Web Mining

Introduction to Student Projects

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Outline

1. Requirements for Student Projects
2. Requirements for Project Summaries
3. Final Exam
Student Projects

Goals

- Gain more practical experience with
  - Web Usage Mining,
  - Web Structure Mining, or
  - Web Content Mining
- Get to know additional problem-specific
  - preprocessing methods
  - Web mining methods

Expectation

- Select an interesting Web mining problem of your choice
- Solve the problem using
  - the Web mining methods that we have learned so far
    plus some advanced problem-specific data pre-processing
  - other Web mining methods which might be helpful for solving the
    problem and build on what we learned in class
Procedure

- Teams of three students
  1. realize a Web mining project
  2. write 12 page report about the project and the methods employed in the project
  3. present the project results to the other students (12 minutes presentation + 8 minutes discussion)

- Final mark for the course
  - 50 % written exam
  - 30 % written summary about the project
  - 20 % project presentation
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<td>Submission of Project Outlines</td>
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<td>Presentation of project results</td>
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Where to find Web Usage Data Sets?

- Netflix
  - provided by commercial movie rental website for Netflix competition ($1,000,000 for 10% better RMSE)
  - 480,000 users rated 18,000 movies, 100M ratings

- Web Data Commons
  - http://www.webdatacommons.org/structureddata/
  - Product/hotel/restaurant ratings as part of Microdata dataset

- Stanford Large Network Dataset Collection
  - Amazon product co-purchasing data

- Amazon Public Datasets
  - https://aws.amazon.com/datasets
  - Wikipedia Traffic Statistics, …

- Web 2.0 Platforms offer plenty of additional rating data
  - e.g. LastFM, delicious
Where to find Web Structure Data Sets?

- **Stanford Large Network Dataset Collection**
  - Social networks: Facebook, Google+
  - Citation networks: Arxiv, US Patents
  - Product co-purchasing network: Amazon

- **Web Data Commons Hyperlink Networks**
  - Aggregated by website (40 million vertices)
  - [http://webdatacommons.org/hyperlinkgraph/](http://webdatacommons.org/hyperlinkgraph/)

- **The Koblenz Network Collection**
  - 235 networks about various topics
  - [http://konect.uni-koblenz.de/](http://konect.uni-koblenz.de/)

- **Billion Triples Challenge Dataset**
  - Linked Data crawled from the public Web

- **Archive.org**
  - Friendster social network (2011)
Where to find Web Content Data Sets?

- **Multiple-Aspect Restaurant Reviews**
  - Reviews taken from we8there, ratings for 5 main aspects of restaurants
  - [http://people.csail.mit.edu/bsnyder/naacl07](http://people.csail.mit.edu/bsnyder/naacl07)

- **The J.D. Power and Associates Sentiment Corpus**
  - Blog entries about cars and cameras, manually labeled with product features (including labeled part-of relations), opinion phrases and opinion targets
  - [http://verbs.colorado.edu/jdpacorpus/](http://verbs.colorado.edu/jdpacorpus/)

- **Web Data Commons**
  - Product/hotel/restaurant reviews as part of Microdata dataset
  - [http://www.webdatacommons.org/structureddata/](http://www.webdatacommons.org/structureddata/)

- **Stanford Large Network Dataset Collection**
  - Amazon product metadata and review information about 548,552 different products

- **Academictorrents.com**
  - Various large data sets
  - e.g. Enron Email Bag of Words, Arizona State University Twitter Data Set

- **Programmable Web**
  - Website giving an overview about 4100 public Web APIs
Some Project Ideas (not binding)

- **Web Usage Log Mining**
  1. Learn a classifier for categorizing the visitors of your website
  2. Identify common navigation paths, drop-out pages

- **Recommender Systems**
  1. Defend a recommender system by identifying fake ratings
  2. Experiment with hybrid recommenders in specific application domain
  3. Linked Open Data-enabled Recommender Systems Challenge

- **Network Analysis**
  1. Common Crawl Hyperlink Graph (analyze by country or topical domain)
  2. Linked Data Cloud (analyze by country, topical domain)
  3. Analyze Graph Structure of Wikipedia or DBpedia (detect communities)

- **Sentiment Analysis**
  1. Extracting product features and opinions using advanced methods
  2. Generating opinion summaries (aggregating extracted information)
  3. Comparison of machine learning vs. lexicon-based approaches
Project Outlines

- 2-3 pages (sharp!) without title or toc pages, DWS master thesis layout
- due 25.04.2016, 23:59
- send by eMail to Chris, Simone, Stefano, and Oliver
- answer the following questions:
  1. What is the problem you are solving?
  2. What data will you use?
     - Where will you get it?
     - How will you gather it?
  3. How will you solve the problem?
     - What preprocessing steps will be required?
     - Which algorithms you plan to use?
     - Be as specific as you can!
  4. How will you evaluate, measure success?
Coaching Sessions

- We will give you tips and answer questions concerning your project.

- Please send us an email that you want to attend a coaching session.
  - until Tuesday night
  - including the questions that you like to discuss

- We will assign you a time slot afterwards and inform you about the slot via email.

- You are required to attend at least one coaching session for getting feedback on your initial results.
Project Summaries

- Max. 12 pages (sharp!) without title or toc pages.
- Every additional page (including appendixes) and every day of late submission downgrades your mark by 0.3
- due 29.05.2016, 23:59
- send by email to Chris, Simone, Stefano, and Oliver

Outline for project summaries:

1. Application area and goals
2. Structure and size of the data set
3. Preprocessing
4. Actual Web Mining
   - including evaluation results
   - including different approaches that you tried
5. Discussion of Results

Requirements

- You must use the DWS master thesis layout.
- Please cite sources properly. Preferred citation style [Author, year].
- Also submit your code/Rapid Miner processes and (a subset) of your data.
Final Exam

- **Date:** 16.6.2016
- **Duration:** 60 minutes

**Structure:** 5 - 6 open questions that
- check whether you have understood the content of the lecture
- require you to describe the ideas behind algorithms and methods
- might require you to do some simple calculations