NLP for Student and Teacher: Concept for an AI based Information Literacy Tutoring System

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Plan

- Information Literacy (IL): definition and teaching methods
- Processes in Information Literacy
- Early-example: Essay Scoring for Short-Answers
- Future work:
  - Which NLP candidates to support coaching
  - How can they be applied?
  - How to build it in a privacy respecting way?
Information Literacy

- From the UNESCO Moscow declaration (2012):

  "critical set of competencies to be able to seek, critically evaluate and create new information and knowledge in different forms using existing tools, and share these through various channels"

- recognized essential to take part to the scientific discourse

- recognized useful to be an informed citizens and, thus, effectively fight fake news

- generally taught integrated to a science-oriented course
  - e.g. when asking to find relevant articles
  - e.g. when asking for a data-collection

- Few dedicated courses exist
Learning and Teaching Information Literacy

- generally taught integrated to a science-oriented course
  - e.g. when asking to find relevant articles
  - e.g. when asking for a data-collection
  - ... classical troubles of *on-the-job-learning*

- Few dedicated courses exist
  - Introduction to scientific work
Learning Processes of the Information Literacy

- use search engines for discovery purposes
  - search, collect, cite, synthesize
- create an overview of a given field based on multiple sources
  - collect, put citations in context, quantify
- express and justify a personal opinion
  - collect, differentiate, create, justify

- Can be done as exercises with evaluation criteria
  - Often discussed among peers
  - Generally scored by a reading teacher
Early Example of NLP-application: Essay Scoring

- Simple question/mission statement
  - Answer expected as a text
  - Use a set of scored texts
  - Train a model on this
    - Neural network, singular vector decomposition matrix, ...
    - Adjust parameters using cross-validation

- Apply model to suggest score (e.g. Camus & Filighera 2020)
  - but could give more info!
    - E.g. similar documents, highlight words or words complexes
    - Paradigm shift from "raw scorer" to "teacher support"
NLP-Methods applicable to IL Teaching

- e.g. when using a search-engine to discover content
  - gather traces with search history, shown results and written recollection
  - recommend further search or further readings
    - give hints referring to shortly visited web-views
  - effectively recognized mentions based on a few words
    - relevance of reported findings with similarity to target topics
    - e.g. using entity linking
- simple formal checks can apply (e.g. citation style) and yield guidance
- closed world or open world
An Architecture to Support IL Teaching

- First implementation:
  - browser-plugin that follows search, read, and write activities
  - precise tasks with closed or opened corpora
  - hints within the search, read and write pages
- within explicit IL courses
  - need exact task spec to devise hints engine
- privacy
  - data-store independent per learner
  - claim: all will be convertible into JavaScript in-web-page code
Conclusion

- We have presented a model to enrich IL learning with automated hints
  - for students and for teachers
  - many can be brought into a community chatbot

- Which methods? NLP algorithms are here

- How to apply them?
  - Frames such as IUBH Scientific Work or the Information-Literacy-Online-MOOC courses
  - Development of a pilot needs expertise
    - to devise a precise analysis and hints generation
    - to develop processing, UIs, corpora in a task-specific manner
Bibliography
