Course: Information Retrieval and Information Visualization
Fall 2018
Instructor: Monika Akbar

Why take this course?

This course will help you
- To get a background in information retrieval and information visualization.
- To prepare you for research involving search engines, natural language processing, classification, indexing, recommendation/personalization.
- To acquire proficiency in visualizing different types of data.

Some of the topics which will be addressed in the class include:

- **Information Retrieval**
  - **Data properties**: Data architecture, data types and data formats, data modeling and design.
  - **IR tasks**: Crawling, data preprocessing, basic text classification techniques, indexing (construction and compression), query processing.
  - **IR models**: Information representation – local and distributed representations, weighted vector-space model, probabilistic graphical model.
  - **Retrieval evaluation**: Scoring and ranking of search results.
  - **Applications**: Filtering, federated search, recommendation, personalization.

- **Information Visualization**
  - **Design Principles**: HCI metrics, scale, tasks, data mapping, overviewing, data density, etc.
  - **Visual Encoding**: Graphical methods for data presentation, visual perception, graphical perception, layering and separation.
  - **Interaction Strategies**: Overviews, multiple views, focus + context, filtering and querying, lens, data flow.
  - **Introduction to D3 visualization.**
  - **Applications of visualizations**
    - Explore, transform, visualize large complex datasets including scientific data, tabular data, text data, graphs, and documents.

Books:
- Introduction to Information Retrieval by Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze (available online, free).
- The Visual Display of Quantitative Information by Edward R Tufte.

Class Description: This class will include lectures, in-class activities, state-of-the-art literature surveys, and a semester long group project. The class will include presentations by the instructor and students, discussions, and demos of various approaches introduced throughout the semester. Students will learn to think critically, communicate effectively, and collaborate productively in a group.
Possible grading schema:
- Project: 30%
- Quiz and in-class participation: 20%
- Exams: 30%
- Homework/assignments: 20%

Prerequisite: None