netherlands eScience center

Network analysis and visualization for legal research

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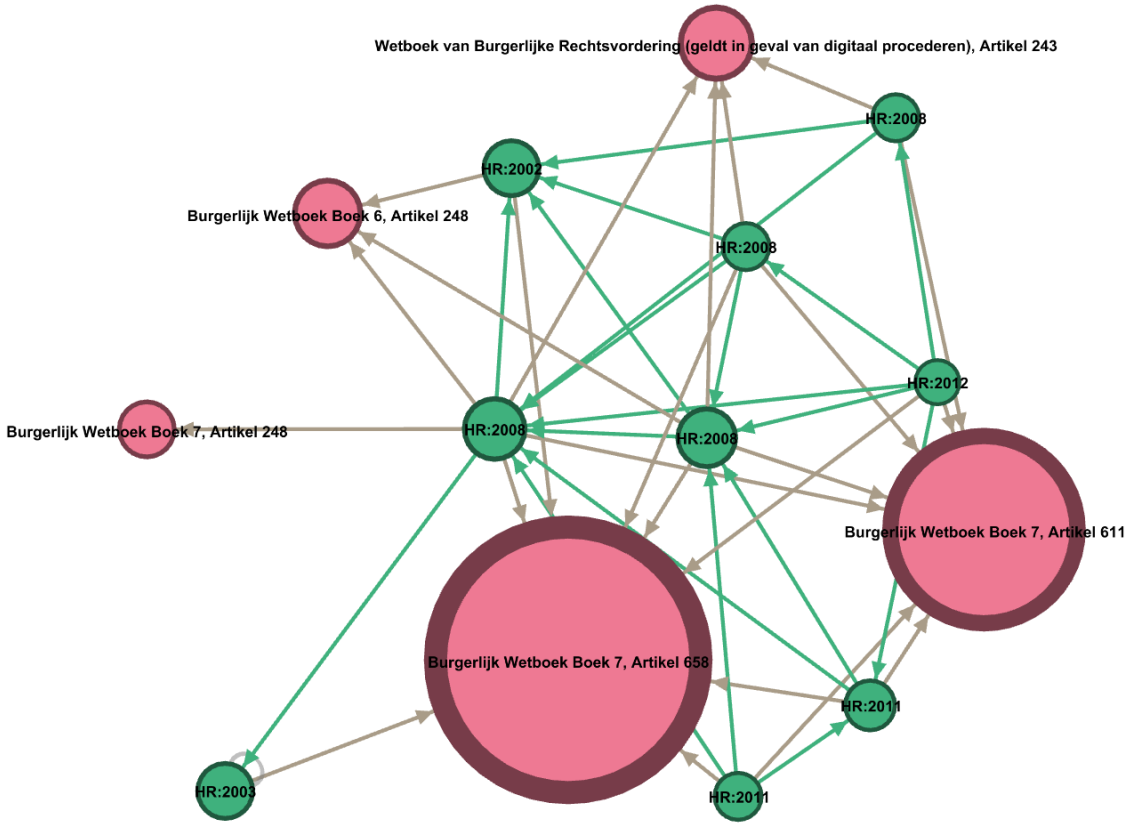
Empirical case law

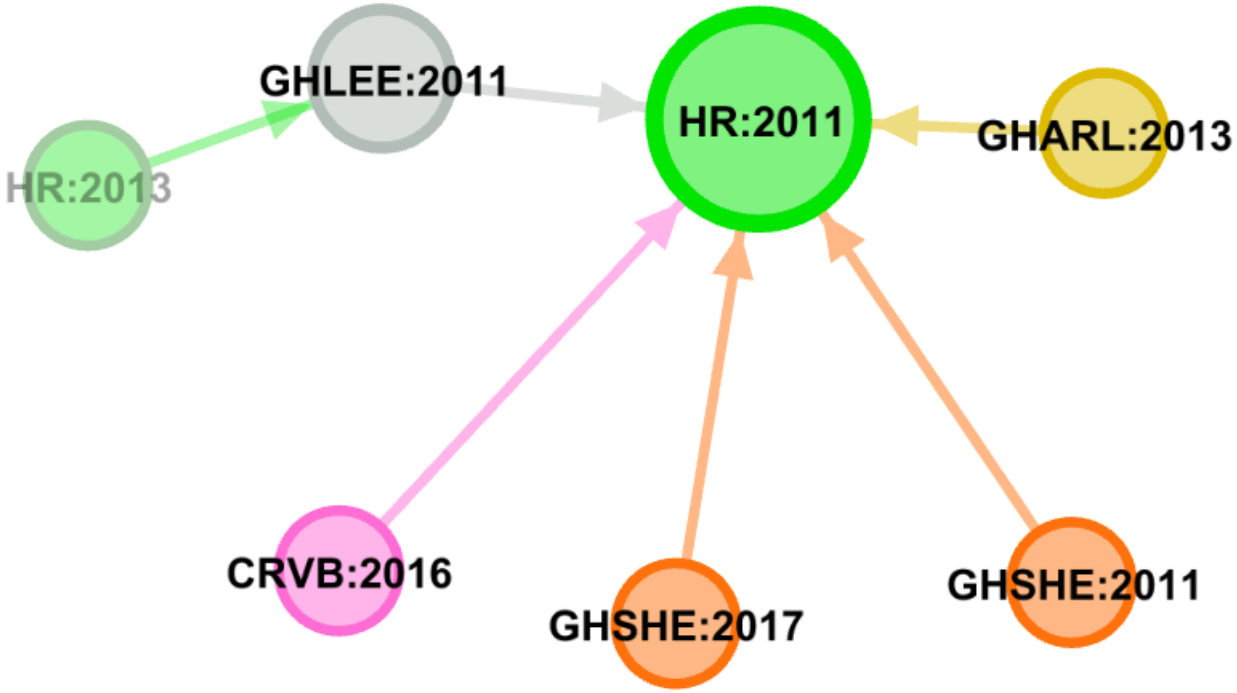
Large body of unstructured data

Very specific language: Natural language processing techniques are not adapted

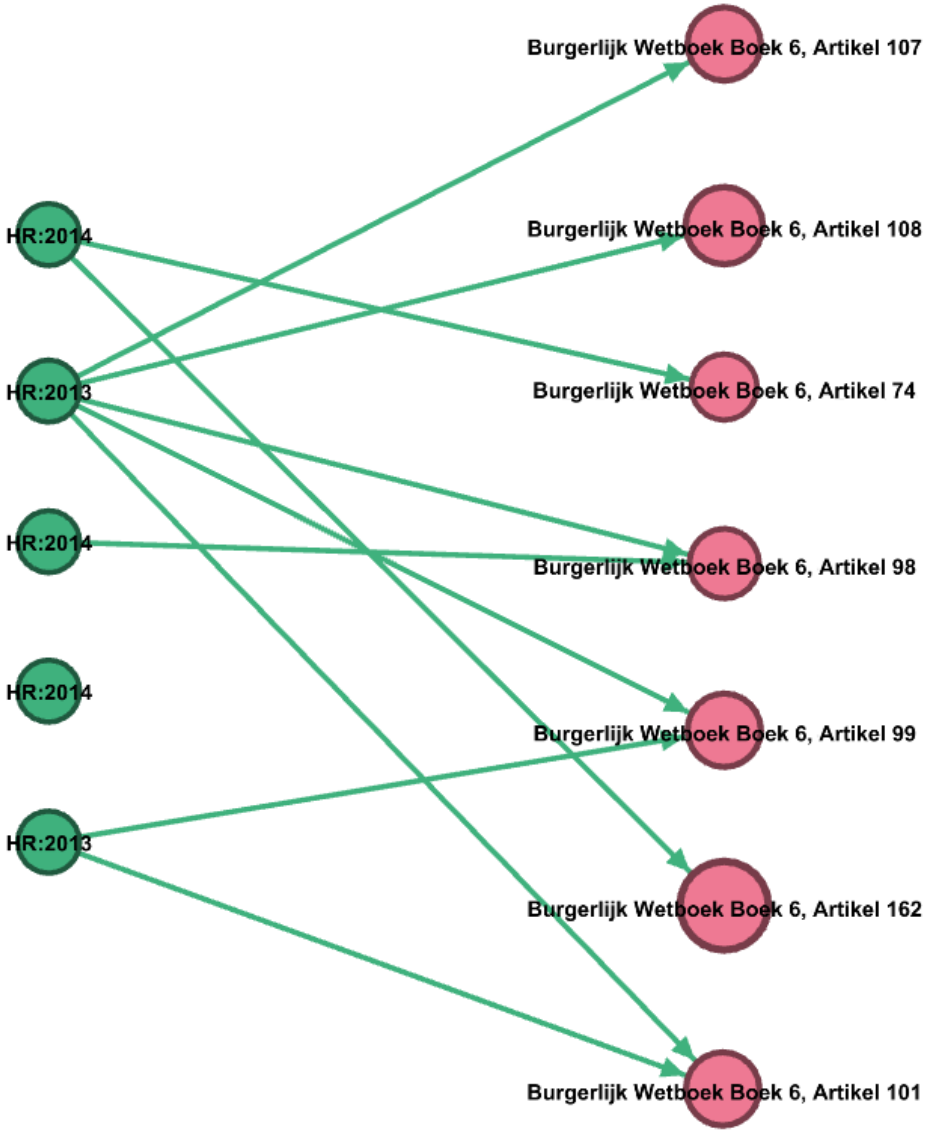
Idea: reasoning is based on codes (legislation) and precedents (previous cases)



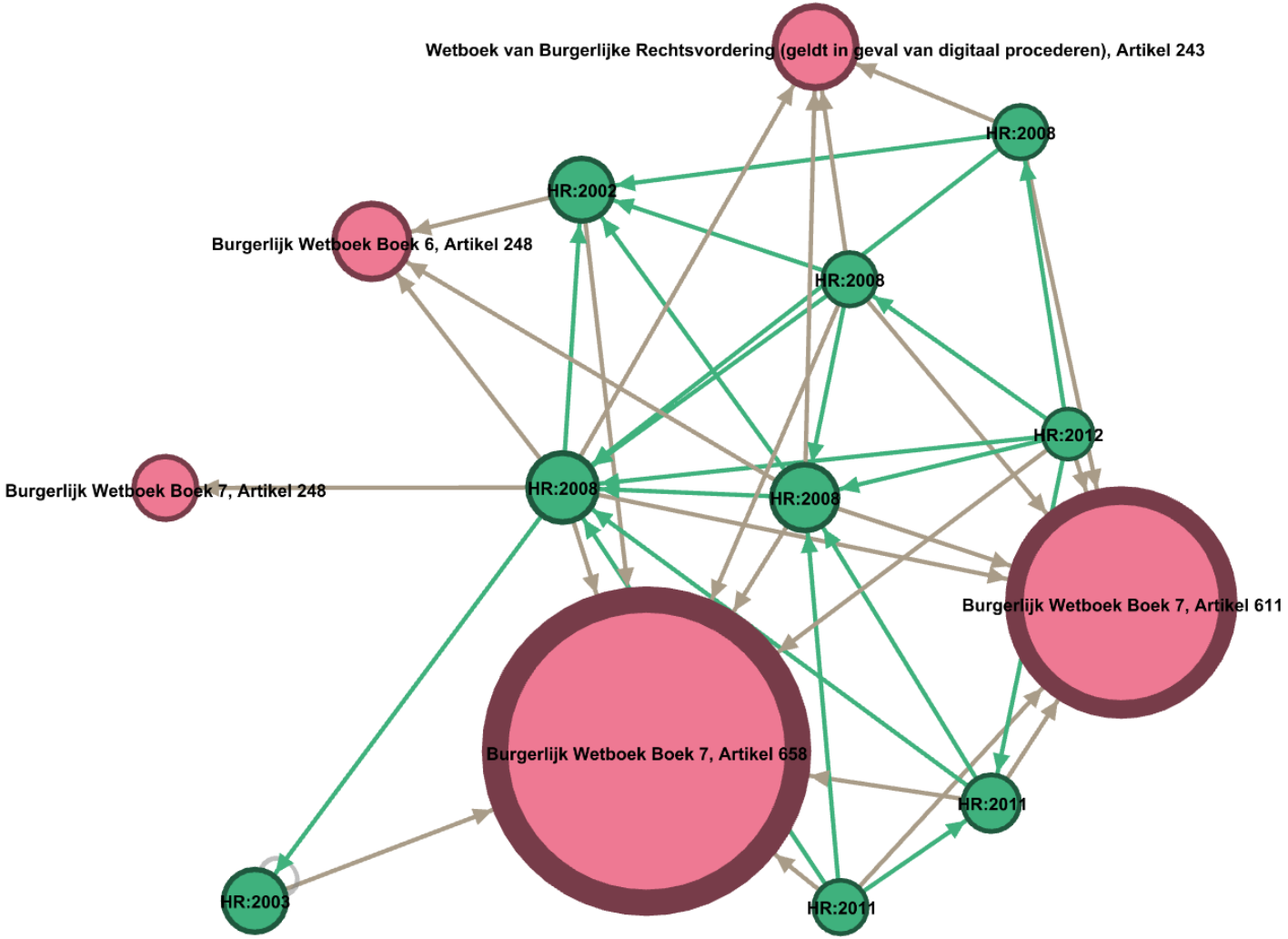
Case-to-case citation network (directed acyclic graph)



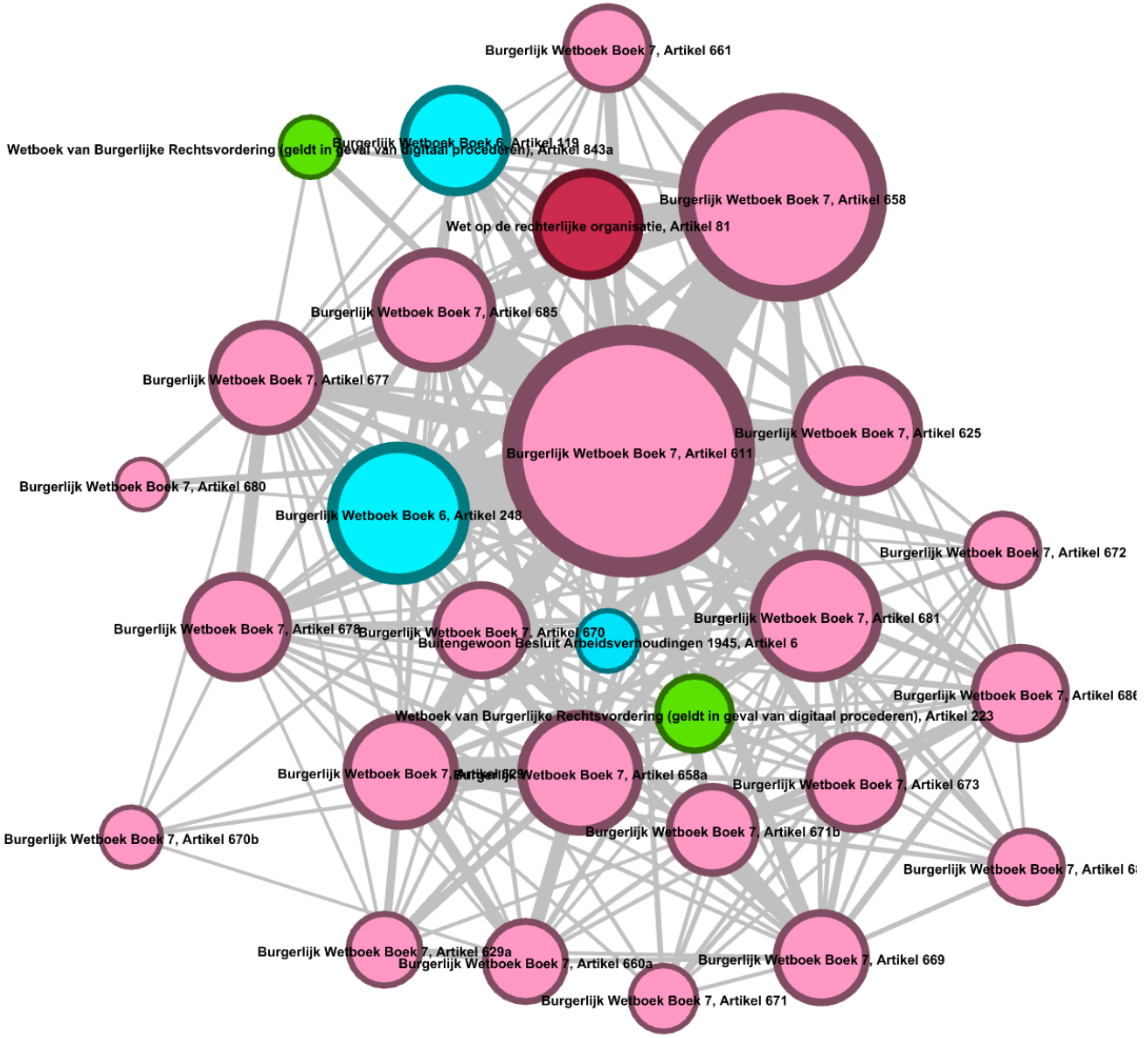
Case to article citations (bipartite graph)



Case-to-case and case-to-article (bimodal, directed graph)

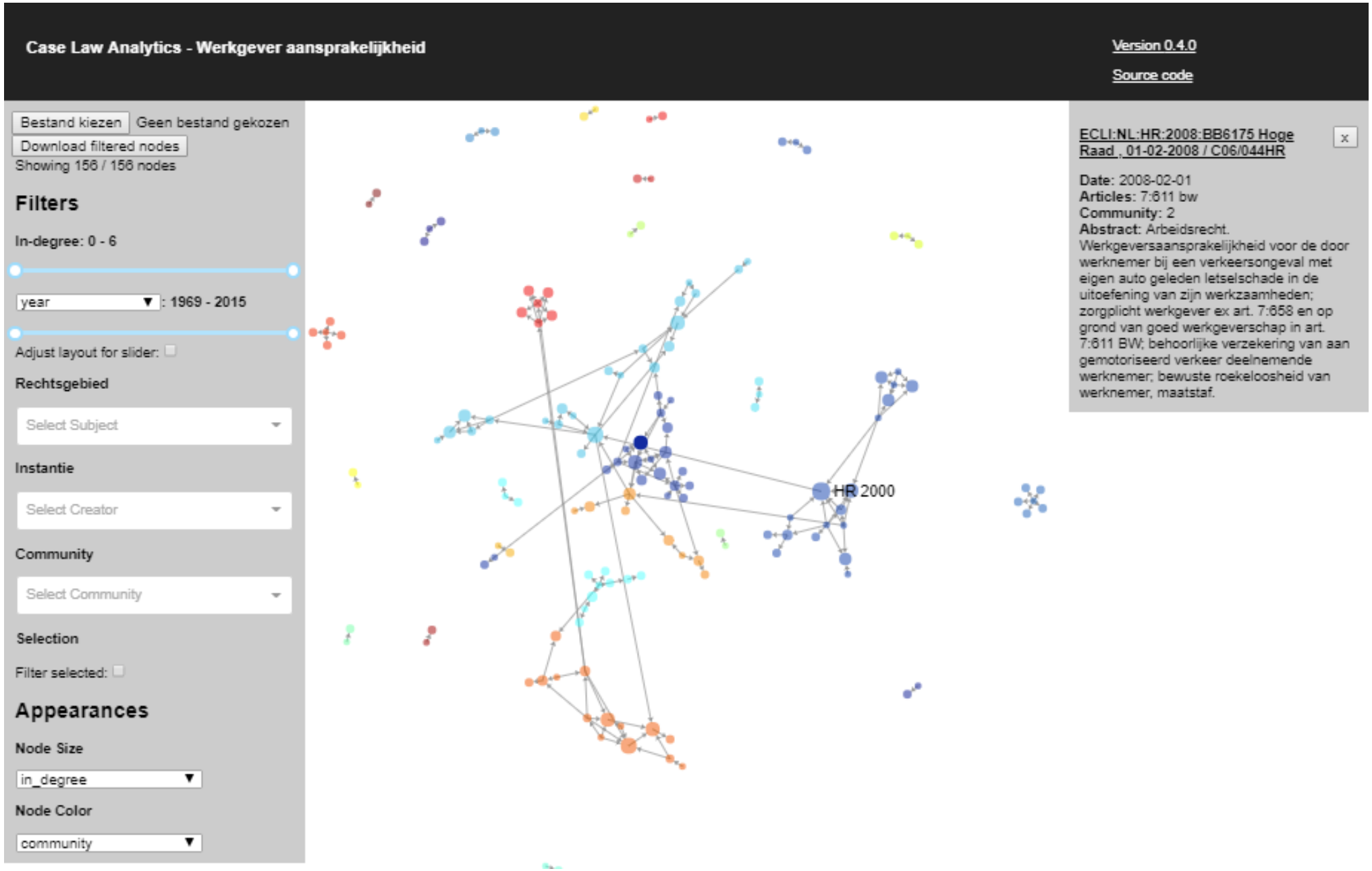


Legislation co-citation network



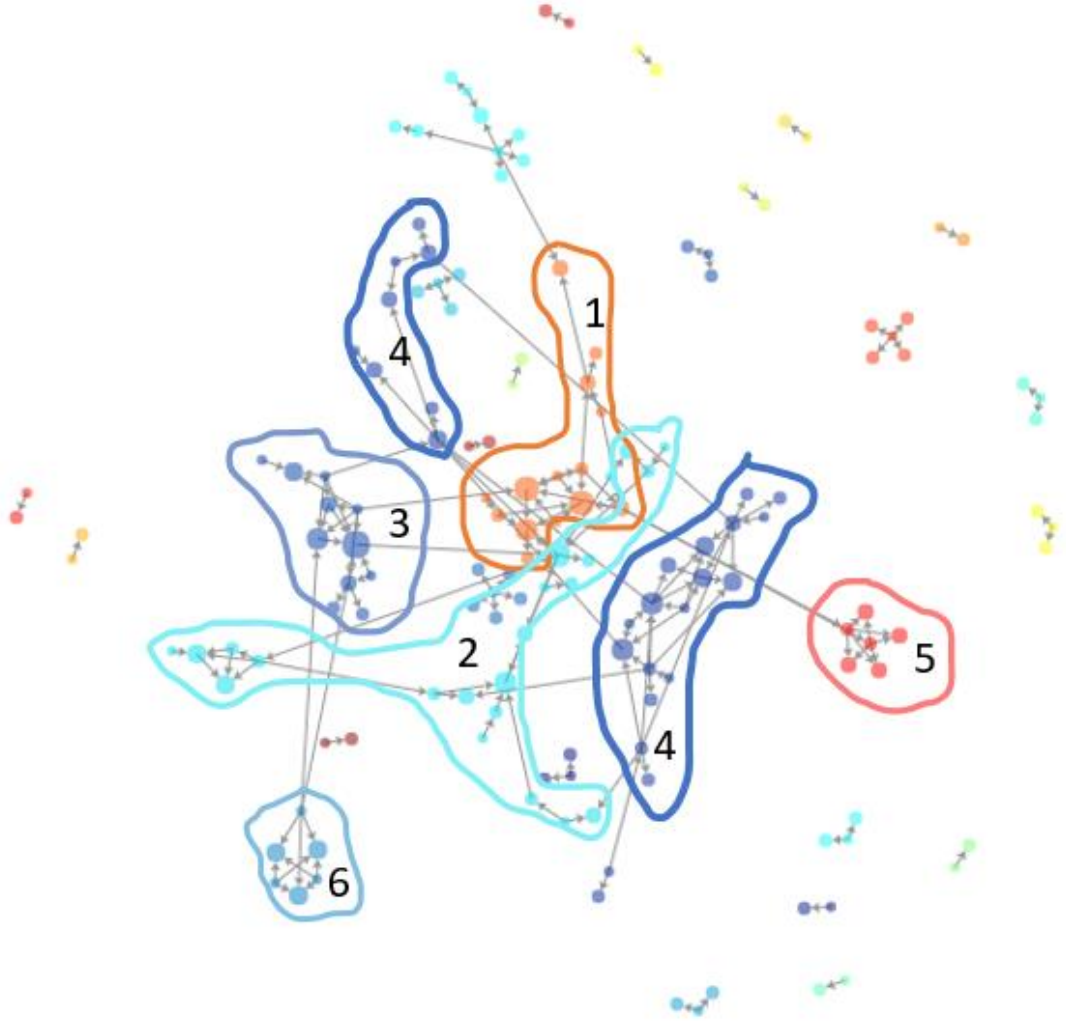
- What are important, often cited cases? *(degree centrality)* [Fowler et al. (2007)]
- Which cases refer to a landmark case? *(proximity in the network)* [Lupu and Voeten (2012)]
- What areas of case law can we differentiate? *(community detection)* [Boulet et al. (2011)]
- What is the collection of relevant cases for my research question? *(information retrieval)* [Christensen et al. (2016)]

Case law visualization tool



Example: employer liability communities

1. Asbestos
2. Duty of care (extent), recipients' liability, contributory negligence, gross negligence
3. Causality
4. Losses while carrying out work, duty to insure
5. Reversal rule
6. Experts, evidentiary burden



Community detection: Blondel et al. (2008)

Example: employer liability, landmark cases

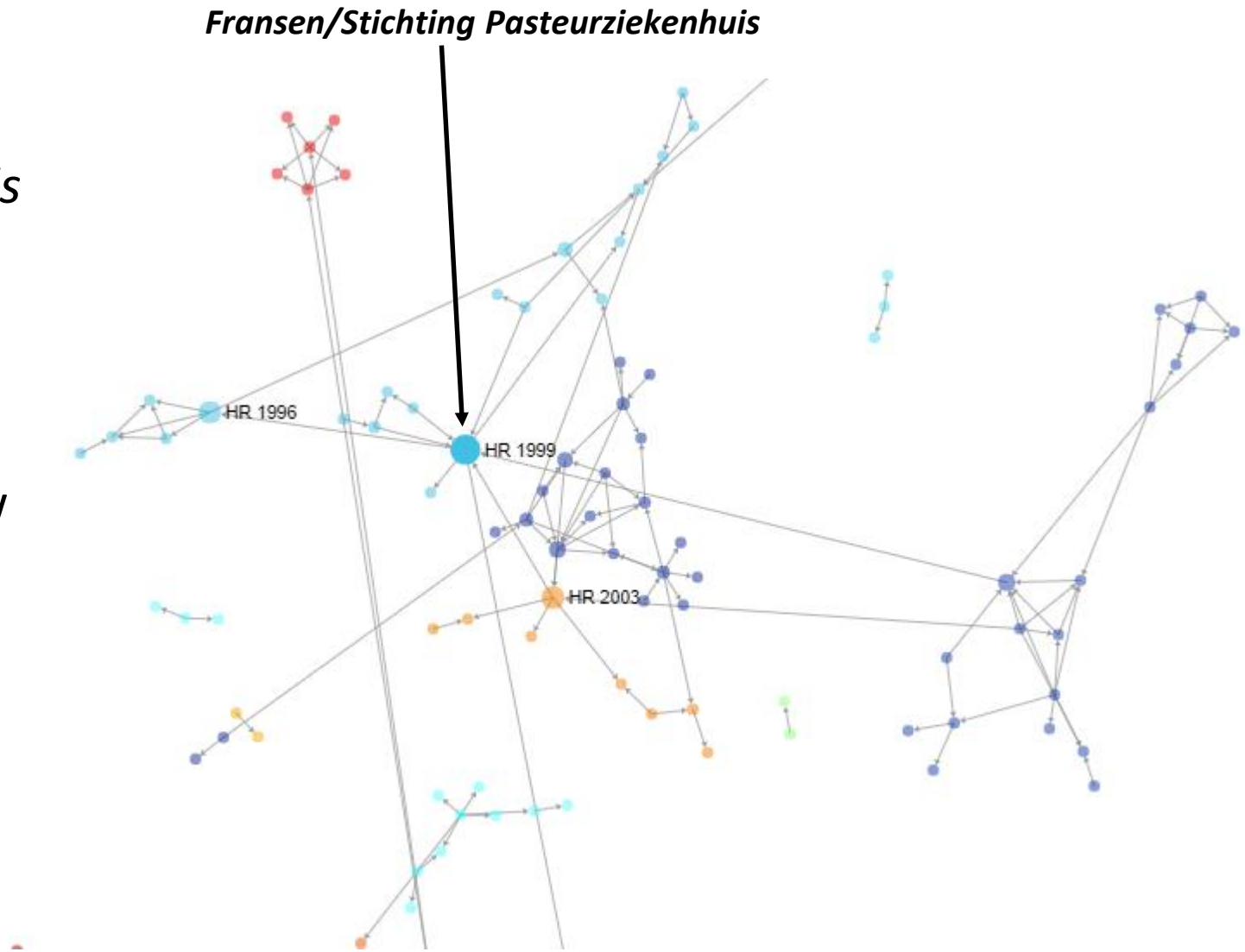
Fransen/Stichting Pasteurziekenhuis

has highest **betweenness score**.

This decision is a **landmark case**

providing interpretation to the new

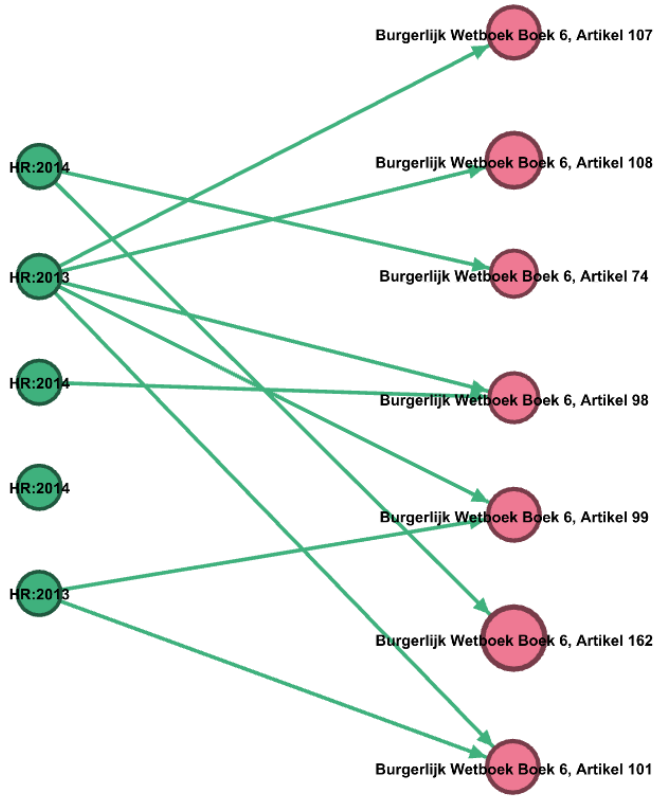
Dutch civil code.

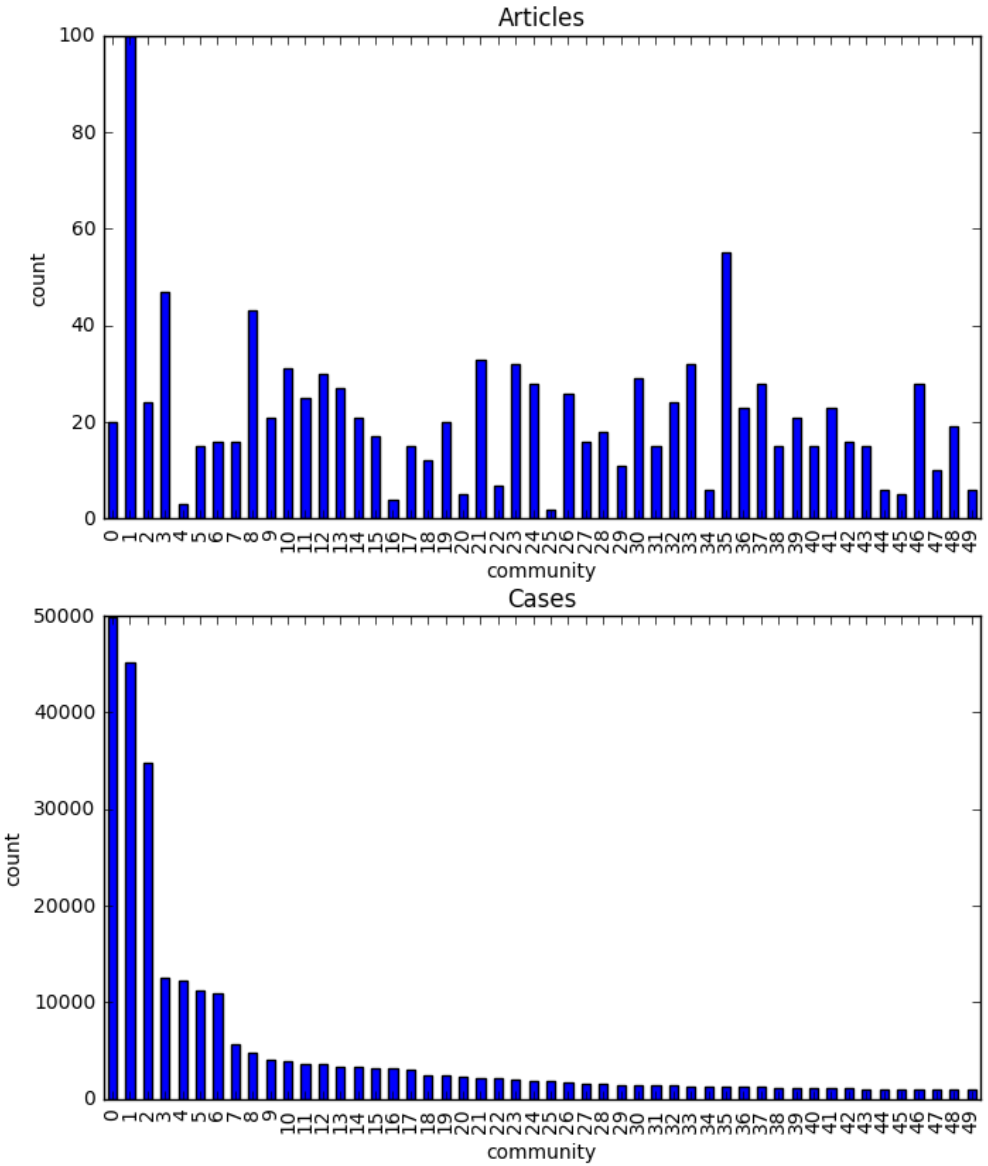


- Investigate legal areas using community detection
- Manual interpretation of communities
- Compare with legal literature

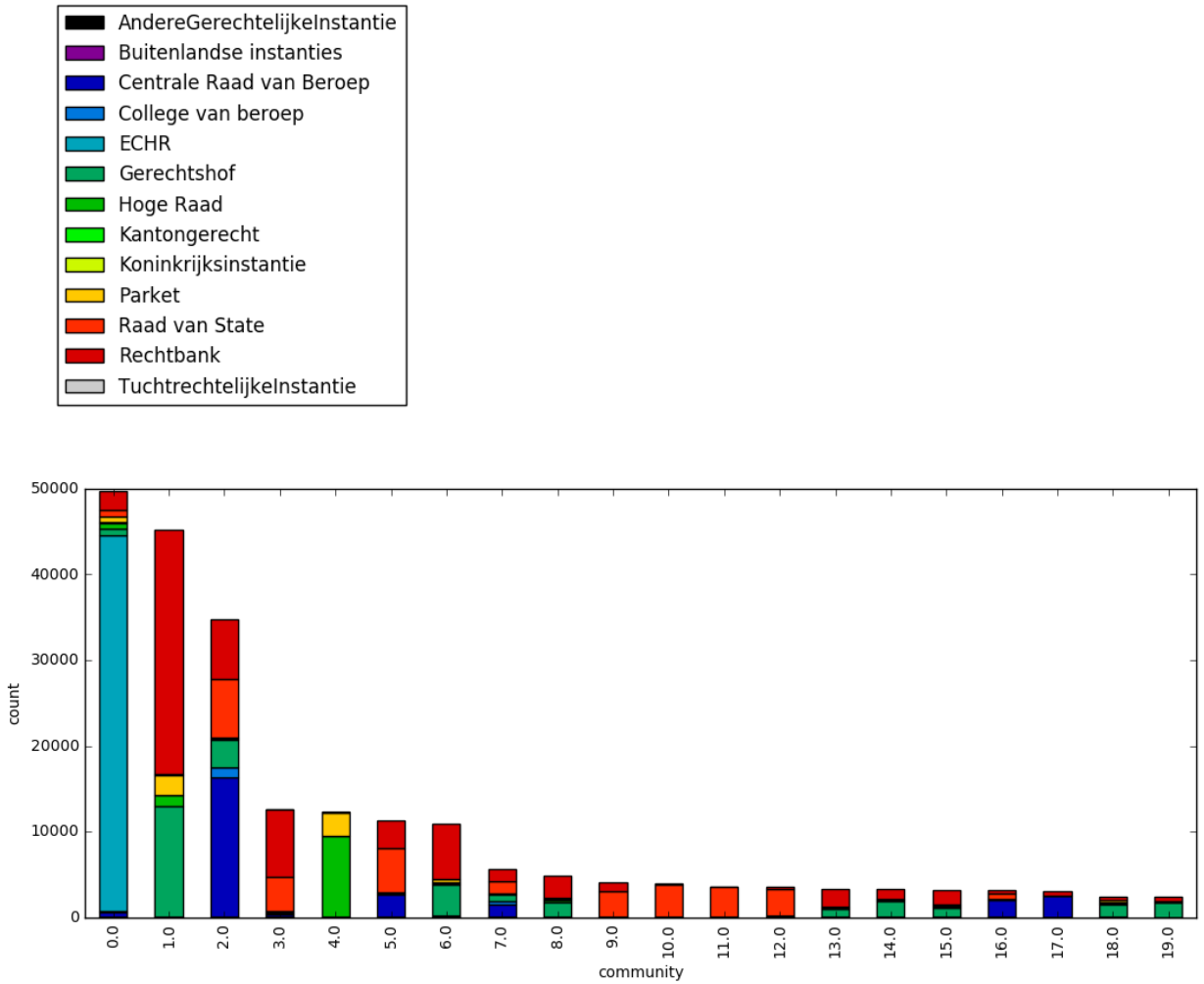
Bimodal community detection on cases and legislation articles

419k cases, 38k articles, 6849 communities





Interpretation of communities



Law books per community

Community 0:

Convention for the Protection of Human Rights and Fundamental Freedoms

Community 1:

Criminal law

Community 3:

Immigration law

Community 4:

Procedural articles about admissibility of appeal

What is an optimal resolution for communities?

How to apply community detection on multi-modal structure? (cases + articles)

Can we trace domain-overarching concepts?

How did legal areas evolve?

Do we see different citing behaviors in different courts?

Network perspective on legal data gives insight in large body of legal documents

Network analysis and visualization is a useful tool for empirical legal research

Thanks to:

Gijs van Dijck

Rena Bakhshi

Willem van Hage

Rob van Nieuwpoort

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Demo:

https://nlesc.github.io/case-law-app/

Paper:

van Kuppevelt, D., & van Dijck, G. (2017). Answering Legal Research Questions About Dutch Case Law with Network Analysis and Visualization. DOI: 10.3233/978-1-61499-838-9-95