Critical thinking for machine learning algorithms

- Buzzword to watch out for: "AI-powered"
  - AI is an umbrella term: you want to ask *"what specific technology does this application or product use?"*
- Natural Language Processing (NLP) means that the processing (i.e.stemming) techniques will affect the outcome.
- If it's machine learning, is it supervised or unsupervised?
  - Supervised machine learning means that people have determined the variables for prediction
  - Unsupervised means that the algorithm itself is figuring out the variables that are important.

In both cases, here are questions to ask:

- ☐ What data was collected and what are its descriptive limitations?
  - ☐ Has every variable been collected, or are some data points standing in for others?
  - ☐ What assumptions have been made about the data, the variables of interest, and the population that will be affected?
  - ☐ Has this data always been collected in an ethical manner?
  - ☐ If there are gaps in the data, why are they there? Who benefits from these gaps?
- ☐ What data wasn't collected, and why?
  - ☐ If the data doesn't exist, why isn't it being counted?
  - ☐ What technical and/or cultural barriers are at play?
  - ☐ Who benefits from the lack of data?
- ☐ What is the historical/cultural/legal context surrounding this particular dataset or problem?
- ☐ How big is the dataset?
  - ☐ Can meaningful decisions be made with a sample of that size?
  - ☐ *Should* meaningful decisions be made with this sample size?
- ☐ What processing steps were applied to the data?
  - ☐ What vocabularies were used for NLP?
  - ☐ What variables were converted or transformed?
- ☐ What problem is this algorithm solving, and can the data truly provide a solution, or is it being used to mean more than the data can actually indicate?
- ☐ Is the answer given by the algorithm taken as truth influencing human decision making?
- ☐ What is the ultimate purpose of the decision the algorithm will make or help humans make?
- ☐ When individual outcomes are determined by an algorithm, does that individual have a part in the data collection and analysis?
  - ☐ Can they legitimately opt-out?
  - ☐ Will the algorithm designers provide details on how decisions were reached?
  - ☐ What recourse does the individual have when they disagree with a decision?
  - ☐ Do they even know that an algorithm has affected their life?
- ☐ For public-facing algorithms, is there governmental or public scrutiny of the data collection, analysis, and retention policies of the collecting organization?

Resources for further learning

Law librarianship & data science

- AALL Webinar: Intro to Data Science for Law Librarians (Sep 2020)
  - https://elearning.aallnet.org/products/intro-to-data-science-for-law-librarians
- "10 Ways Data Science Can Help Law Librarians," *AALL Spectrum*
  - https://aallspectrum.aallnet.org/html5/reader/production/default.aspx?pubname=&edid=9030083c-a9ef-460f-a788-9e47205754d2&pnum=18
- "Using data analytics to tell your story with RStudio's Sarah Lin," The Geek in Review Podcast Ep. 90
  - https://www.geeklawblog.com/2020/10/the-geek-in-review-ep-90-using-data-analytics-to-tell-your-story-with-rstudios-sarah-lin.html
- Data science for lawyers
  - https://www.datascienceforlawyers.org/

Other resources

- Intro to Data Science for Law Librarians 4-page handout
  - https://sarah.rbind.io/talk/2020-ds4lawlibrarians/
- *Library of Missing Datasets* art installation
  - https://mimionuoha.com/the-library-of-missing-datasets
- "ODSC West 2019 Keynote Rachel Thomas on Algorithmic Bias," Open Data Science Conference
  - https://opendatascience.com/odsc-west-2019-keynote-rachel-thomas-on-algorithmic-bias/
- *Automating Inequality*, Eubanks (2018)
- *Weapons of Math Destruction*, O'Neill (2016)
- "Data Capitalism and Algorithmic Racism," Milner & Traub (2021)
  - https://datacapitalism.d4bl.org/documents/Demos_Data_Capitalism_Final.pdf
- UC Davis Data Feminism reading list
  - https://www.zotero.org/groups/2324756/data_feminism/items/F4GHDBH5/library