Consortium:

UB Mannheim

Deutsches Forschungszentrum für Künstliche Intelligenz GmbH

Hochschule der Medien

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Funded by:

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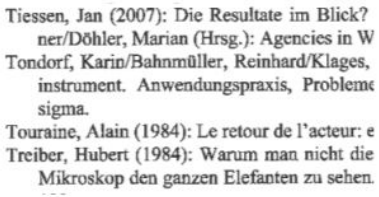
LOC-DB:
A **Linked Open Citation Database**
provided by Libraries.
Motivation and Challenges.

EXCITE Workshop 2017
March 30/31, 2017
GESIS, Cologne



Overview

1. **Motivation**
   Presenter: Kai Eckert, Stuttgart Media University

2. **Infrastructure**
   Presenter: Anne Lauscher, Stuttgart Media University

3. **Reference Extraction**
   Presenter: Akansha Bhardwaj, DFKI Kaiserslautern

Motivation

Scientists:

- ... search for **content**, not for books.
- ... need to check **citations**.
- ... need to know **who cites** the content.
- ... as a special case: need to know who cites **their** content.

Source: https://commons.wikimedia.org/wiki/File:Mad_scientist_transparent_background.svg

Libraries: What is in the catalog?

Basically: Things you can put on a shelf.

But there are databases!

Many commercial, incomplete databases.

Many smaller, focused databases.

Many library services, like the OnLine Contents Fachausschnitte (fka. OLC-SSG).

All are **incomplete** (most do not even try to be complete)

Most are **not freely available as Open Data.**

Most do **not contain citation references.**

What if...

... libraries would just do it?

- **Catalog** journals and collections (proceedings),
- with **all articles / chapters** as separate resources,
- with a structured form of all **citation references** in all articles,
- ideally with **links** to the cited resources.

Linked Open Citation Database

Goal: Answering the question:

What is needed (persons, resources, money)
for libraries to actually “do it”?

(i.e., not the creation of a complete and free citation database, at least for now...)

Method: Prototypical creation of a complete (in the sense of a subset) and free citation database with a focus on cataloging efficiency.

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Focus on efficiency

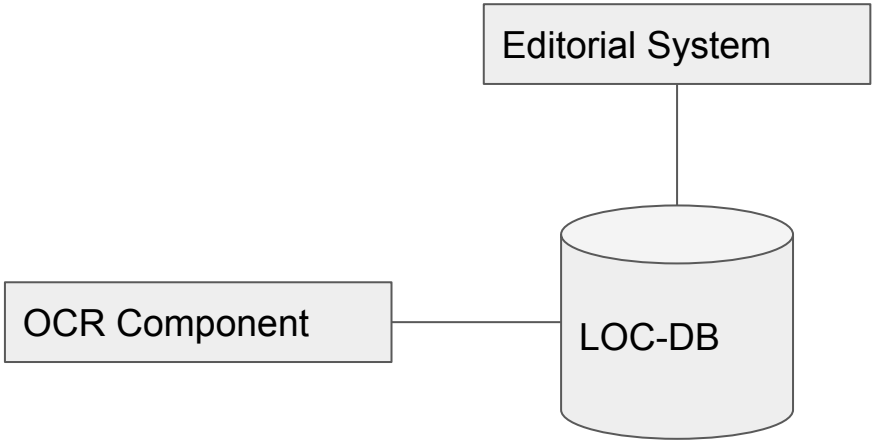
- Reuse existing data (e.g., from publishers or other projects).
- Use OCR.
- Semi-automatic data extraction and linking.
- Streamline and automate the process wherever possible.
- Distributed database and cataloging process.

Desired answer: If X libraries use Y persons to do the LOC-DB cataloging, we manage to get Z percent of the content.

Hopefully with low X and Y and high Z ;-)

Infrastructure

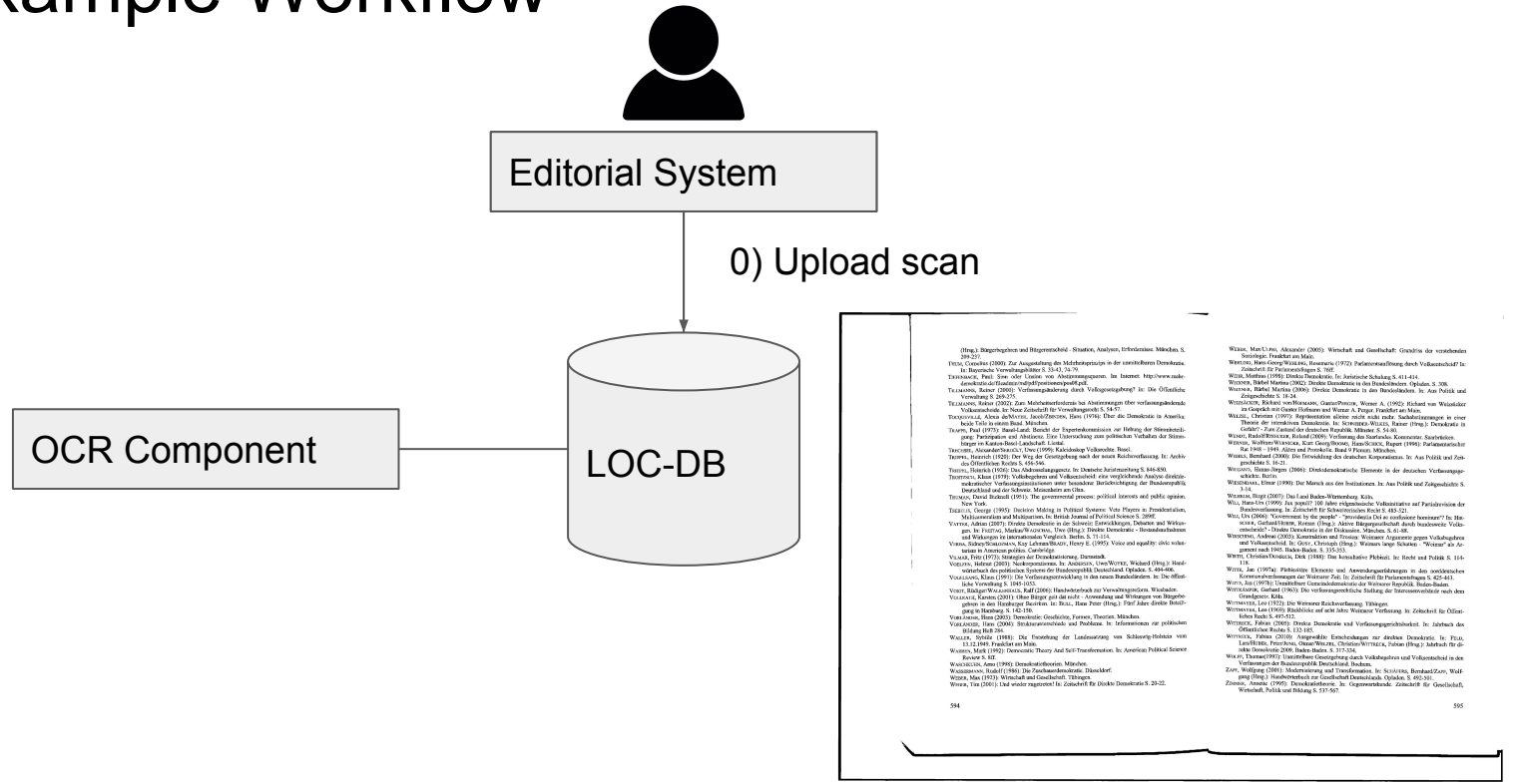
Overview



Main components:

- Editorial System (GUI)
- Central Component (LOC-DB)
- OCR Component

Example Workflow



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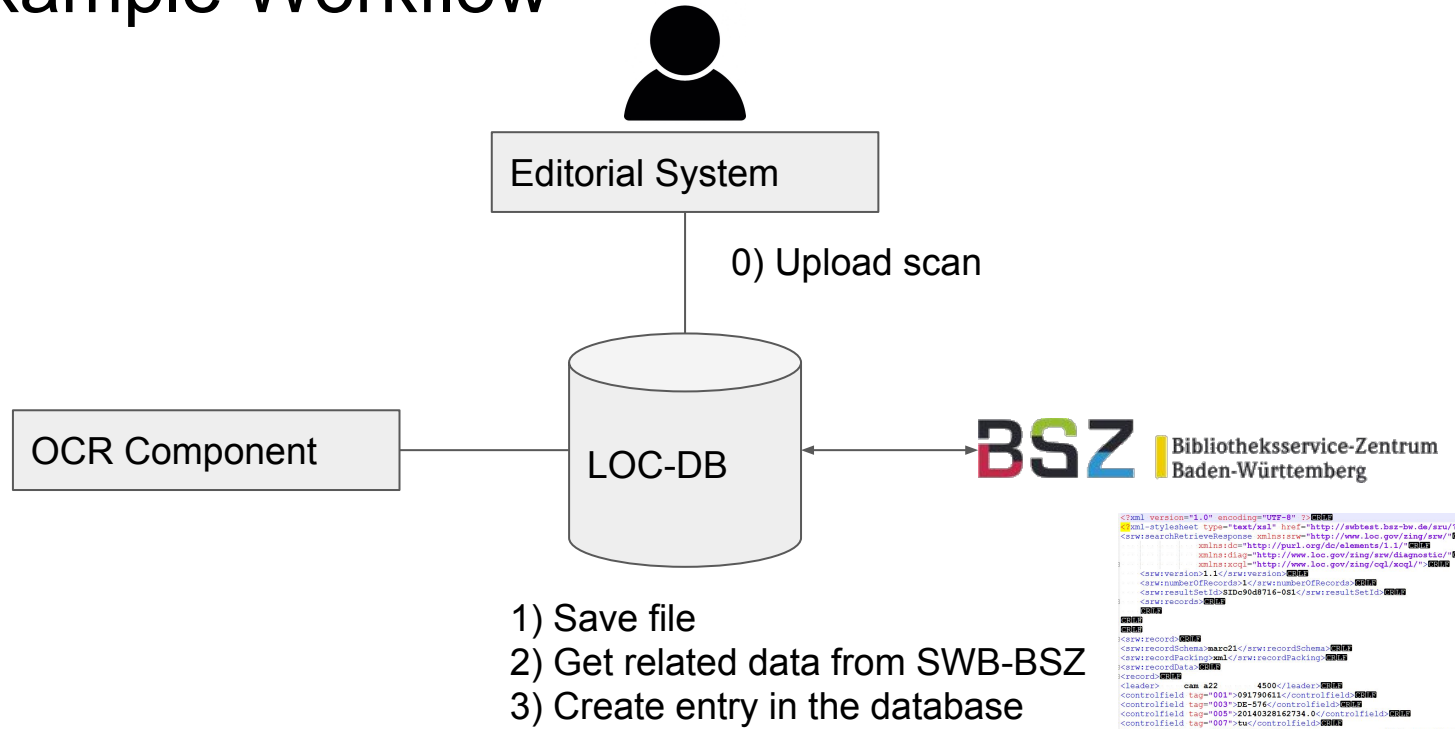

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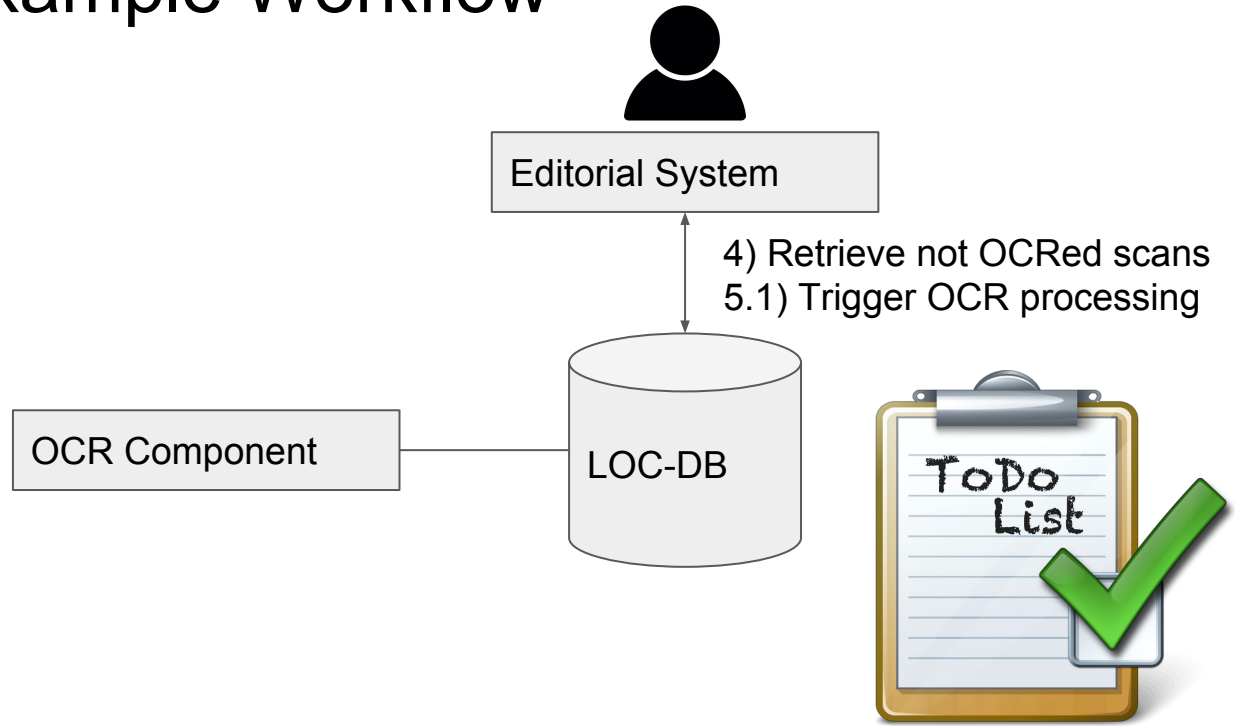

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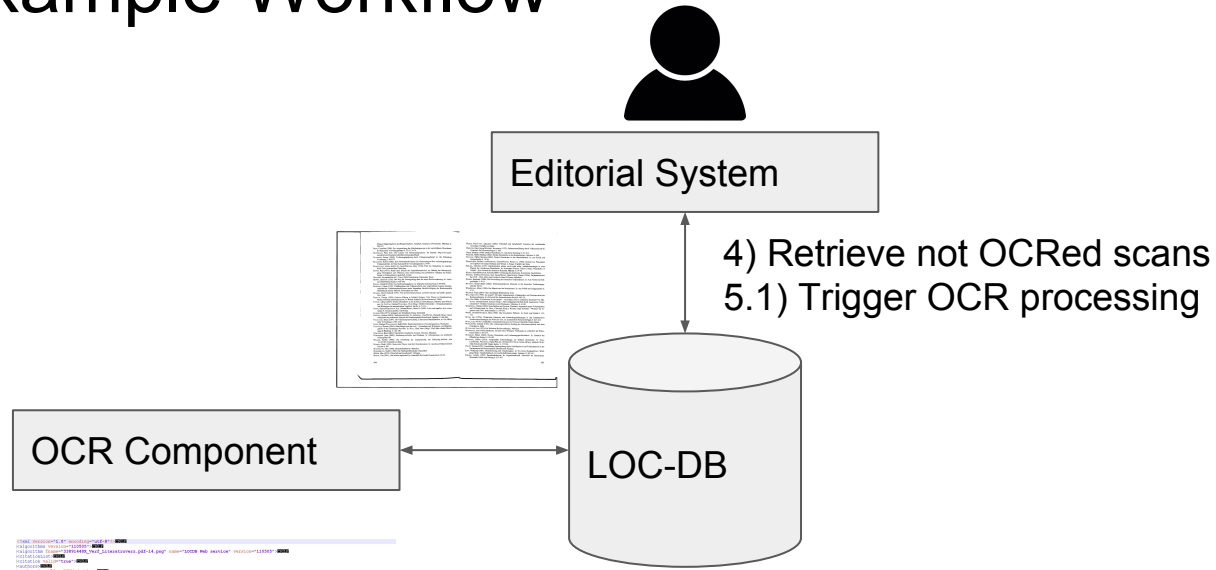
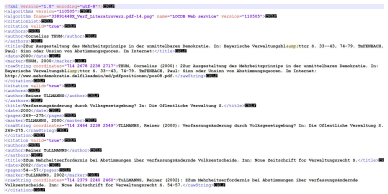
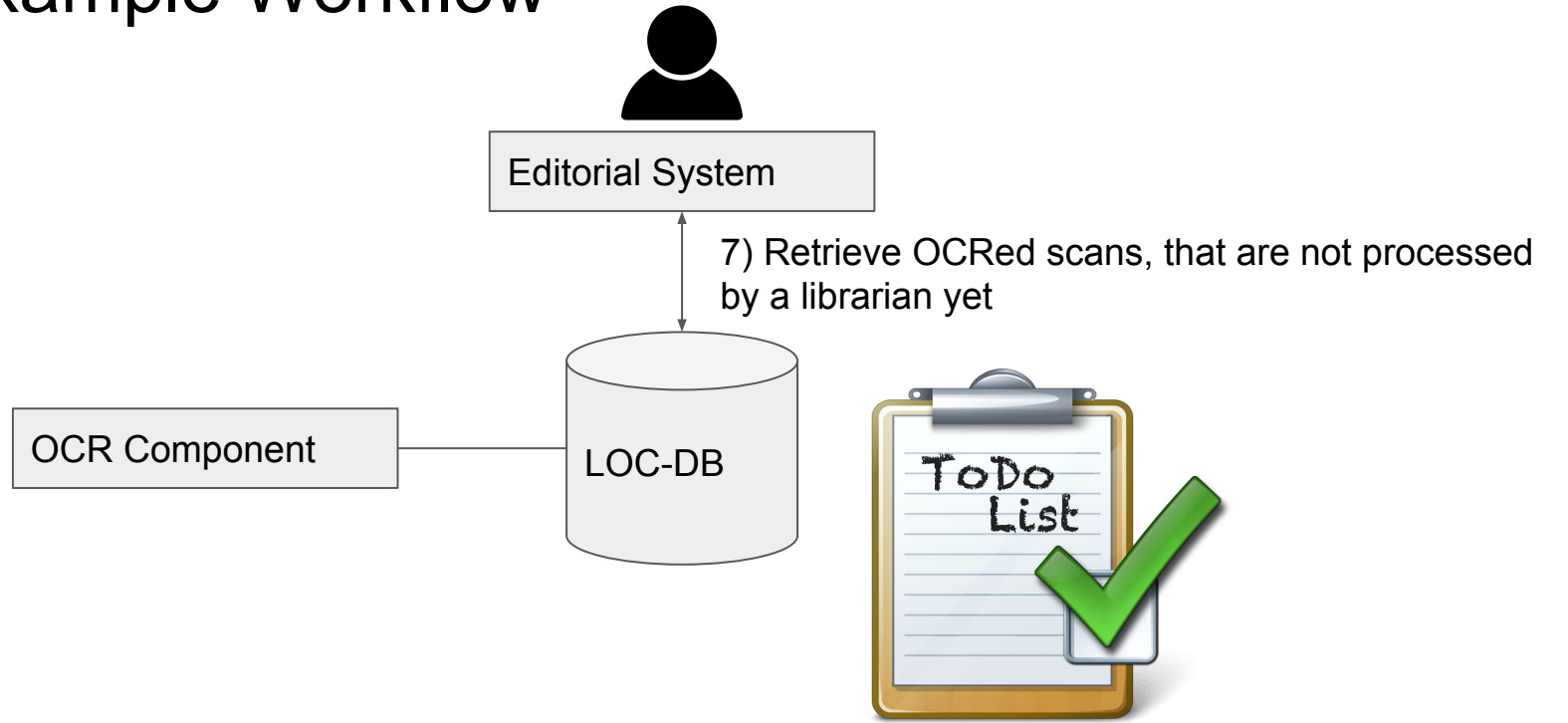




5.2) Trigger OCR processing
6) Retrieve OCRed data (e.g. coordinates of the references on the scanned page) and save it

Example Workflow



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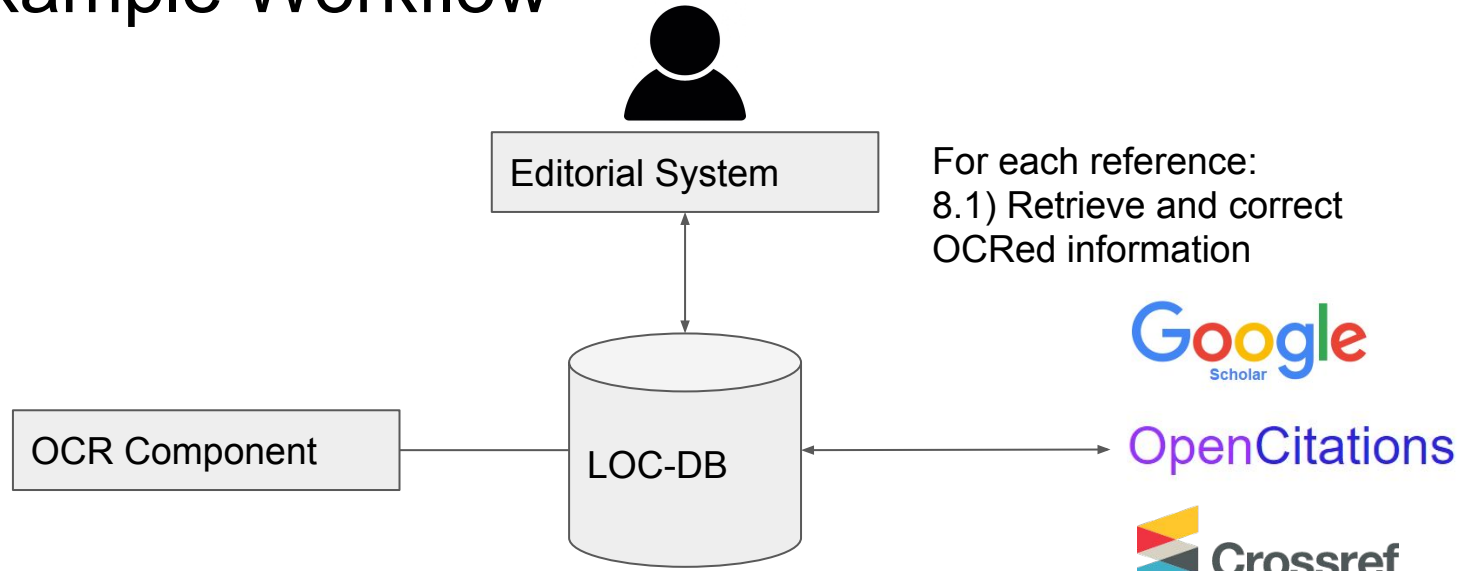

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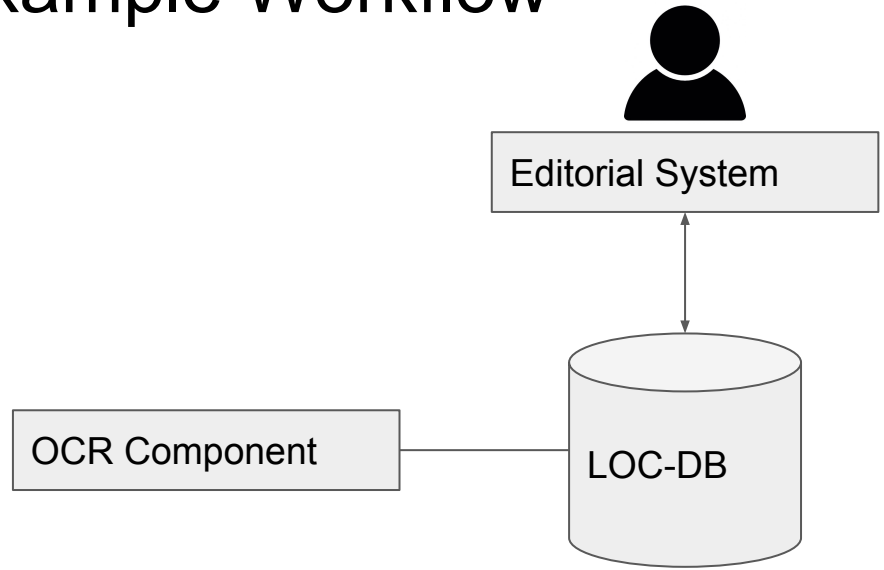
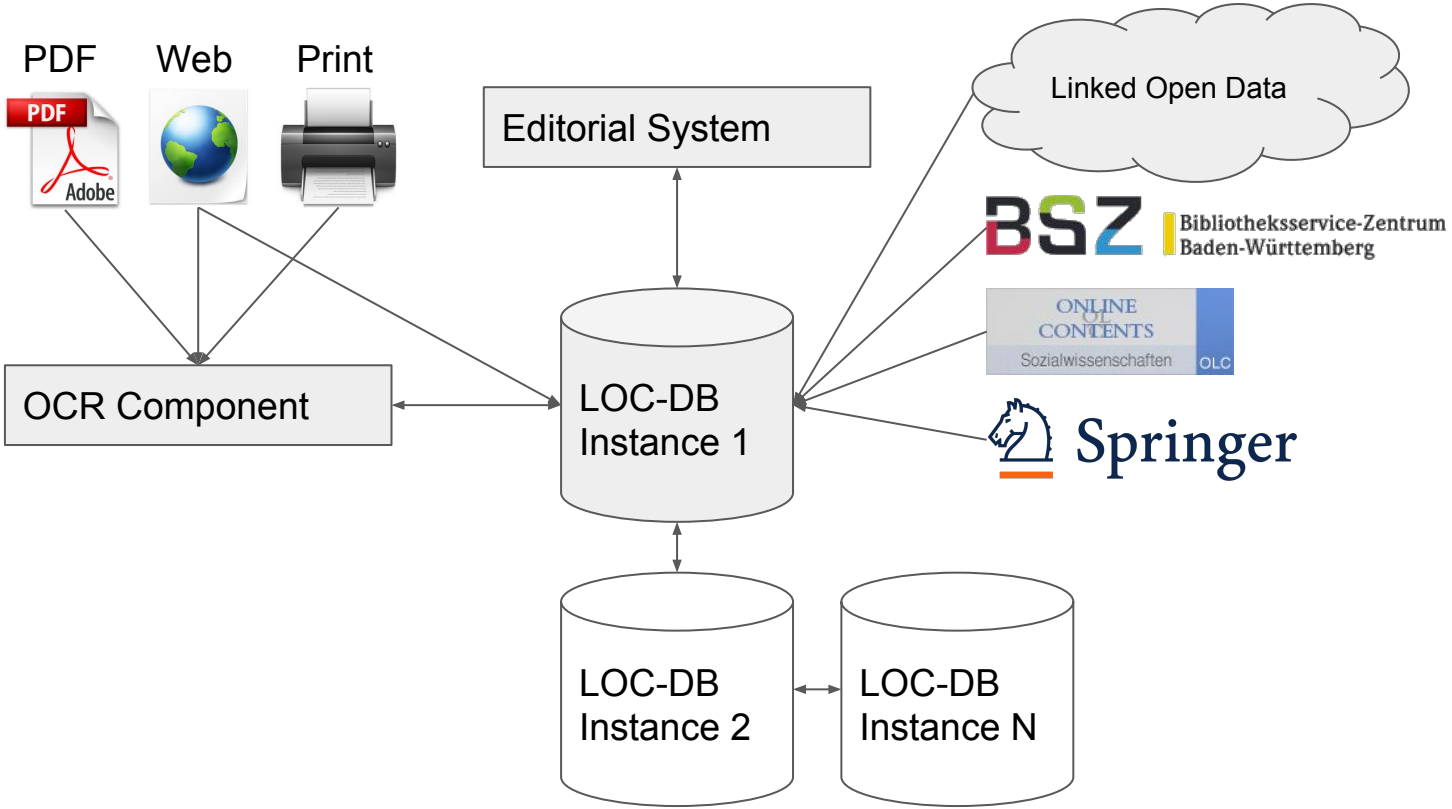


Result:
A linked open citation database extracted from reference lists created by librarians

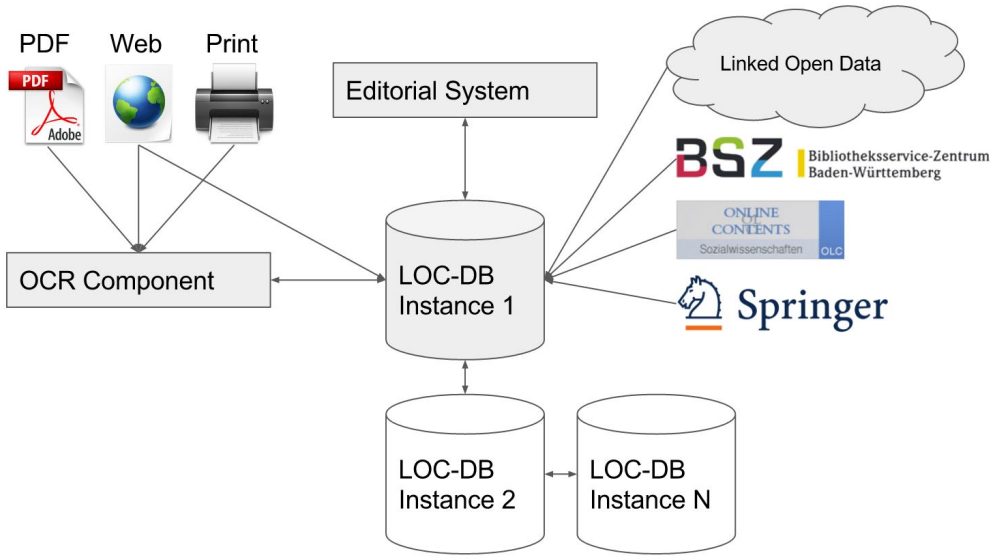
Sources of the images used: [1]

A bit more than just three components..



Sources of the images used: [1], [2], [7], [8], [9], [10],[11]

Technologies



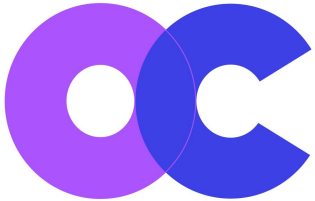
Main components:

- Editorial System (GUI)
  - Angular.io
  - Typescript
  - Bootstrap
- Central Component (LOC-DB)
  - Swagger
  - Node.js
  - MongoDB
- OCR Component

Sources of the images used: [1], [2], [7], [8], [9], [10],[11]

Data Model

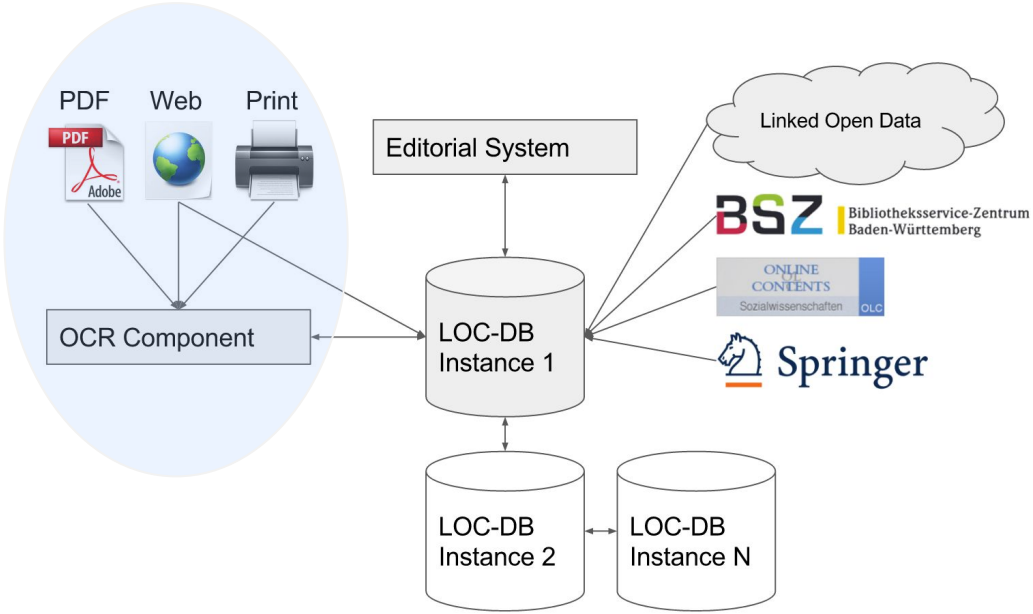
- Inspired by the OpenCitations Data Model
- Extensions to support the management of scans and detected references in different status
- Example: BibliographicEntry (“a single reference”)
  - Identifier of the corresponding scan
  - Status
  - OCRed information, e.g. coordinates of the reference on the scan, title etc.



Sources of the images used: [12]

Reference Extraction

Overview



Main components:

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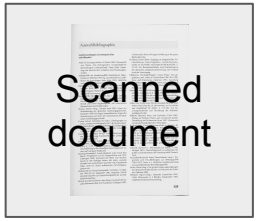

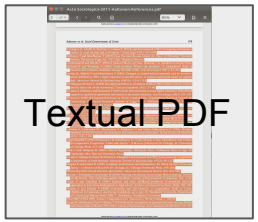

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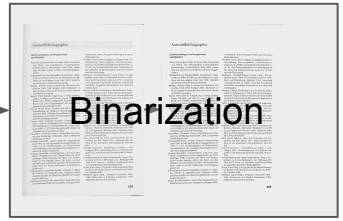

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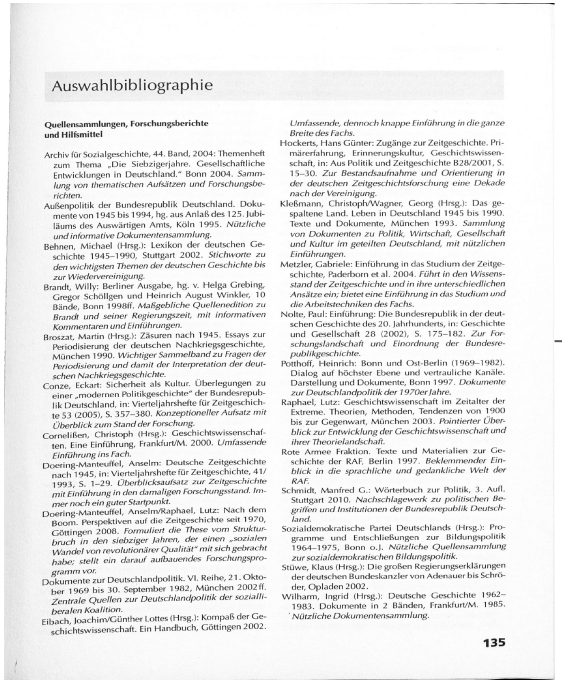

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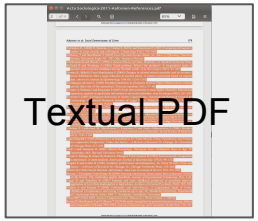

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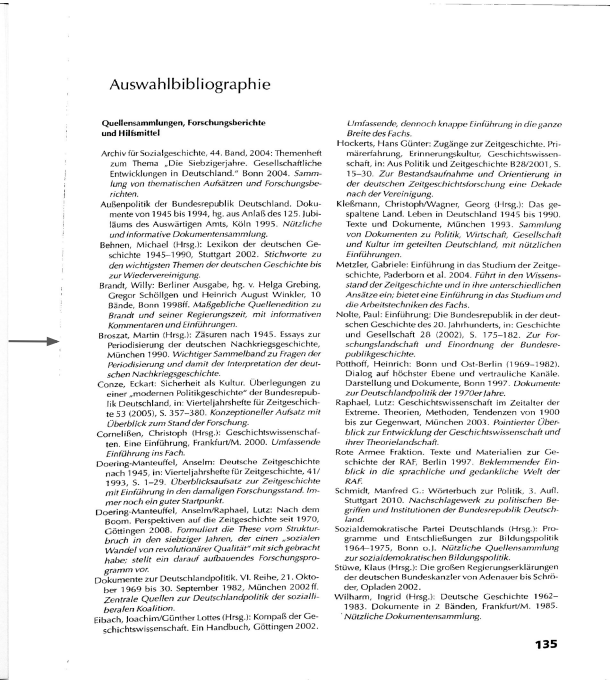

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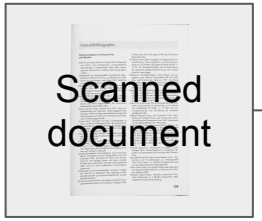

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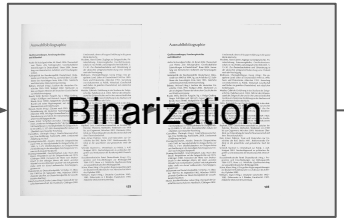

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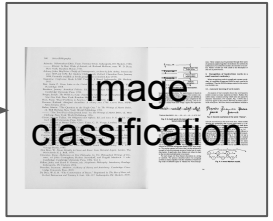

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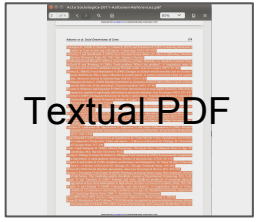

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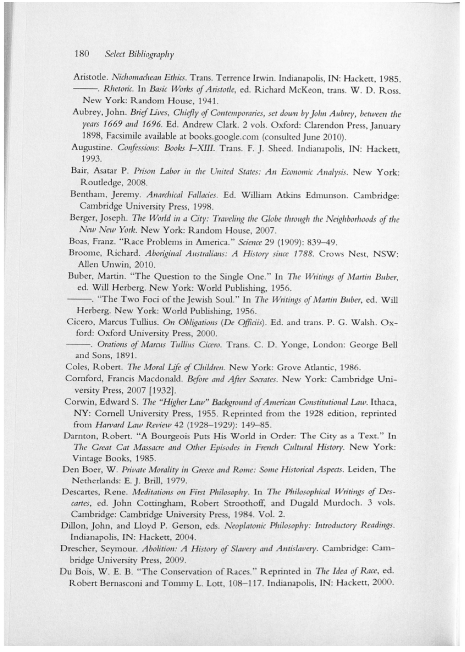

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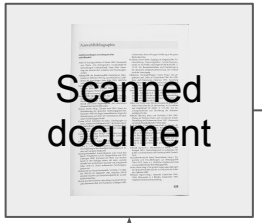
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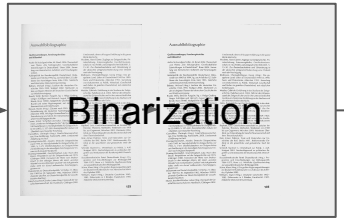
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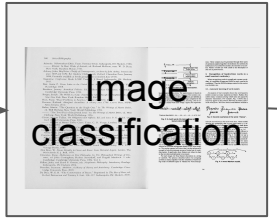
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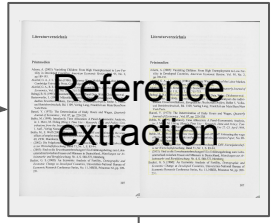
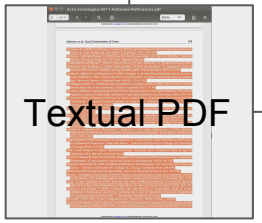

Reference extraction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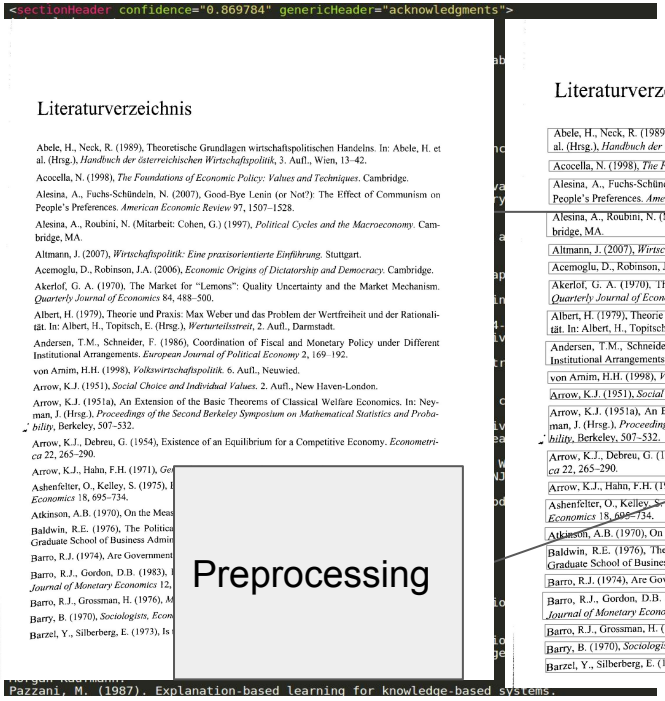
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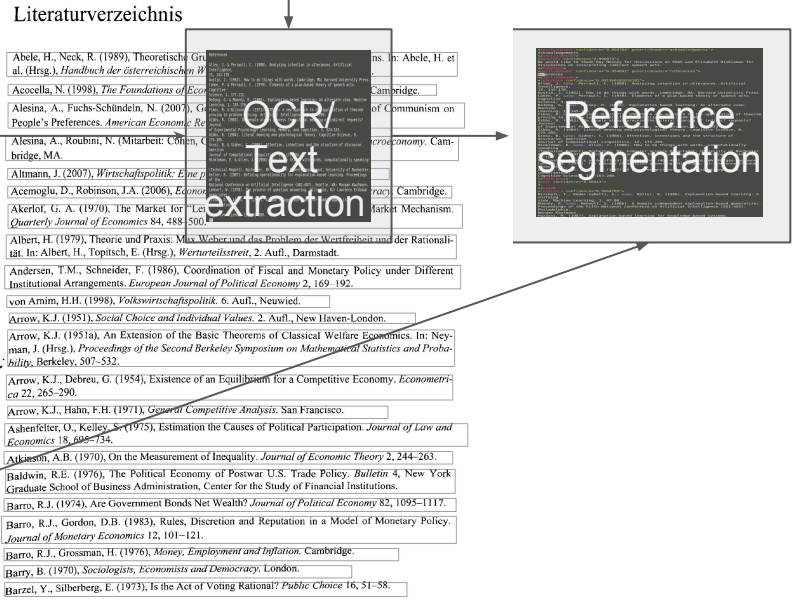
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OCR / Text extraction
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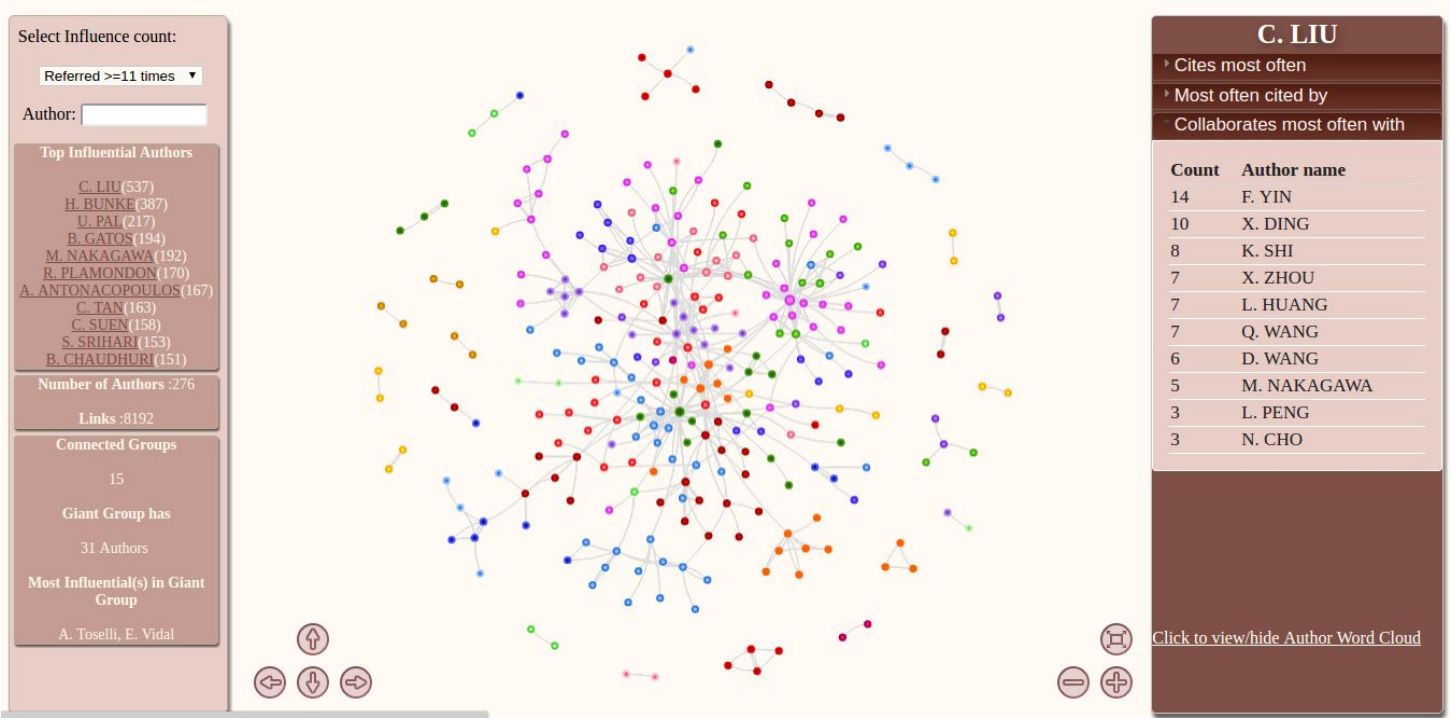
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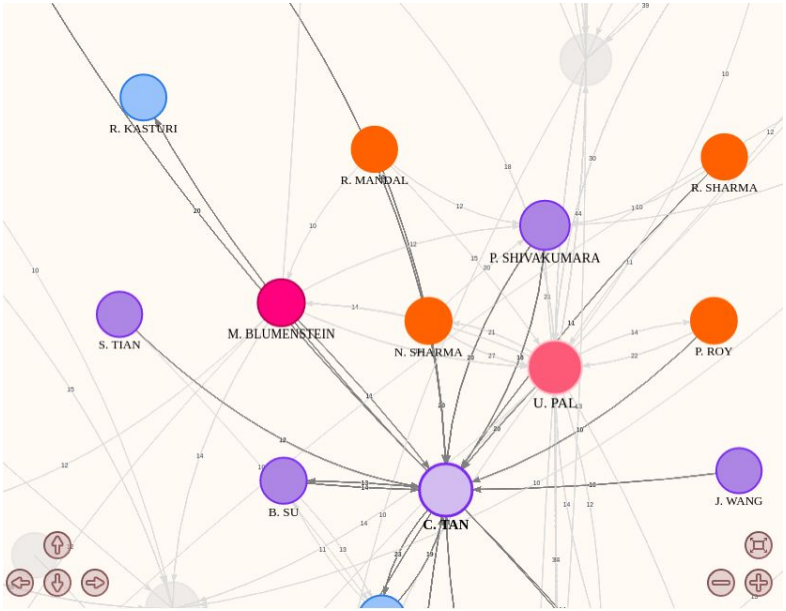
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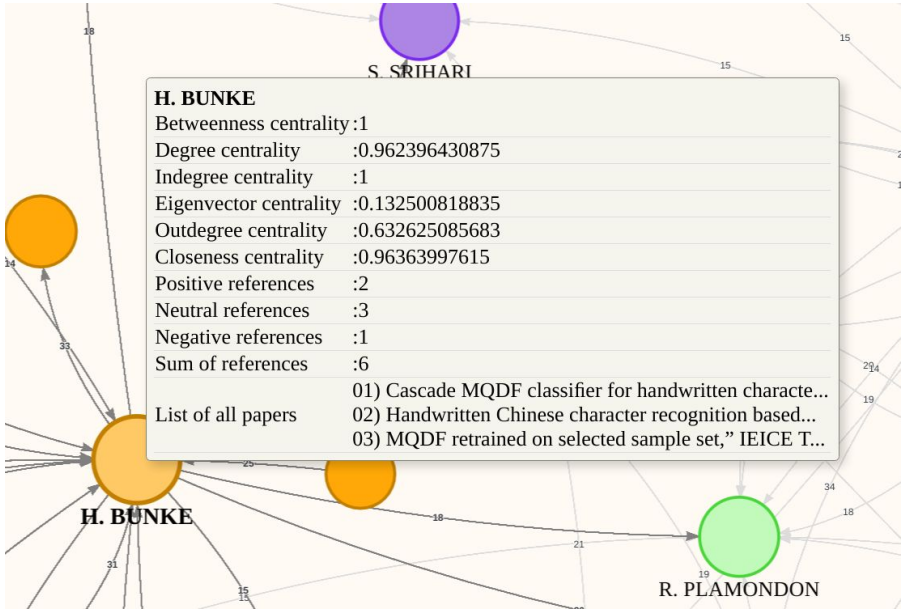
S. SRIHARI
H. BUNKE
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Eigenvector centrality :0.132500818835
Outdegree centrality :0.632625085683
Closeness centrality :0.96363997615
Positive references :2
Neutral references :3
Negative references :1
Sum of references :6
List of all papers
01) Cascade MQDF classifier for handwritten characte...
02) Handwritten Chinese character recognition based...
03) MQDF retrained on selected sample set," IEICE T...
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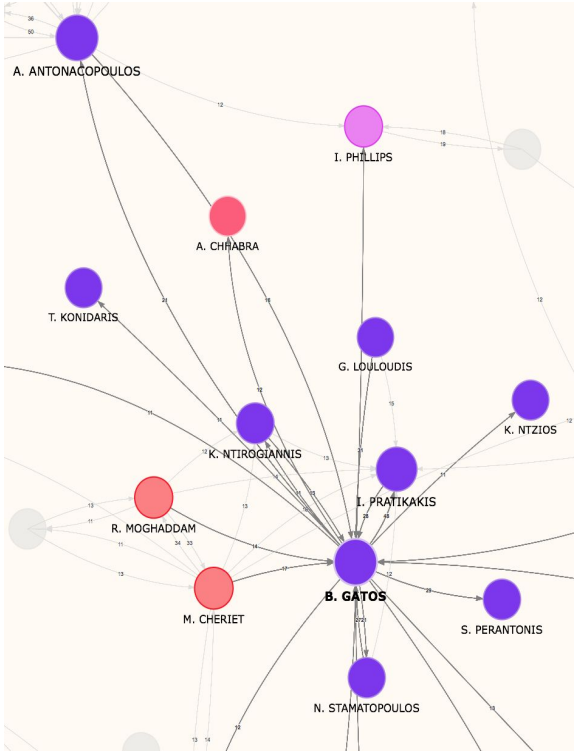
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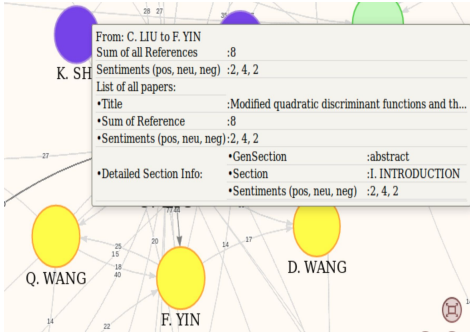
N. STAMATOPOULOS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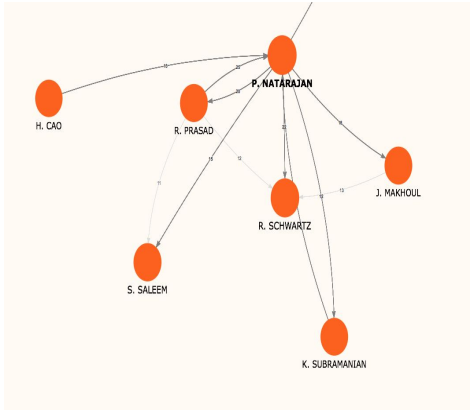
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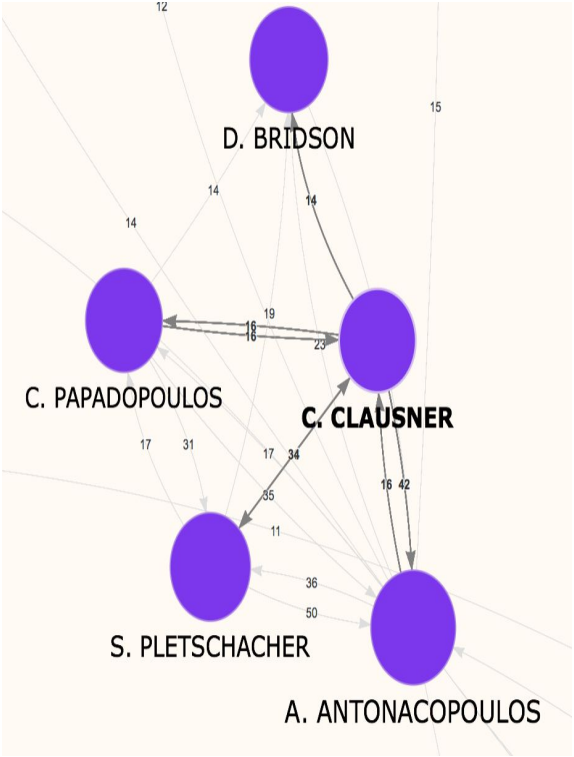
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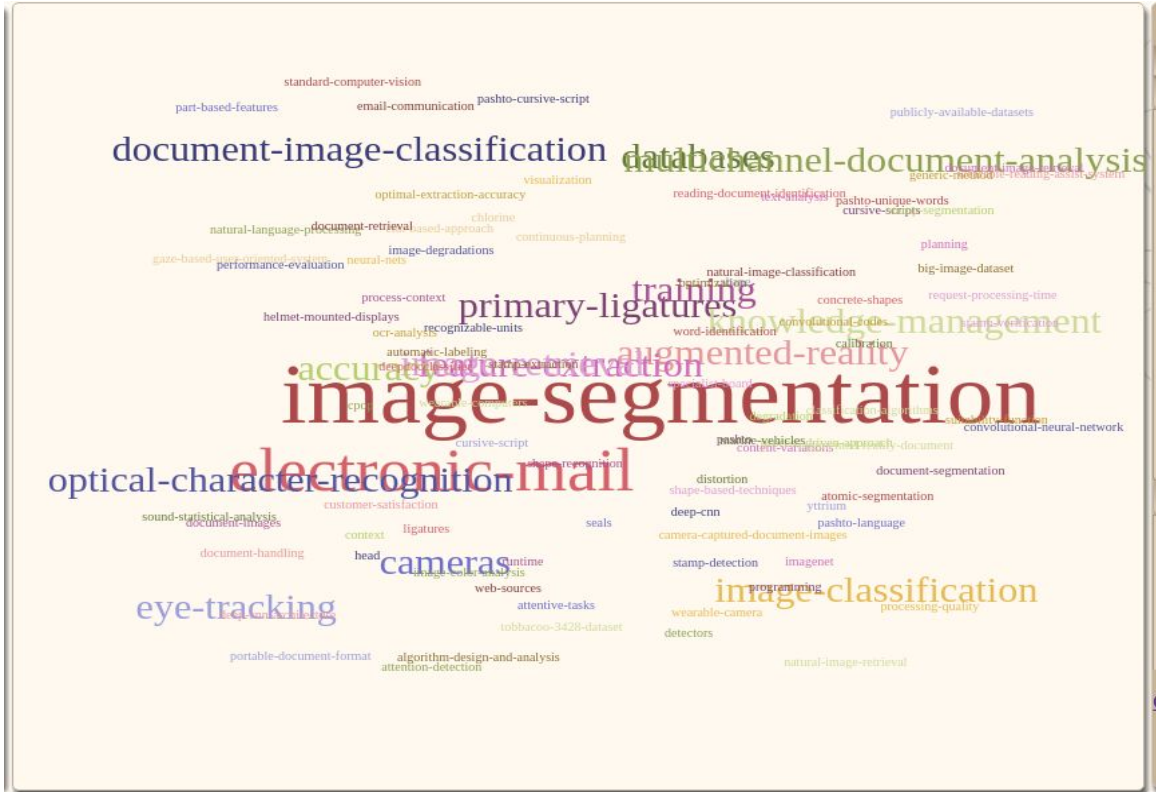

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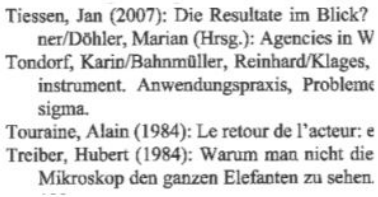

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