

# PoliMedia - Improving the Analyses of Radio & Newspaper coverage of Political Debates

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## ABSTRACT

Students of media and communication sciences study the role of media in our society. They frequently search through media archives to manually select items that cover a certain event. When this is done for large time spans and across media-outlets, this task can however be challenging and laborious. Therefore, up until now the focus of students has been on manual and qualitative analyses of newspaper coverage. PoliMedia aims to stimulate and facilitate large-scale, cross-media analysis of the coverage of political events. We focus on the meetings of the Dutch parliament, and provide automatically generated links between the transcripts of those meetings, newspaper articles, including their original lay-out on the page, and radio bulletins. Via the portal at [www.polimedia.nl](http://www.polimedia.nl) students will be able to search through the debates and find related media coverage in two media-outlets, facilitating a more efficient search process and qualitative analyses of the media coverage. Furthermore, the generated links are available via a SPARQL endpoint, allowing quantitative analyses with complex, structured queries that are not covered by the search functionality of the portal, thus challenging the student to go across the academic borders and enter fields that previously have been neglected.

## Keywords

Parliamentary debates, linking, mediatization, linked data, media coverage, newspapers, radio

## 1. INTRODUCTION

Analysing media coverage of political debates across several types of media-outlets is a challenging task for academic students and researchers. Up until now, the focus of students has been on doing manual and qualitative research since newspaper articles have only been available in analogue format. Other media types such as radio bulletins have been neglected even more since these were hardly available to students.

In recent years, archives of major Dutch newspapers, the

transcripts of the Dutch parliament, and radio bulletins have been digitised and made available as open datasets. This contains an enormous advantage, as material can now be accessed from the Web. However, since the available data is very large, another challenge arises; it is a cumbersome and challenging task for students to analyse media items from different datasets both qualitatively as well as quantitatively. Therefore, we created automatically generated links between the transcripts of the parliament with two media-outlets: 1) newspapers in their original layout of the historical newspaper archive, and 2) radio bulletins of the Dutch National Press Agency (ANP), both located at the Dutch National Library. These links can be explored via the PoliMedia search user interface (SUI) which is currently online as working demo at <http://rdbg.txic.nl:1235/apps/polimedia> but will be moved to [www.polimedia.nl](http://www.polimedia.nl) when the portal will officially be launched. The SUI allows researchers to search the debates by date and analyse the related media coverage, as well as search by name of a politician or any keyword and evaluate the debates in which the politicians appeared and how he or she was covered in the press. An innovative approach of PoliMedia is that the coverage in the media is incorporated in its original form (figure 4), enabling analyses of both the mark-up of news articles as well as the photos in newspapers allowing further qualitative analyses of the media coverage. Furthermore, we made the automatically generated links available through a SPARQL endpoint, allowing quantitative analysis of for example the amount of links per year and decade or the number of links per political party enabling students to research the mediatization of Dutch politics in an efficient manner. The current SPARQL endpoint is at <http://rdbg.txic.nl:8080/openrdf-workbench/repositories/>. We will move this to the more convenient URL [data.polimedia.nl](http://data.polimedia.nl) in the future.

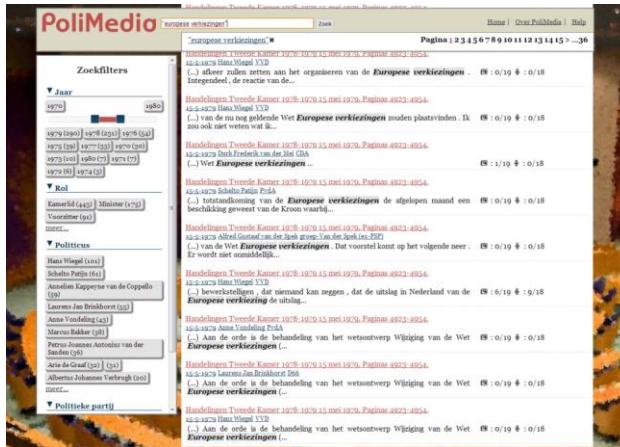
## 2. SYSTEM DESCRIPTION

The SUI consists of three main levels:

- 1) the landing page where researchers can enter search terms (figure 1),
- 2) the results page (figure 2) with the search results, facets for refinements and a search bar for new queries and
- 3) the debate page (figure 3) which shows a complete debate and the linked media items. When clicking on a media item, the item will be opened in a new screen in its original lay-out (figure 4).



**Fig. 1. Screenshot of the PoliMedia home page**



**Fig. 2. Screenshot of the PoliMedia search results page.**

**Fig. 3. Screenshot of the PoliMedia debate page**



**Fig. 4. Screenshot of an example newspaper in original lay-out, containing an article about a parliamentary debate.**

The development of the SUI was based on a requirements study with five scholars/teachers in history and political communication, leading to a faceted SUI as depicted in figure 2. Facets allow the user to refine search results, they support the searcher by presenting an overview of the structure of the collection, as well as provide a transition between browsing and search strategies [3]. During the development, an initial version of this SUI was evaluated in an eye tracking study with 24 scholars/teachers performing known-item and exploratory search tasks [4].

### Innovation in Education

The big advantage of the PoliMedia system is that it allows students to make cross-media comparisons in a straightforward way both quantitatively and qualitatively. Earlier they had to manually search each archive separately, using the archives proprietary metadata, and decide whether or not a media item covers a certain (political) event. The focus of the assignments in the curriculum was therefore on qualitative analysis only. Working with the PoliMedia portal gives students a hands-on experience with a quantitative approach to their field of study. In addition, it provides them with substantive insights into how media coverage varies over a large number of political events. We believe that this type of insight is best learned through interaction with the data, rather than, for example, literature study.

With the PoliMedia approach students can go to one website where they will have access to all sources in a standardized format. Where students before mainly used newspaper articles, the PoliMedia system allows students to make cross-media analyses in a more efficient way, challenging them to go across the academic borders and enter fields that previously have been neglected.

### Audience

The targeted student groups are primarily students of the bachelors of 1) *History*, 2) *Communication and Media* and the Masters 3) *Media Studies* and 4) *Sociology of Culture, Media and the Arts*. However, the PoliMedia portal is valuable for a much wider range of Humanities and Social Sciences students who for example analyse the representation of politicians in the media or discussion of recurring themes. But we also envision the system to be useful for several other disciplines, such as communication students who are interested in doing discourse analysis or linguistic aspects of media and political debates, psychologists researching the self-mediation of public persons, and even economists who nowadays pay more attention to the way politicians talk about the current economic crises. Furthermore, since we will make all the links available at [data.polimedia.nl](http://data.polimedia.nl) this data can also be used by students of computer science or related fields, interested in data analysis and visualization.

### Usability

Before we created the SUI we did a requirements study and we organised a meeting with a UI-designer. This resulted in a user friendly and faceted interface. Furthermore, we evaluated a preliminary version of the interface by means of an eye tracking study [4]. This study showed that the faceted SUI enabled users to perform both known-item searches, as well as exploratory searches to analyse a topic over time. However, navigating the debates themselves proved to be rather difficult; as debates can be dozens of pages long, it was hard for users to gain an overview of the debate. To address this issue, the faceted search which was already available on the search results page (figure 2) was also introduced on the debate page (figure 3) in the final version of the interface.

### Performance

We created a stable system by using SPARQL to fetch the relevant debate data from an OWLIM repository that hosts the PoliMedia dataset. To ensure reasonable response times, the server hosting the repository has been upgraded from 8GB to 16GB of memory. Because of OWLIM's limited capabilities in the respect of full-text and faceted search a separate SOLR index has been created. SOLR was chosen because of its widespread use and reputation as a high performing search index with capabilities for faceted search and many other optimization options, such as language specific options to ensure better results for Dutch.

The accuracy of our linking approach was evaluated via a manual assessment of a sample of links to newspaper articles. We found that the recall of the algorithm is approximately 62%, with a precision of around 80% [2].

### Data usage and quality

PoliMedia combines three data sources: parliamentary debates, a newspaper archive and a radio bulletin archive. For the 9,294 debates that were held in the period 1945-1995 we provide 3,804 individual links to either newspaper articles or radio bulletins.

To represent the debates and the links to media items, we have created a semantic model in RDF which is a specialization of the more widely applicable Simple Event Model (SEM) [5]. SEM is a model that aims to represent events on the Web and explicate complicated semantic relations between people, places, actions and objects: not only who did what, when and where, but also the roles each actor played, the time during which this role is valid, and the authority according to whom this role is assigned. To represent the parliamentary debates in RDF, we have created a domain specific semantic model as a specialization of SEM that enables us to express

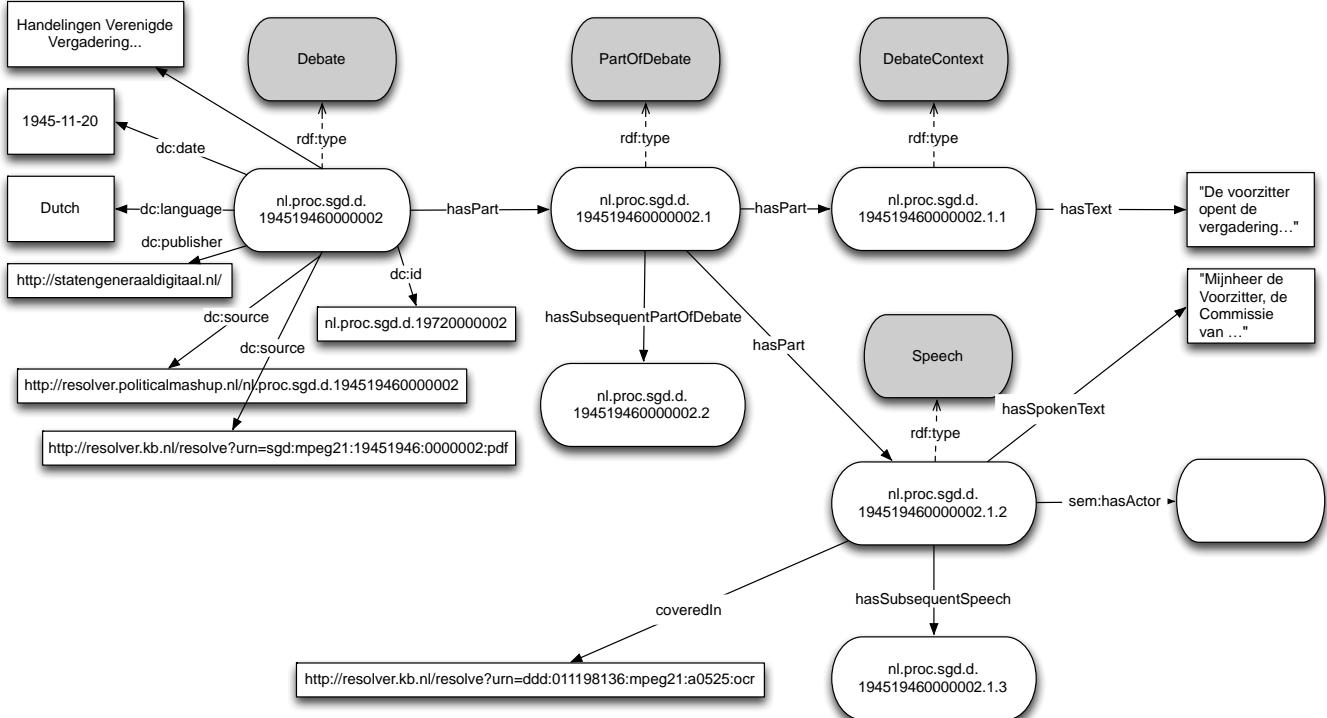


Figure 1: RDF model to represent parliamentary debates and links to media

information associated with the debates such as topics, actors, debate structure, and links to media. To increase re-usability of the data, we use Dublin Core properties where appropriate, for example to denote dates, titles and publishers of debates. Figure 5 shows the RDF model. For brevity, we have left the representation of speakers (i.e. politicians and their party) out. For a detailed description of the design decisions of the model, we refer to [5] and [6].

The newspaper archive as well as the radio bulletin archive reside at the Dutch Royal Library. To determine links between debates and the media items in these archives, we query the full text as well as the metadata through the OAI protocol. For copyright reasons, the dataset used in the PoliMedia portal does not contain the media items themselves or their metadata; only links to the URLs of the items in their original archives are included. From the portal, a user can click a hyperlink to the Royal Library site to view the requested media item. At the moment, the datasets are static; they contain the debate transcripts and links to media archives of the period 1945-1995. In the future, we plan to include up-to-date data in the form of the latest debate transcripts and news articles and bulletins.

### The Linking Algorithm

The basis of PoliMedia lies in the transcripts of the Dutch parliament from 1814-1995, containing circa 2.5 million pages of debates with speeches that have been OCR'd and thus allow for full-text search. The transcripts have been

converted to structured data in XML form in previous research [1]. For each speech (i.e. a fragment from a single speaker in a debate), we extract information to represent this speech; the speaker, the date, important terms (i.e. named entities) from its content and important terms from the description of the debate in which the speech is held. This information is then combined to create a query with which we search the archives of the newspapers and radio bulletins. Media items that correspond to this query are retrieved, after which a link is created between the speech and the media item [2]. The links, as well as the parliamentary debates are represented as RDF [5]. These links will be made available at [data.polimedia.nl](http://data.polimedia.nl) as an open dataset for future researchers.

### Legal & Privacy

The PoliMedia portal does not involve or store any user-specific data. Since it is a web-portal, visited URLs may be stored locally by a user's own browser. Clicks on hyperlinks to media items that reside at the servers of the National library of the Netherlands may be logged by the library. The original debate data as provided by the Dutch government has a CC0 licence. The copyrights of the newspaper articles and radio bulletins are with the original publishers/broadcasters. This material may be used "for private use or a user's own study."

### 3. DISCUSSION

As mentioned above we performed an evaluation study and adjusted the interface accordingly. Furthermore, we successfully automatically created links between the minutes of the debates and newspaper articles & radio bulletins, showing the uniqueness of this project. However, we also tried to link the debates with television programmes located at the Netherlands Institute for Sound and Vision but have not been able to do this. There can be several reasons for the lack of these links: the size of the available television dataset of Academia.nl, the lack of full-text search in AV or the suitability of the linking algorithm. Therefore, we are currently conducting both a manual evaluation of the archivist-generated metadata as well as a content analysis of the television programs. We expect to find that the metadata contained insufficient information to be linked to, while the television programs did contain coverage of the relevant debates. Therefore we expect that when linking to audio-visual sources other techniques to open up AV archives should further be explored, such as the inclusion of time-based metadata (e.g. subtitles) or the use of speech and image recognition since these techniques give more information about the content of the programs than is described in the existing metadata. We are currently working on a follow-up project of PoliMedia in which we aim to link the transcripts of the European Parliament to television programs of which the metadata has been enriched with subtitles and speech recognition to further explore the possibilities of linking to television programs.

### 4. CONCLUSIONS

The PoliMedia search user interface clearly shows the potential for students by linking the transcripts of political debates to different media outlets, allowing cross media analysis of both newspapers as well as radio items. However, we did not yet succeed in linking to television programs but envision this will be possible in future research projects that can build upon the knowledge and insights we gained through the development of the PoliMedia project.

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