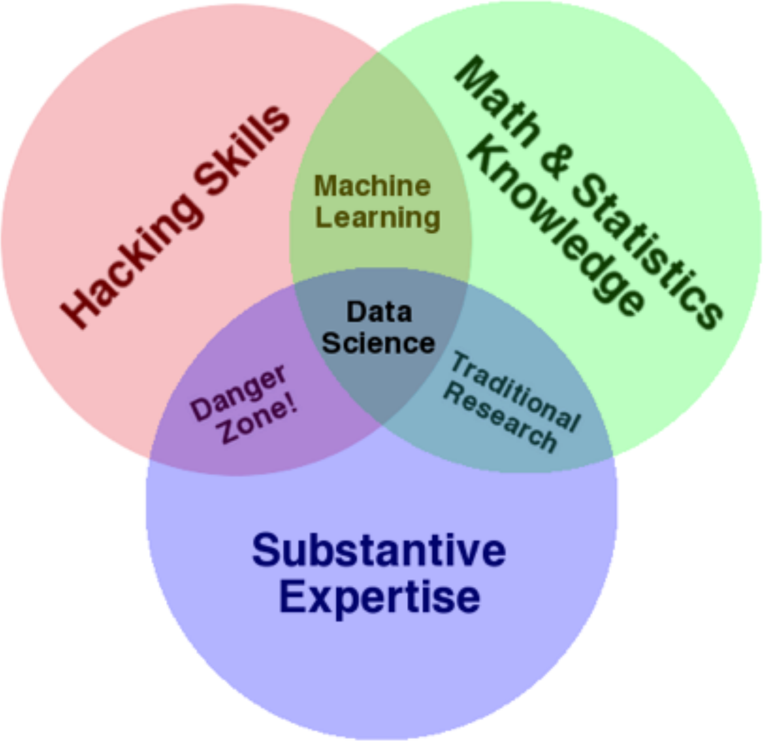
Data scientists: better statisticians than most programmers & better programmers than most statisticians bit.ly/NHmRqu @peteskomoroch

THE QUALITIES OF A DATA SCIENTIST



source: http://www.dataists.com/2010/09/the-data-science-venn-diagram/

THE QUALITIES OF A DATA SCIENTIST

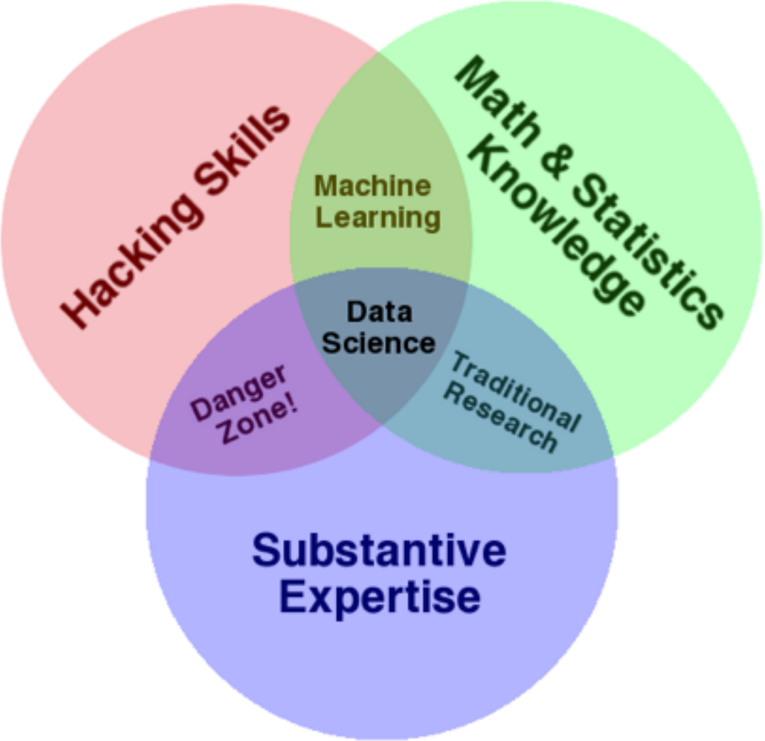


ONE MORE THING!

Communication skills

source: http://www.dataists.com/2010/09/the-data-science-venn-diagram/

THE QUALITIES OF A DATA SCIENTIST



ONE MORE THING!

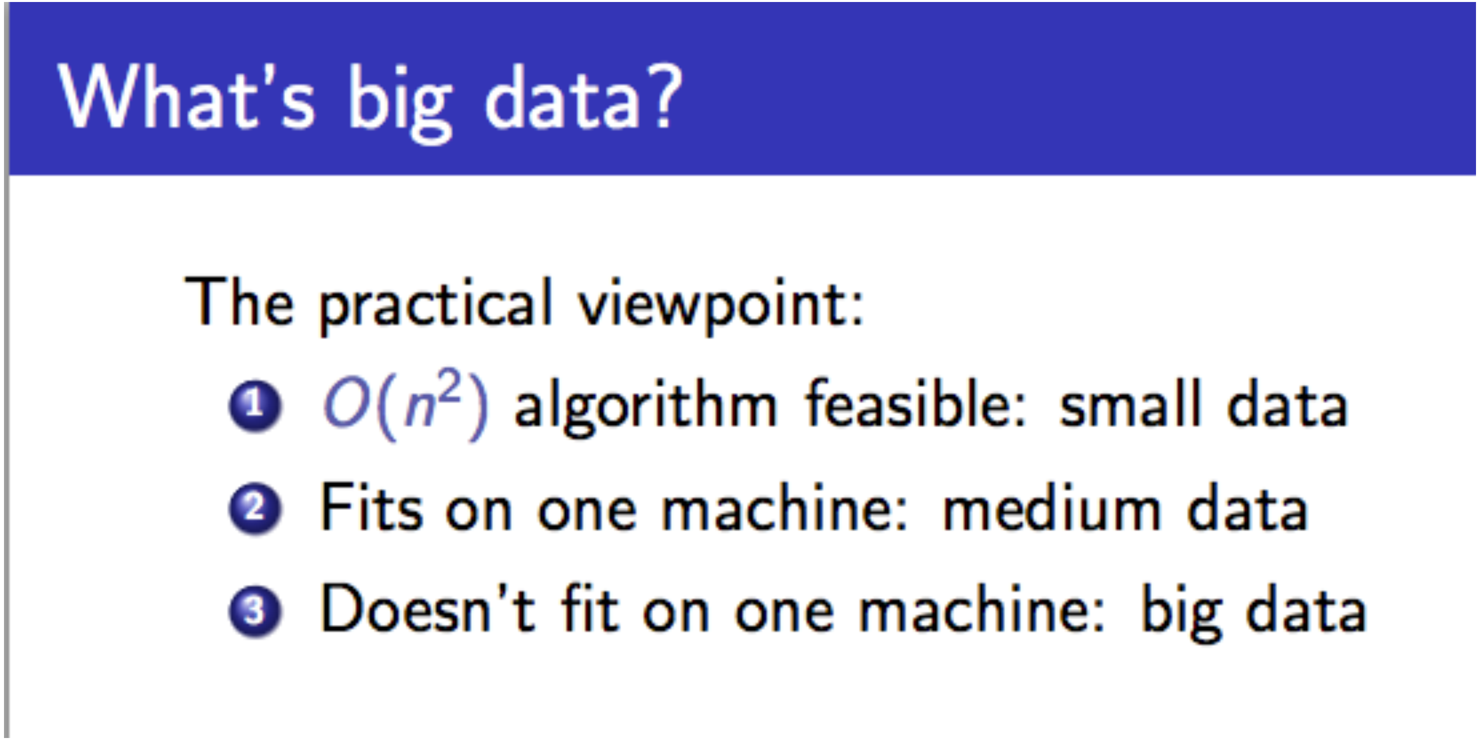
Communication skills

ANOTHER THING!

Answer a question!

source: http://www.dataists.com/2010/09/the-data-science-venn-diagram/

BUZZWORD BREAK



What's big data?

The practical viewpoint:

1. $O(n^2)$ algorithm feasible: small data
2. Fits on one machine: medium data
3. Doesn't fit on one machine: big data

source: http://people.cs.umass.edu/~mcgregor/stocworkshop/langford.pdf

II. THE DATA SCIENCE WORKFLOW

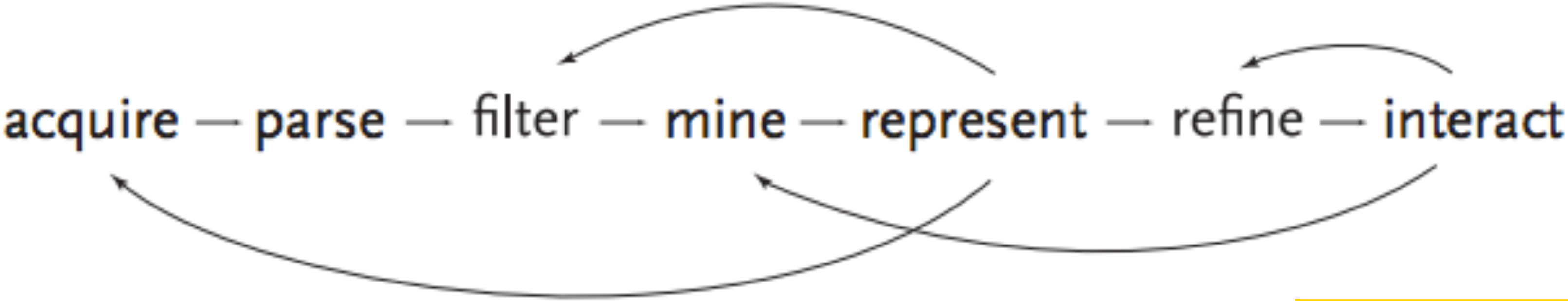
THE DATA SCIENCE WORKFLOW

from Jeff Hammerbacher:

- 1. Identify problem
- 2. Instrument data sources
- 3. Collect data
- 4. Prepare data (integrate, transform, clean, impute, filter, aggregate)
- 5. Build model
- 6. Evaluate model
- 7. Communicate results

source: http://berkeleydatascience.files.wordpress.com/2012/01/20120117berkeley1.pdf

THE DATA SCIENCE WORKFLOW



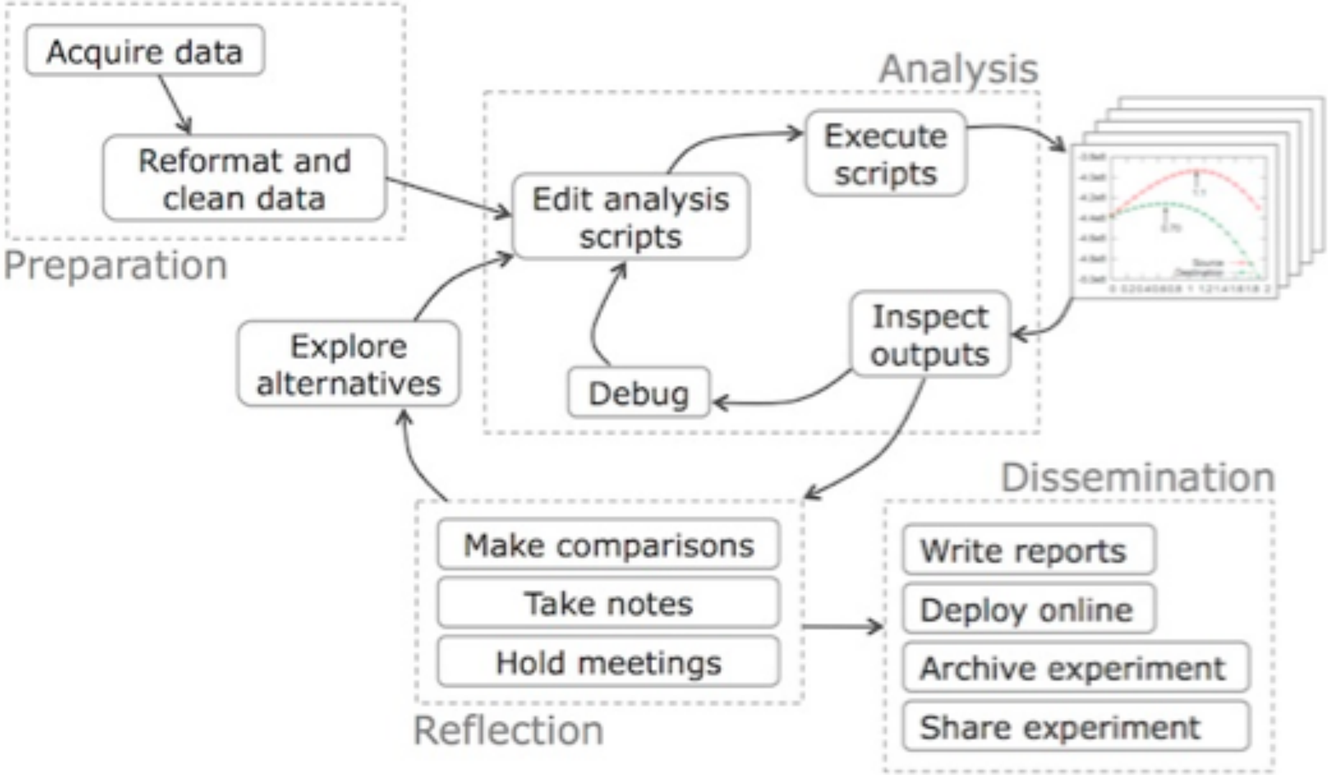
acquire — parse — filter — mine — represent — refine — interact

ALSO:

scale

source: http://benfry.com/phd/dissertation-110323c.pdf

THE DATA SCIENCE WORKFLOW



source: Phillip Guo - BLOG@CACM Data Science Workflow: Overview and Challenge

INTRO TO DATA SCIENCE

III. WORKING AT THE UNIX COMMAND LINE

EXERCISE – WORKING AT THE UNIX COMMAND LINE

KEY OBJECTIVES

- Navigate the filesystem
- Create, move, copy, and delete files & directories
- View & search files
- Edit & interact with files
- Combine steps
- Learn more

TOOLS

- ls, cd
- cat, touch, mv, cp, mkdir, rm, rmdir

- head, tail, less, cat, grep
- vim, tr, sort, uniq, wc
- pipe (|)
- man, apropos

NOTE

Being comfortable at the command line makes your life much easier!

GIT

LINE-ORIENTED PIPELINES

INTRO TO DATA SCIENCE