Digging Deeper, Reaching Further

Module 1: Getting Started

In this module we’ll…

- Introduce text analysis and broad text analysis workflows

  → *Make sense of digital scholarly research practices*

- Introduce HathiTrust and the HathiTrust Research Center

  → *Understand the context for one text analysis tool provider*

- Introduce our hands-on example and case study

  → *Recognize research questions text analysis can answer*

What is text analysis?

- Using computers to reveal information in and about text (Hearst, 2003)
  - Algorithms discern patterns
  - Text may be “unstructured”
  - More than just search
- What is it used for?
  - Seeking out patterns in scientific literature
  - Identifying spam e-mail

How does it work?

- Break textual data into smaller pieces
- Abstract (reduce) text so that a computer can crunch it
- Counting!
  - Words, phrases, parts of speech, etc.
- Computational statistics
  - Develop hypotheses based on counts of textual features

How does it impact research?

- Shift in perspective, leads to shift in research questions
  - Scale-up to “distant reading” (Moretti, 2013)
- One step in the research process
  - Can be combined with close reading
- Opens up:
  - Questions not provable by human reading alone
  - Larger corpora for analysis
  - Studies that cover longer time spans

Discussion

- *What examples have you seen of text analysis?*

- *In what contexts do you see yourself using text analysis? What about the researchers you support?*

Text analysis research questions

- May involve:
    - Change over time
    - Pattern recognition
    - Comparative analysis

Hands-on activity

☞ *See Handout p. 1*

In pairs or small groups, review the summarized research projects available at http://go.illinois.edu/ddrf-research-examples. Then discuss the following questions:

- How do the projects involve change over time, pattern recognition, or comparative analysis?
- What kind of text data do they use (time period, source, etc.)?
- What are their findings?

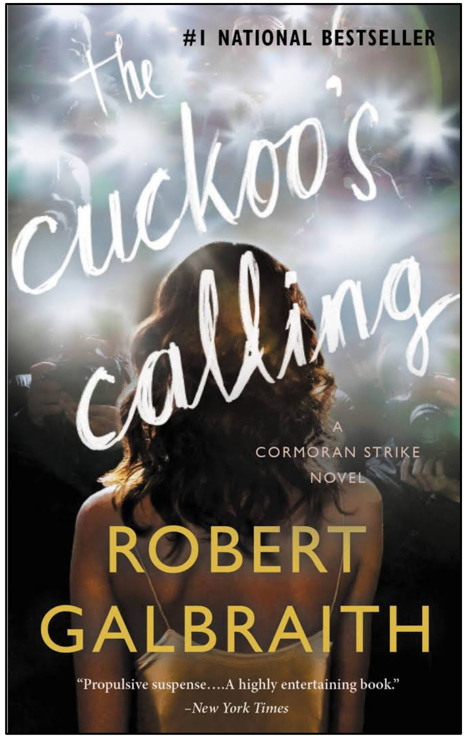
Example: *Rowling and "Galbraith": an authorial analysis*

Question:

Did JK Rowling write The Cuckoo's Calling *under the pen name Robert Galbraith?*

Would be impossible to prove through human reading alone!

comparative | patterns



Book cover for The Cuckoo's Calling

Read more: Rowling and "Galbraith": an authorial analysis (Juola, 2013)

Example: *Rowling and “Galbraith”: an authorial analysis*

Approach:

- Reading led to hunch about authorship
- Computational comparison of diction between this book and others written by Rowling
- Statistical ‘proof’ of authorial fingerprint

Read more: Rowling and “Galbraith”: an authorial analysis (Juola, 2013)

Example: *Significant Themes in 19th Century Literature*

Question:

What themes are common in 19th century literature?

Answering this question requires a very large corpus and an impossible amount of human reading!

patterns | comparative

Read more: Significant Themes in 19th Century Literature (Jockers and Mimno, 2012)

Example: *Significant Themes in 19th Century Literature*

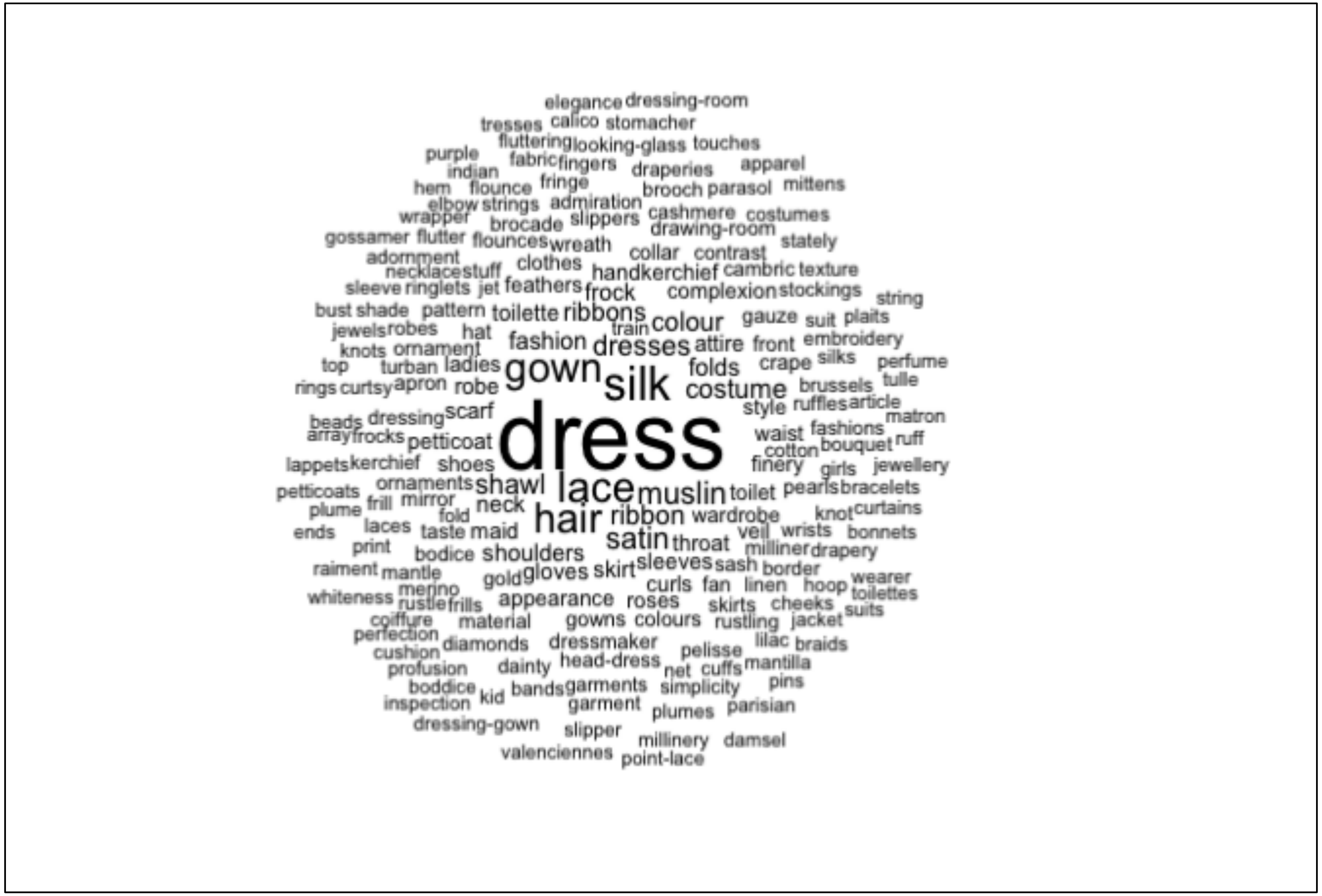
Approach:

- Run large quantities of text through a statistical algorithm
- Words that co-occur are likely to be about the same thing
- Co-occurring words are represented as topics

Read more: Significant Themes in 19th Century Literature (Jockers and Mimno, 2012)

Example: *Significant Themes in 19th Century Literature*

From paper - Figure 3: Word cloud of topic labeled “Female Fashion.”



Example: *The Emergence of Literary Diction*

Question:

What textual characteristics constitute "literary language"?

This question covers a very large time span!

change over time | patterns

Read more: The Emergence of Literary Diction (Underwood and Sellers, 2012)

Example: *The Emergence of Literary Diction*

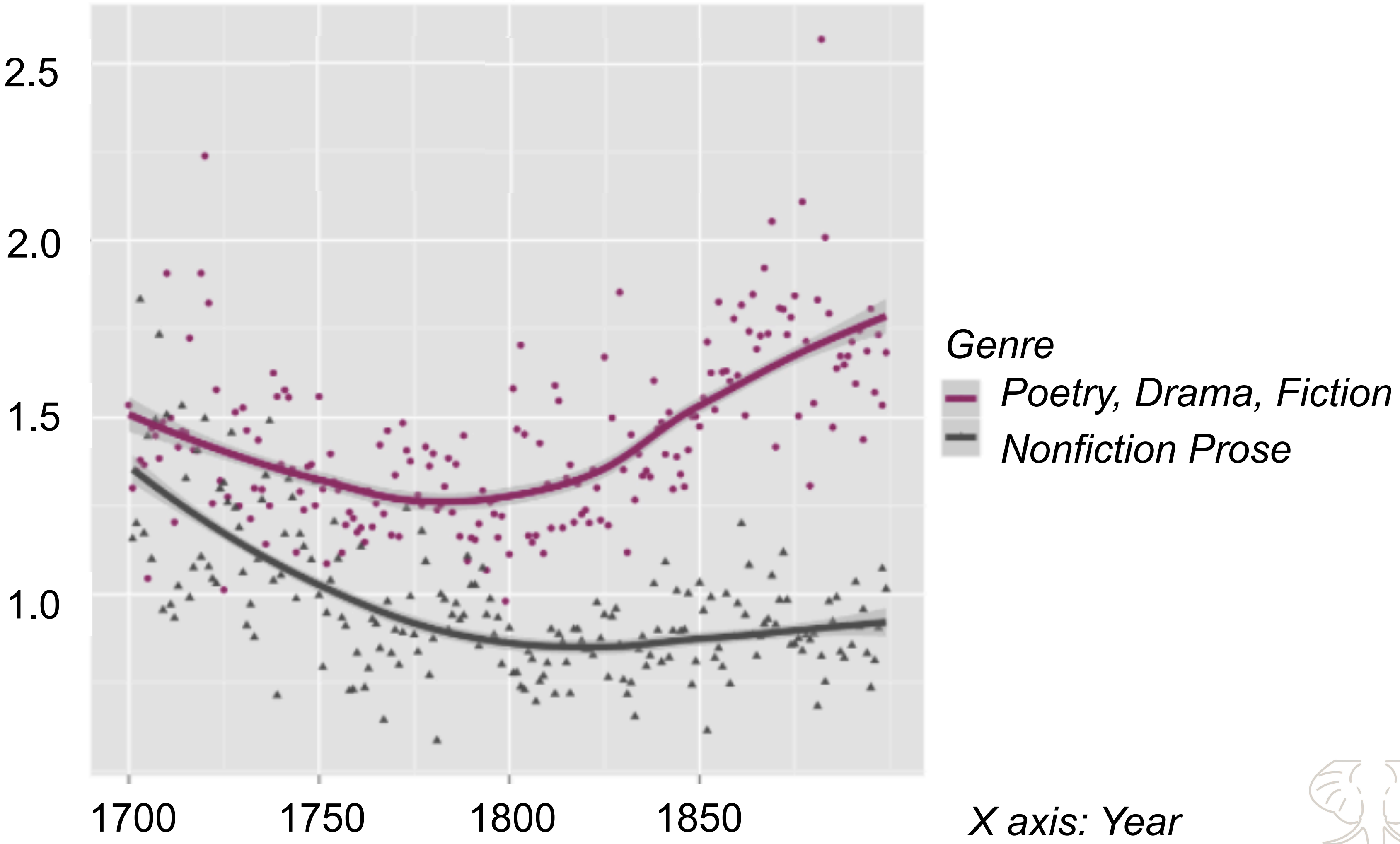
Approach:

- Train a computational model to identify literary genres
- Compare which words are most frequently used over time in non-fiction prose versus “literary” genres
- Demonstrated tendency for poetry, drama, and fiction to use older English words

Read more: The Emergence of Literary Diction (Underwood and Sellers, 2012)

Example: *The Emergence of Literary Diction*

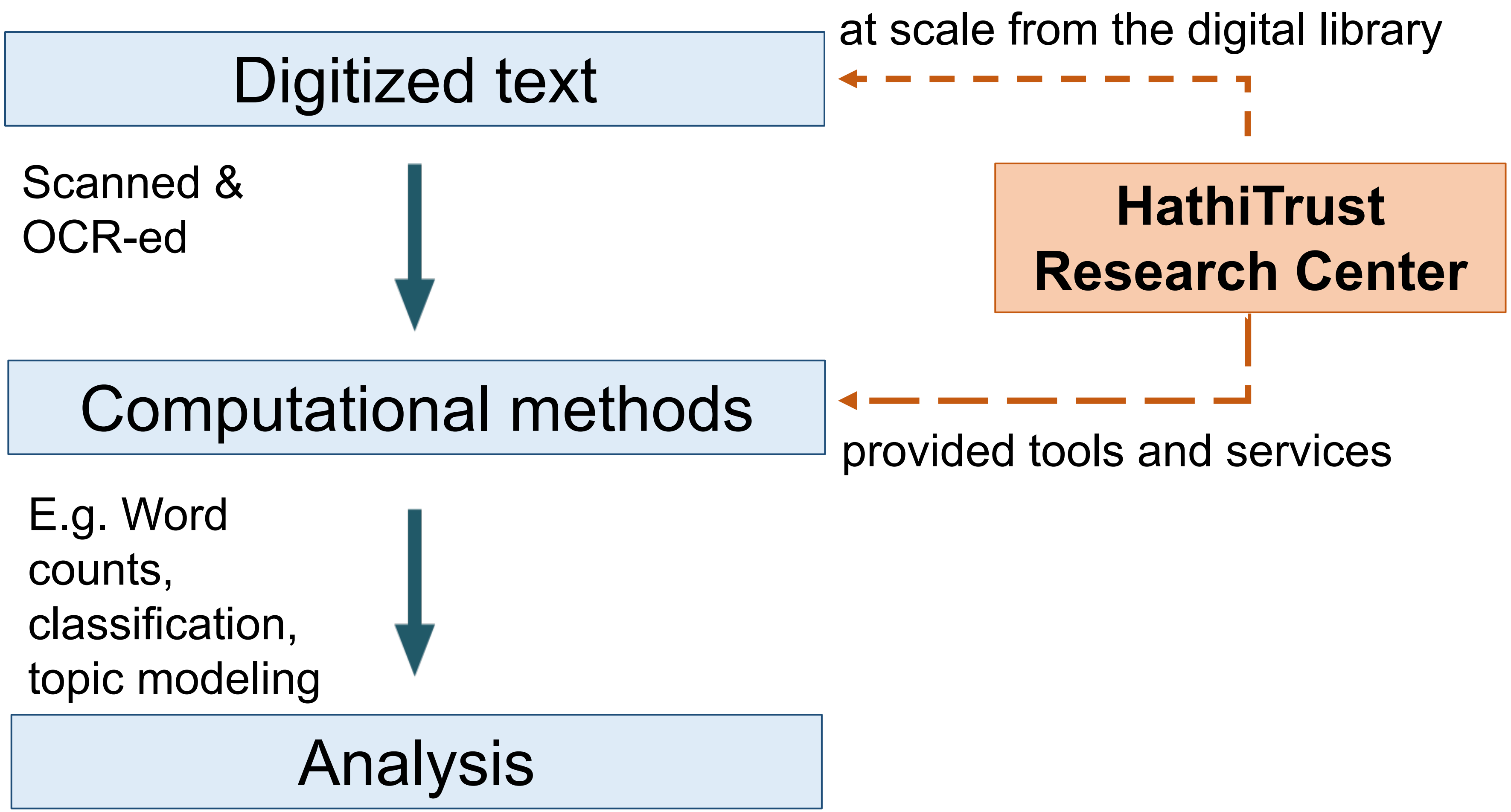
Y axis: Yearly ratio of words that entered English before 1150 / words that entered from 1150-1699



X axis: Year

From paper: graph of diction patterns between genres, using frequency counts

HTRC for text analysis



Digitized text

Scanned & OCR-ed

Computational methods

E.g. Word counts, classification, topic modeling

Analysis

HathiTrust Research Center

at scale from the digital library

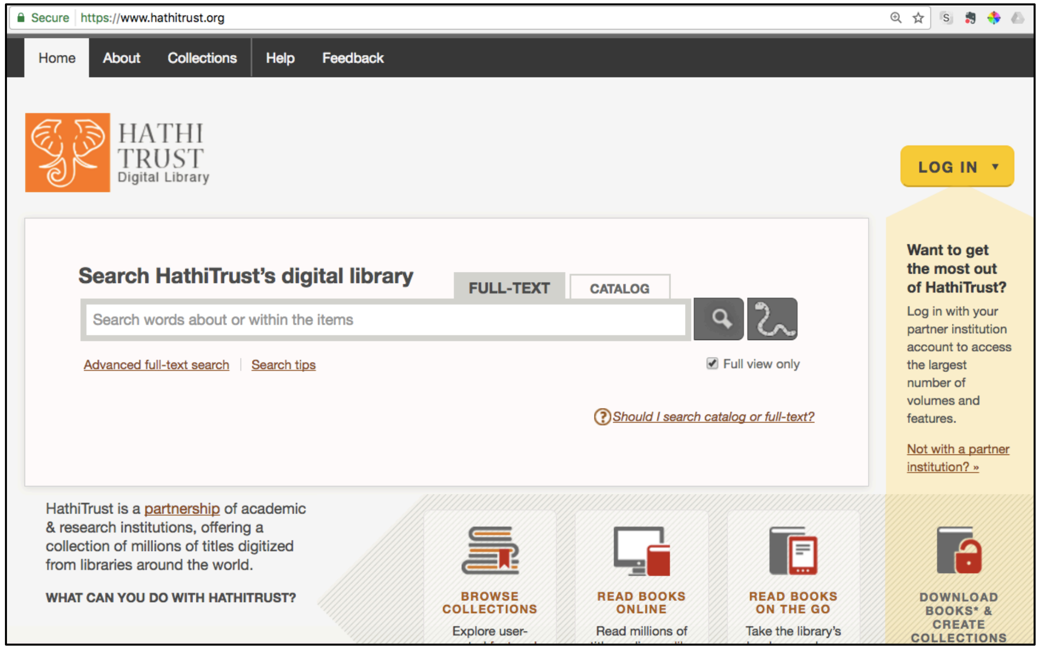
provided tools and services

HathiTrust

- Founded in 2008
- Grew out of large-scale digitization initiative at academic research libraries
  - With roots in Google Books project
- Over 120 partner institutions continue to contribute

HathiTrust Digital Library

- Contains over 16 million volumes
  - ~ 50% English
  - From the 15th to 21st century, 20th century concentration
  - ~ 63% in copyright or of undetermined status
- Search and read books in the public domain



Search HathiTrust's digital library

Search words about or within the items

Should I search catalog or full-text?

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HathiTrust Research Center

- Facilitates text analysis of HTDL content
- Research & Development
- Located at Indiana University and the University of Illinois

Non-consumptive research

Research in which computational analysis is performed on text, but not research in which a researcher reads or displays substantial portions of the text to understand the expressive content presented within it.

- Complies with copyright law
- Foundation of HTRC work
- Other terms: non-expressive use

Discussion

Are you (or your colleagues) currently offering research support for text analysis?

- How so?
- Why or why not?
- What kinds of questions and/or projects does your library handle?

Workshop outline

- Follow the research process:
  - Gathering textual data: 2 modules
  - Working with textual data: 1 module
  - Analyzing textual data: 2 modules
  - Visualizing textual data: 1 module
- Hands-on activities around a central research question & case study example at each step
  - Using both HTRC and non-HTRC tools

Workshop outline

- Build skills to engage with text analysis research
- Covers programming concepts
  - But won’t teach you to code!
- Introduces computational methods
  - But won’t delve into all nuances

Sample Reference Question

Question:

I’m a student in history who would like to incorporate digital methods into my research. I study American politics, and in particular I’d like to examine how concepts such as liberty change over time.

Approach:

- We’ll practice approaches for answer this question throughout the workshop

Case Study

Inside the Creativity Boom **|** Researcher: Samuel Franklin

Question:

How do the use and meaning of creative *and* creativity *change over the 20th century?*

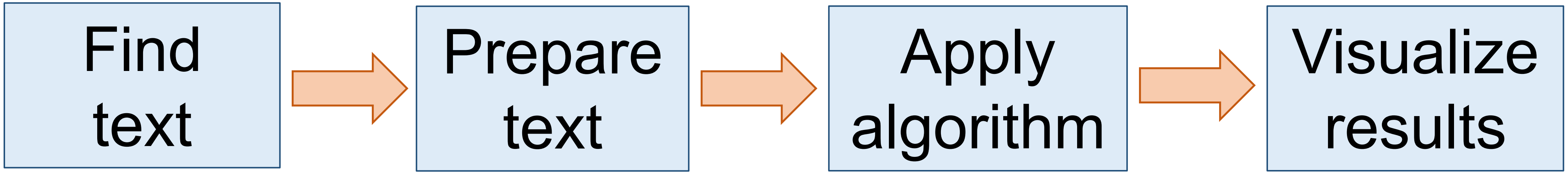
Approach:

- We'll discuss how this researcher approached his question throughout the workshop

Learn more: https://wiki.htrc.illinois.edu/x/CADiAQ

A word of caution…

Workshop outline suggests research workflow like:



Find text

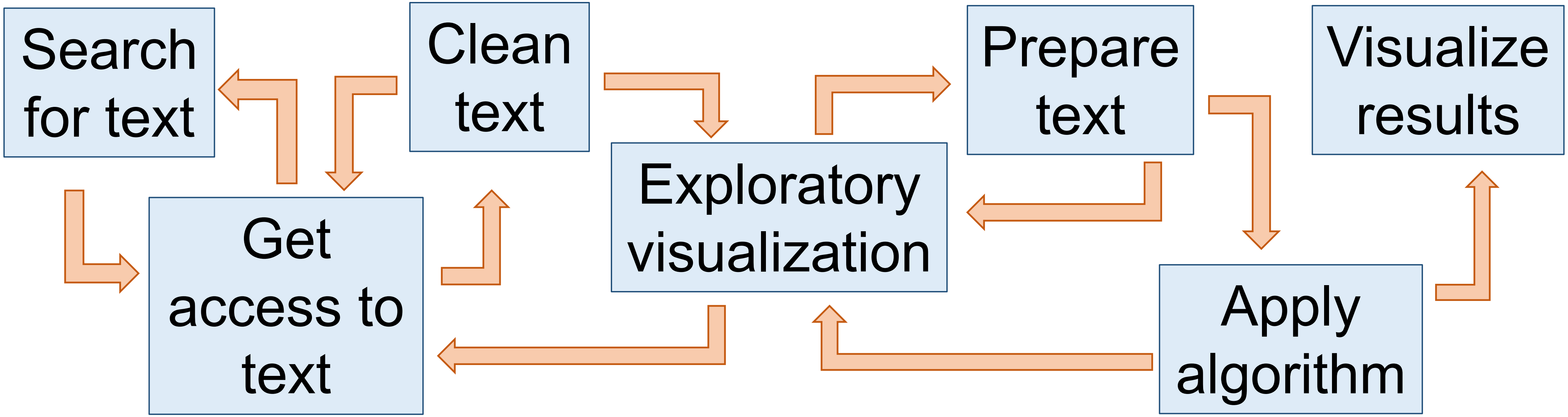
Prepare text

Apply algorithm

Visualize results

A word of caution…

Actual research workflow like:



Search for text

Clean text

Prepare text

Visualize results

Exploratory visualization

Get access to text

Apply algorithm

Discussion

- *What are some of the characteristics of a good candidate research question/project for using text analysis methods?*

Questions?

References

- Hearst, M. (2003). What is text mining. SIMS, UC Berkeley. http://people.ischool.berkeley.edu/~hearst/text-mining.html
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