CAPSTONE DESIGN EXPO | Computer Science | CS 25-336

Community-Engaged Research Evaluation: A Computational Framework for Data Collection, Processing, and Visualization

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Sponsor: VCU Wright Regional Center for Clinical and Translational Science | **Mentor:** Amy Olex, Ph.D.

Problem Statement

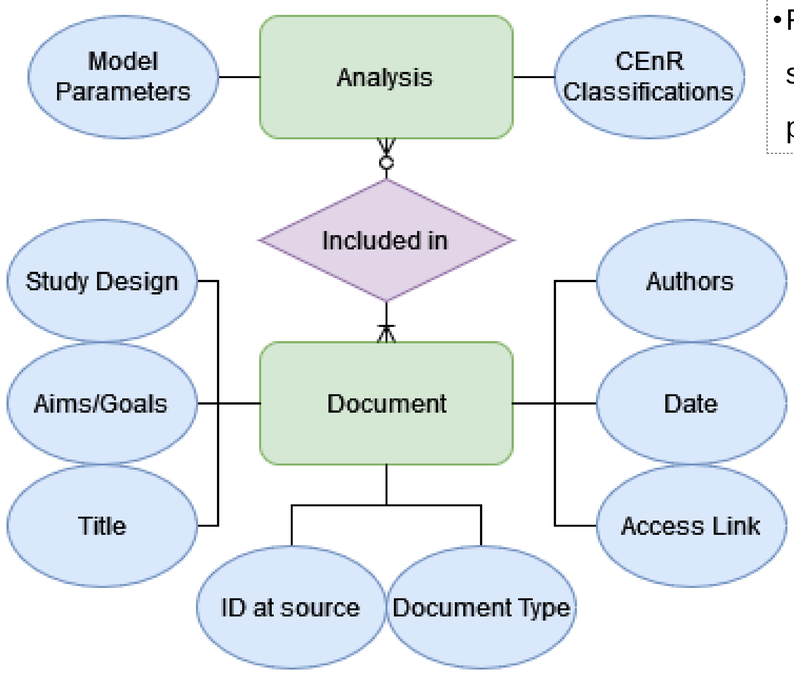
- Researchers and administration at the Wright Center would like to be able to quantitatively measure the impact of their Community-Engagement Research (CEnR) initiative
- CEnR participation data is measured through voluntary surveys, Institutional Review Board (IRB) submissions and manuscripts, grants, and publications
- **There lacks a sole repository to store, access, and evaluate these sets of data**
- The project seeks to establish methods for better capturing data, utilizing external resources, and improving the reporting and impact measurement of CEnR activities

Objective/Overview

- Database to act as a sole repository for text documents
- API design & user manual with documentation of API, so that programmers can run models & algorithms over the database
- API framework which can be used to obtain, format, and incorporate appropriate data from external datasets
- Documentation instructing how to extend this portion of the API to function with additional databases
- Front-end graphical user interface application to access the database, view specific sets of data and statistical visualizations, and upload new data to the database
- Web-hosted and accessible from browser with authentication

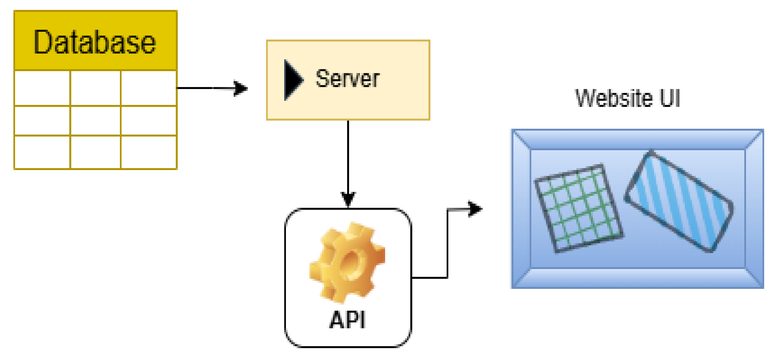
Schema

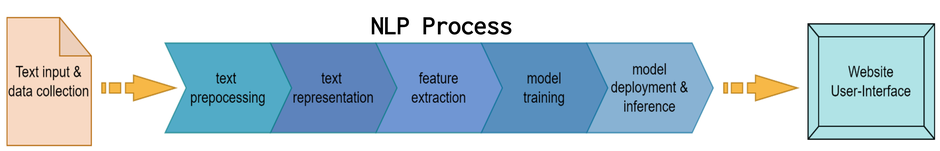
The entity relationship diagram (ERD) shown below visualizes data relationships within this project. The core entity, Document, can be included in various analyses and has different properties, such as document type. Documents connect to Data Sources that include Publications, Surveys, and IRB Documents. The CEnR Team monitors and categorizes each document within analyses, ensuring compliance with community-engaged research standards.



Impact

- **User Interface** – Graphical user interface to display visualization elements for non-programmers such as graphs, charts, and analytical tools
- **Database** – Store text documents to use for information mining and retrieval
- This allows researchers to analyze a large batch of raw data, identify patterns, and extract useful information
- **API** – Allows integration between new applications and existing systems, enabling a seamless data exchange and easy scaling of applications
- Researchers can efficiently scrape papers from sources such as PubMed, interface with other databases to easily pull data, and interact with machine learning models





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