Data Cleaning

Duen Horng (Polo) Chau
Assistant Professor
Associate Director, MS Analytics
Georgia Tech

Partly based on materials by
Professors Guy Lebanon, Jeffrey Heer, John Stasko, Christos Faloutsos
Data Cleaning
Why data can be dirty?
How dirty is real data?

Examples

- Jan 19, 2016
- January 19, 16
- 1/19/16
- 2006-01-19
- 19/1/16

How dirty is real data?

Examples

- duplicates
- empty rows
- abbreviations (different kinds)
- difference in scales / inconsistency in description/ sometimes include units
- typos
- missing values
- trailing spaces
- incomplete cells
- synonyms of the same thing
- skewed distribution (outliers)
- bad formatting / not in relational format (in a format not expected)
More to read

Big Data's Dirty Problem [Fortune]
http://fortune.com/2014/06/30/big-data-dirty-problem/

For Big-Data Scientists, ‘Janitor Work’ Is Key Hurdle to Insights [New York Times]
Data Janitor
Data Cleaners

Watch videos

• Open Refine (previously Google Refine)
• Data Wrangler (research at Stanford)

Write down

• Examples of **data dirtiness**
• Tool’s **features** demo-ed (or that you like)

Will collectively summarize similarities and differences afterwards

Open Refine: [http://openrefine.org](http://openrefine.org)
Data Wrangler: [http://vis.stanford.edu/wrangler/](http://vis.stanford.edu/wrangler/)
Welcome!

OpenRefine (formerly Google Refine) is a powerful tool for working with messy data: cleaning it; transforming it from one format into another; extending it with web services; and linking it to databases like Freebase.

Please note that since October 2nd, 2012, Google is not actively supporting this project, which has now been rebranded to OpenRefine. Project development, documentation and promotion is now fully supported by volunteers. Find out more about the history of OpenRefine and how you can help the community.

Using OpenRefine - The Book

Using OpenRefine, by Ruben Verborgh and Max De Wilde, offers a great introduction to OpenRefine. Organized by recipes with hands on examples, the book covers the following topics:

1. Import data in various formats
2. Explore datasets in a matter of seconds
Wrangler is an interactive tool for data cleaning and transformation. Spend less time formatting and more time analyzing your data.

UPDATE: The Wrangler research project is complete, and the software is no longer actively supported. The team behind Wrangler has moved on to work on a commercial venture, Trifacta.

Why wrangle?

- Too much time is spent manipulating data just to get analysis and visualization tools to read it. Wrangler is designed to accelerate this process: spend less time fighting with your data and more time learning from it.
- Wrangler allows interactive transformation of messy, real-world data into the data tables analysis tools expect. Export data for use in Excel, R, Tableau, Protovis, ...
- Want to learn more about Wrangler's design? Take a look at our research paper.
- Wrangler is still a work-in-progress. Please share your feedback and feature requests!

TRY IT NOW
How are the tools similar or different?

- [W] can do extraction
- [G] needs the data to be in tabular format
- [G] supports expressive language (e.g., log)
- [W, G] history, preview
- [W] “learn” what you want to do from examples (“learning by examples”)
- [W] can export to javascript (trifacta: export hadoop program)
- [G] show histogram/ data distribution; spotting outliers, etc.

G = Google Refine
W = Data wrangler
How are the tools similar or different?

- [G] cluster similar entities (e.g., T&M), synonyms
- [G, W] history
- [G] trailing spaces
- [W] text extraction
- [W] export script, code (work on other systems? interoperability)
- [W, G] one-click (usability)
- [G] distribution of data (apply log scale)
- [W] pivot data (unfold)
- [W] suggestions (even more usable)
- [W + G] preview changes

G = Google Refine
W = Data wrangler
The videos only show some of the tools’ features. Try them out.

**Google Refine**: [http://code.google.com/p/google-refine/](http://code.google.com/p/google-refine/)

**Data Wrangler**: [http://vis.stanford.edu/wrangler/](http://vis.stanford.edu/wrangler/)