DIGILAB WORKSHOP SERIES

ADVANCED TEXT ANALYSIS WITH R

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INSTALL R AND R STUDIO

R

- Extremely useful programming language; includes a wide variety of packages for working with text(s) and corpora.
- Many packages support working with additional languages besides English, as well as regular expressions and data cleaning.

PACKAGES

- Tidyverse: tidytext & gutenbergr
- quanteda
- syuzhet & textdata
- topicmodels

BACKGROUND ON SENTIMENT ANALYSIS

- Natural Language Processing (NLP) technique
- Goal is to identify subjective information (Lui 2015); opinion mining (Silge & Robinson 2020)
    - Ex: identifying the polarity of a sentence or text (positive, negative)

BACKGROUND ON SENTIMENT ANALYSIS

- Syuzhet (Jockers)
  - inspired by Vonnegut's argument that the highs and lows of conflict in the plot of stories can be "fed into computers" by looking at emotional highs and lows of characters in stories
  - utilizes a sentiment dictionary to analyze sentiment progression from beginning to end
  - focus is turned away from the "actual events in the novel and more toward the author's presentation or organization of the plot"
- Textdata
  - includes three different sentiment dictionaries afinn, bing, and nrc
  - works well with Tidyverse data principles and gutenbergr() package

BACKGROUND ON TOPIC MODELING

- Machine learning
- Today we will use the Latent Dirichlet Allocation (LDA) technique for topic modeling with two different R packages topicmodels (Grün& Hornik) and stm (Roberts et al.)
- Utilizes statistical modeling to take in features and output topics
- Allows probabilistic modeling of term frequency occurrences in documents, used to estimate the similarity between documents and variables (topics)
- Includes a wide variety of applications beyond text analysis: genetic information, geography, bioinformatics, etc.

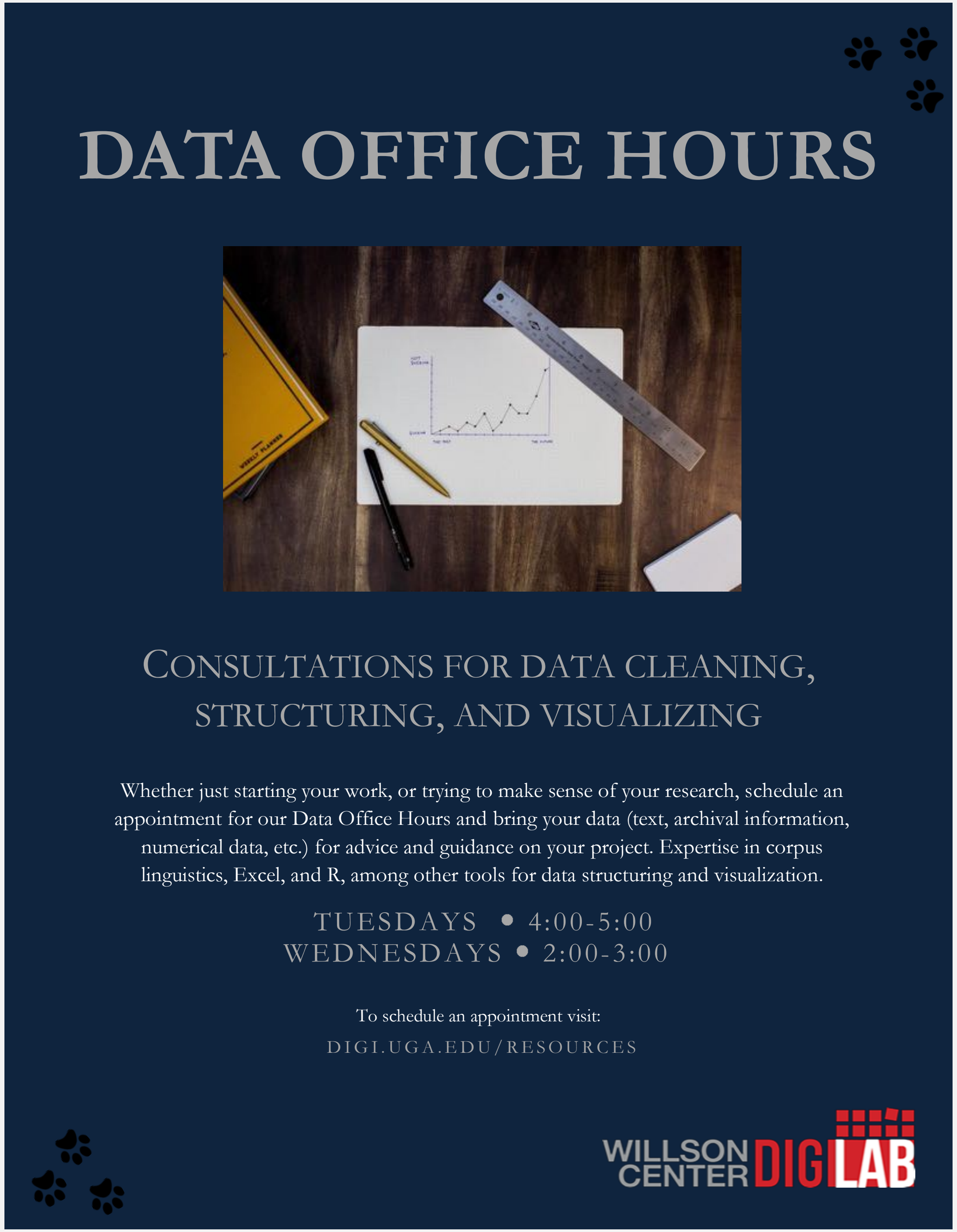
- **Tidytext**: helpful for data formatting and visualization; works well with other packages in the Tidyverse (Silge & Robinson 2016)
- **Textmining/tm:** includes options for data processing, metadata management, and creation of term-document matrices (Feinerer 2020; Feinerer et al. 2008)
- **Syuzhet:** package created specifically for sentiment analysis by Jockers
- **Text2vec**: dtm, vectorizing data, supports topic modeling and collocational analysis, too
- **StringR**: supports regex, pattern matching, useful for string manipulation
- **spacyR**: NLP package originally created for Python; useful for tokenization and works well with quanteda and tidytext
- **Quanteda**: incredibly useful package; includes preprocessing abilities, dtm function, as well as statistical analyses options like document classification and topic modeling
- **Ggplot2**: great way to visualize your data

RESOURCES AT UGA

- Corpus Server
- Upcoming Courses
- Digilab Resources
- Data Office Hours

COURSES AT UGA

- This Fall 2021:
- Natural Language Processing: LING 4570/6570
- Style: ENGL/LING 4826/6826
- American English: ENGL/LING 4010/6010
- Note: These all count toward the Digital Humanities Undergraduate certificate!



DATA OFFICE HOURS

CONSULTATIONS FOR DATA CLEANING, STRUCTURING, AND VISUALIZING

Whether just starting your work, or trying to make sense of your research, schedule an appointment for our Data Office Hours and bring your data (text, archival information, numerical data, etc.) for advice and guidance on your project. Expertise in corpus linguistics, Excel, and R, among other tools for data structuring and visualization.

TUESDAYS • 4:00-5:00
WEDNESDAYS • 2:00-3:00

To schedule an appointment visit:
DIGI.UGA.EDU/RESOURCES

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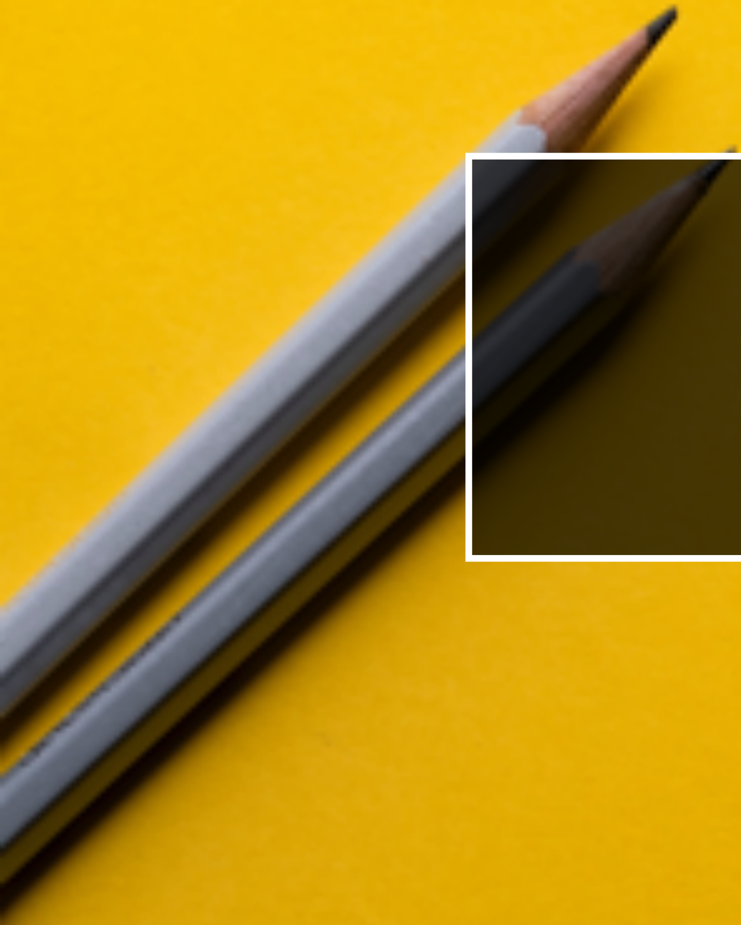
RECOMMENDED RESOURCES

- Data office hours!
- For more on pos-tagging, check out this tutorial : UDPipe Natural Language Processing Annotation.
- Tidyverse tutorial
- Tokenizers package tutorial



THANKS FOR LISTENING!

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WORKS CITED

- Benoit K, Watanabe K, Wang H, Nulty P, Obeng A, Müller S, Matsuo A. 2018. quanteda: An R package for the quantitative analysis of textual data. https://quanteda.io. Journal of Open Source Software, 3(30), 774. doi: 10.21105/joss.00774
- Bing, Liu. 2015. Sentiment Analysis: Mining Opinions, Sentiments, and Emotions.
- Brown, Simon. 2016. Tips for Computational Text Analysis. https://matrix.berkeley.edu/research/tips-computational-text-analysis
- Clark, Michael. 2018. An Introduction to Text Processing and Analysis with R.https://m-clark.github.io/text-analysis-with-R/
- Evert, Stefan and Andrew Hardie. 2011. Twenty-first century Corpus Workbench: Updating a query architecture for the new millennium. In *Proceedings of the Corpus Linguistics 2011 conference,* University of Birmingham, UK.
- Evert, Stefan. 2003. The CQP Query Language Tutorial.
- Feinerer, Ingo. 2020. Introduction to the tm Package: Text Mining in R. https://cran.r-project.org/web/packages/tm/vignettes/tm.pdf
- Grün, Bettina & Kurt Hornik. topicmodels: An R Package for Fitting Topic Models.https://cran.r-project.org/web/packages/topicmodels/vignettes/topicmodels.pdf
- HathiTrust. https://www.hathitrust.org/about.
- Hvitfeldt, Emil & Julia Sigle. 2020. textdata: download and load various text datasets.
- Jockers, M. 2015. Syuzhet: Extract sentiment and plot arcs from text. https://github.com/mjockers/syuzhet

- Jockers, M. 2015. That Sentimental Feeling Matthew L. Jockers. http://www.matthewjockers.net/2015/12/20/that-sentimental-feeling/
- Jockers, M. 2016. More syuzhet validation Matthew L. Jockers. http://www.matthewjockers.net/2016/08/11/more-syuzhet-validation/
- Laudun, John. Text Analytics 101. https://johnlaudun.org/20130221-text-analytics-101/
- Millot, Thomas. Photo. Unsplash
- Mullen, Lincoln. 2018. Introduction to the tokenizers package. https://cran.r-project.org/web/packages/tokenizers/vignettes/introduction-to-tokenizers.html
- Mullen, Lincoln, Keyes, Os, Selivanoc, Dmitriy, Arnold, Jeffrey, Kenneth, Benoit. 2018. tokenizers R package.https://cran.r-project.org/web/packages/tokenizers/index.html
- Project Gutenberg. https://www.gutenberg.org
- Roberts, Margaret, Brandon Stewart, and Dustin Tingley. Stm: R Package for Structural Topic Models.
- Silge, Julia, and David Robinson. 2016. tidytext R package.
- Silge, Julia, and David Robinson. 2020. Text Mining with R: A Tidy Approach. https://www.tidytextmining.com/preface.html
- Wickam, Hadley et al. 2019. Welcome to the tidyverse. https://tidyverse.tidyverse.org/authors.html
- Witten, Ian. 2004. Text mining. https://www.cms.waikato.ac.nz/~ihw/papers/04-IHW-