

# WAHSP

## End-user Manual

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Web Application for Historical Sentiment mining in Public media

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## 1 Introduction

In this document we will describe how to use the web application of the Clarin WAHSP project. With your browser <sup>1</sup> you can find the application at <http://dev.wahsp.nl>.

WAHSP is a research tools for historians that uses the newspaper data of the KONINKLIJKE BIBLIOTHEEK as input material. One can search with single query terms or with combinations thereof. Apart from showing the articles that match the query, the results can be visualized by word clouds of single articles together with sentiment words highlighted, or by a word cloud of the whole result set together with newspaper statistics derived from their metadata.

Additional information about the project can be obtained from the BILAND CMS site <http://biland.nl>, which is the successor of WAHSP.

## 2 User interface

In this section we will give an overview of the components of the user interface. After accessing the WAHSP URL you will see the login window, see fig. 1. Type your username and password and press **Enter** or click the **Login** button.

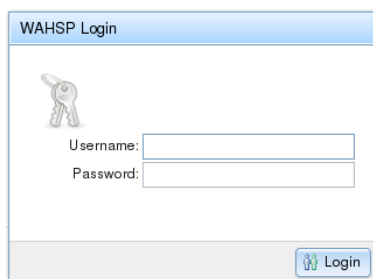


Figure 1: Login window.

The WAHSP opening window is shown in fig. 2.  
The window consists of the following screen regions:

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<sup>1</sup>Internet Explorer may not work with WAHSP. Please use Google Chrome, a recent Firefox, Opera, ...

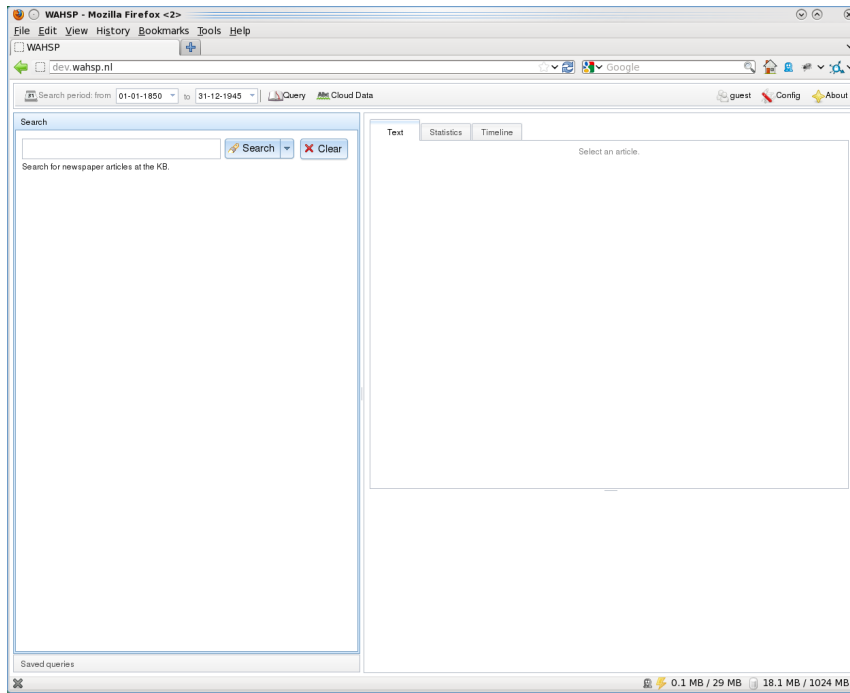


Figure 2: WAHSP opening screen.

- The toolbar at the top
- An accordion widget at the left
- The article tab widget at the top-right
- A region for the word cloud at the bottom-right

The *toolbar* consists of the following widgets:

- Two date widgets to limit the search period. The full date range of the KB newspapers is 1850–1945.
- A query widget, used to combine saved queries into a new query. (And the tiny start of a new query editor.)
- A cloud data widget, to view the cloud words and their frequencies, which can be exported as a csv-file.
- A logout widget.
- A configuration widget, to select an increasing number of options.
- An about widget, showing the collaborators of the project, and a link to this document.

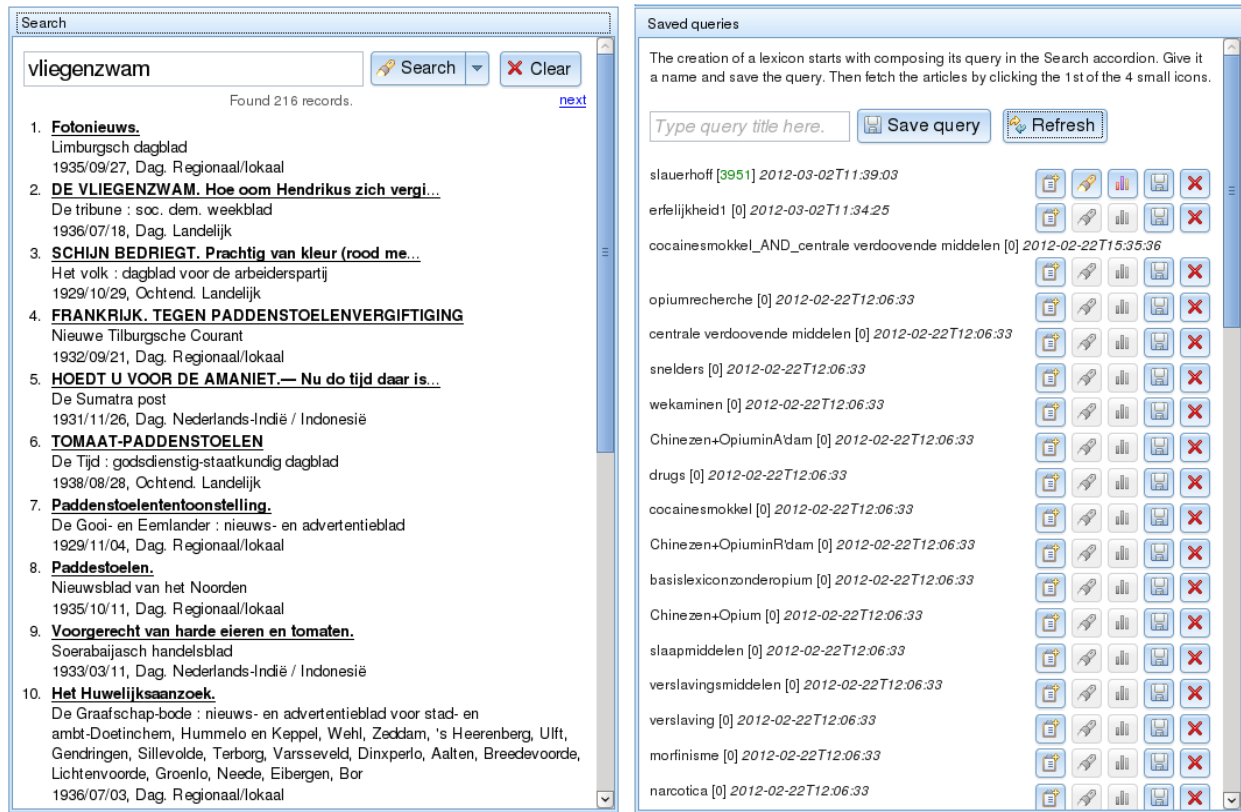
The query *accordion* on the left has the two divisions:

- **Search**  
Here one creates new queries, to be sent to the KB search engine.
- **Saved queries**  
This shows the list of your saved queries, which are used to retrieve the OCR data of the articles, create word clouds, timelines, and display newspaper statistics.

The screen area to the right of the accordion is for displaying the OCR, statistics and clouds, and will be discussed together with searching.

### 3 Searching

A trivial way to search is by using a single query word. Say, we type **vliegenzwam** in the textline area in the accordion, and then click the **Search** button; see fig. 3a. It shows that 216 articles are found. The first chunk is displayed with their titles in bold and underlined. Underneath the title is some additional information: the newspaper title, article date, and newspaper ‘type’ (country-wide, or regional). Clicking **next** gives the next chunk of articles. Clicking **Clear** clears the search area.



(a) Search panel

(b) Saved queries

Figure 3: Search and Saved queries in the accordion.

When you click one of the article titles, its OCR text is shown in the Text tab, see fig. 4. Clicking the Original tab shows the scan image of the newspaper article (fig. 5).

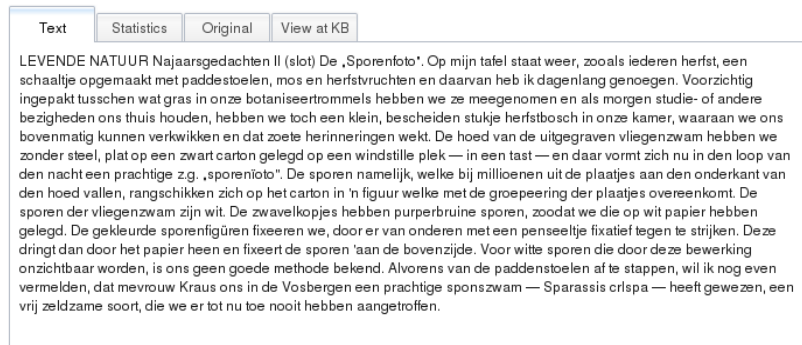
The tab View at KB opens the KB search engine page in a new browser window (or tab).

The corresponding word cloud of the article is shown in fig. 6. The used font size of the words is the graphical equivalent of their frequency in the document. Words of too low frequency may not be shown, and in general ‘noise’ (i.e. stopwords) is also suppressed.

When you have chosen the SVG (Scalable Vector Graphics) cloud option in the config menu, you can see the word frequencies at the top of the cloud when you hover the words with your mouse. And when you click on a word, you can add that word to your personal stopwords list, to be removed the next time you generate a cloud.

#### 3.1 Query editor

Creating queries that consist of more than a single word is done with the built-in query editor. The editor is easiest to explain by creating an example query. Let say that we create a new query that we will later save with the name ‘luminal’. Proceed with the following steps:



- In the **Search** panel of the accordion, type **luminal** as search term.
- Click on the tiny arrow on the right half of the **Search** button.
- Click on the button **Start search** that appeared underneath the Search button.
- Below the text widget (that now contains `((cql.serverChoice exact "luminal"))`) there is a new button with text **luminal**. Click on its arrow at the right side.
- You will see a new frame with several buttons and other widgets. Click on the button **Create word list**.
- Next to **Word list: luminal** there is a tiny icon of the inline textbox, click on it.
- Type **chloral** in the text region (see fig. 7) and then press Enter. Next to **luminal** we now also see **chloral** in the word list.
- Once more press the icon.
- Type **wekaminen** and press Enter.
- Click the **Search** button, which shows the found records.
- Then go to **Saved queries** in the accordion and at **Type query title here.** type **luminal**, and click the **Save query** button. Then **luminal** is displayed as the new saved query (unless that name is already taken).
- Click its first icon (with hover text **Create basis lexicon: luminal**). This loads the OCR data of all the **luminal** articles from the KB.
- When the loading is done, click the second icon **Apply query: luminal**. That creates the cloud of the **luminal** articles, plus some statistics.

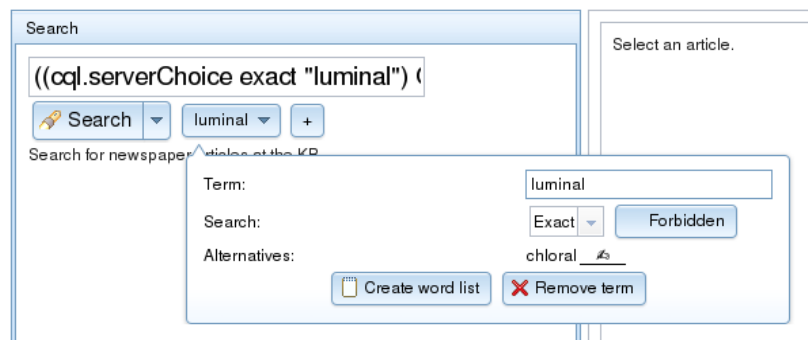


Figure 7: Query editor.

The **Saved queries** panel shows the query titles, their article count, and the creation date of the queries that you have saved. If the article count is zero, either you have not loaded the KB data, or there just is no loadable data, because your query did not yield a single hit. To the right of each query are five small icons. When you move your mouse over them, you will see their hover text:

- Create basis lexicon
- Apply query
- Timeline
- Modify
- Delete

After you saved a new query, it is important to realize that you cannot show the word cloud of those articles together yet, because the OCR text of all articles has to be fetched from the KB, and be pre-processed by our xTAS (Text Analysis Service), see <http://xtas.net>. That will be accomplished by clicking the first of the five icons. As long as the article count is zero,

the Apply and Timeline buttons are inaccessible (grayed-out). When the query yielded many articles it is time for coffee.

After a while the loading is done (fig. 8), and the number of articles is shown. Please remember this number for moment. What is actually done, is that WAHSP finished delegating all the hard work to a bunch of helper processes. And they may need a bit more time.

The new lexicon now appears in the accordion. The number after the lexicon name in brackets shows the number of articles available. If it is a **single number** identical to the number mentioned before, then the loading might be done. But it may easily happen that you see **two numbers** which are the separate counts of the article metadata and ORC. It likely means that the WAHSP helpers are still busy. You may click the **Refresh** button to see if progress is being made. When the metadata and OCR counts are non-zero the tiny Apply and Timeline icons will have been enabled, and you can proceed to look at preliminary word clouds and graphs of statistics.

There are two other reasons that may lead to article counts changing over time.

- The KB digitization of the historical newspapers is still an ongoing process. Once in a while new data is made available. WAHSP does not check this, but when you manually reload the data you may see an increase of the number of articles.
- Another issue is that over time (days, weeks) the metadata and OCR count may become different. This is an unresolved bug (like WAHSP itself?). Reloading the data will fix this, at least for some time.

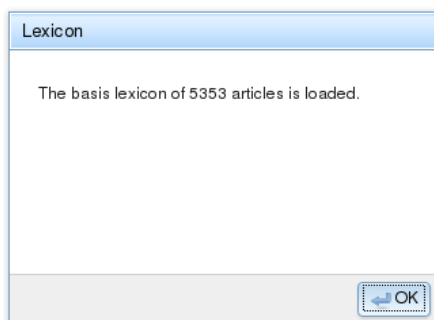


Figure 8: Loading of the KB data seems to be done.

So the article set corresponding to the query must first be loaded in order to view the cloud of all words together. For a single article you can view the word cloud immediately. The cause of this difference is that with a single article the fetching of the data is done automatically.

When fetching and pre-processing the articles is done, you can click the second icon, which now produces the word cloud of all articles together (after a while, accumulating all the word frequencies), and some basic statistics of the lot in the text panel, see fig. 9.

When you click the third icon, a ‘timeline’ is generated: a histogram of article frequencies over time, see fig. 10. High-frequency ‘bursts’ are flagged in red.

## 3.2 Combining Queries

With the query widget (see fig. 11, reachable from the toolbar) one can combine two existing (i.e. saved) queries into a new query. First select the desired boolean combination operator (AND, OR or NOT), and then select the first and second query from the available list. The widget will suggest a name for the combined query, but you can change that before clicking OK.

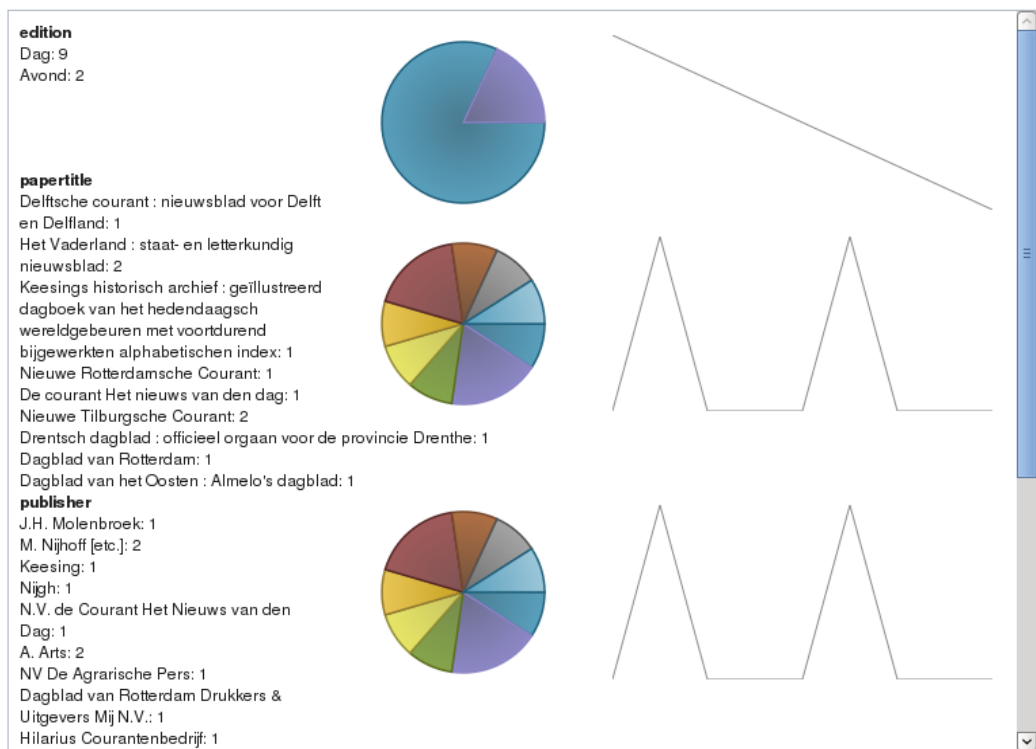


Figure 9: Some newspaper statistics corresponding to the query. Hovering the pie pieces displays the corresponding text.

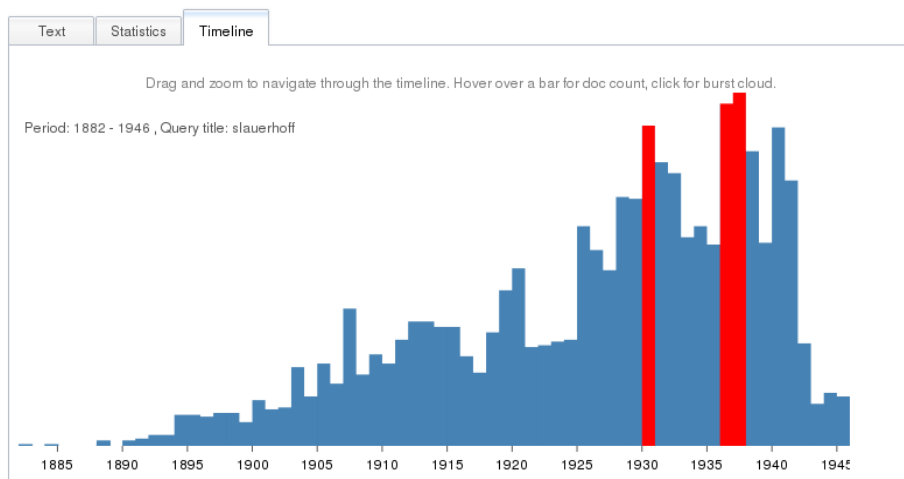


Figure 10: Histogram of article frequencies over time.



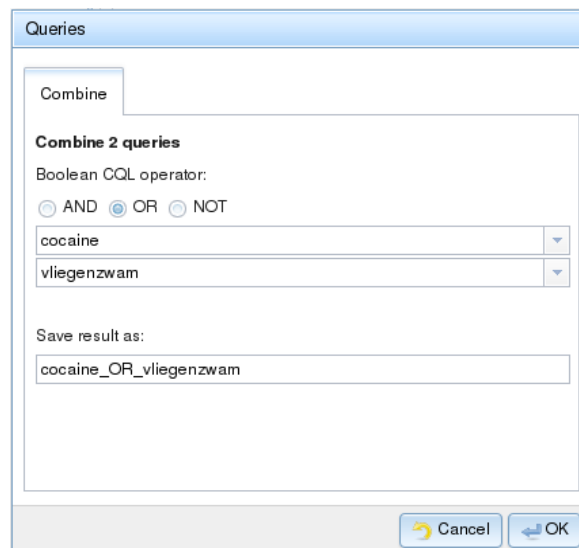


Figure 11: Combining existing queries.

## 4 Word cloud configuration

The word cloud in fig. 6 was made with default cloud parameters, but there are several options to tune the result according to your wishes. Fig. 12 shows the word cloud options. This configuration widget can be opened from the toolbar.

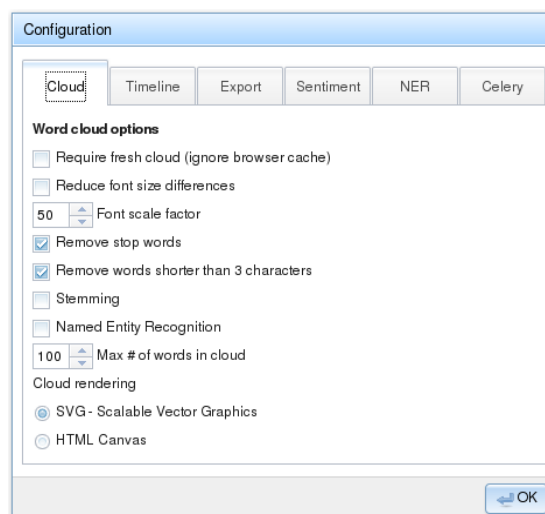


Figure 12: Word cloud configuration.

The word cloud options have the following effect:

- **Require fresh cloud.** This adds a dummy variable with random value to the cloud request. This should convince your browser not to return a cached result.
- **Reduce font size differences.** When the word sizes decline too fast at the cloud edge, this option should improve the result.
- **Font scale factor.** This scale factor determines the maximum font size.
- **Remove stop words.** This removes short words, as specified by a pre-defined list, plus the user-defined stopwords from the cloud.

- Remove words shorter than 3 characters. When the stop word list does not block enough noise, this will filter more.
- **Stemming.** This applies stemming to the words before computing the cloud. A consequence of stemming is that all words become lower-case. Currently stemming is applied before NER, which makes NER helpless because upper-case letters are crucial. In the course of 2013 the xTAS pipeline will change, circumventing this problem.
- **Named-Entity Recognition.** This applies NER, currently a bit slow.
- **Max. # of words in cloud.** The number of words returned by the server can be very big. Truncating the list before generating the cloud speeds it up.
- **Cloud rendering.** Choose between the original HTML canvas cloud, or the newer interactive SVG cloud.

Fig. 13 shows the word cloud of the query **wekaminen**, which yielded (only) 11 articles. Often, as in this case, the cloud does not properly occupy the available space. One can increase the maximum number of words displayed to remedy this, assuming more words are indeed available. But when the words at the border of the cloud are already small, that does not help much, because words that are too small become invisible anyway. Then it is better to reduce the font size differences, see fig. 14 for the result.

Finally, fig. 15 shows the same word cloud with Named-Entity Recognition. Used colors: **locations**, **persons**, **organizations**, and **miscellaneous**. The latter means that the NER algorithm ‘thinks’ these are entities, but cannot be more specific about it. The NER we used is Stanford, trained for Dutch. It is not perfect, but it is better than several alternatives. Notice that the figure only shows the recognized entities, the remaining words are left out.



Figure 13: Word cloud of the query `wekaminen`.



## 5 Sentiment highlighting

In fig. 4 we showed the plain OCR text of an article. After turning on the sentiment option in the configuration widget (see fig. 16), the article OCR looks as depicted in fig. 17, with **positive** and **negative** sentiment words highlighted.

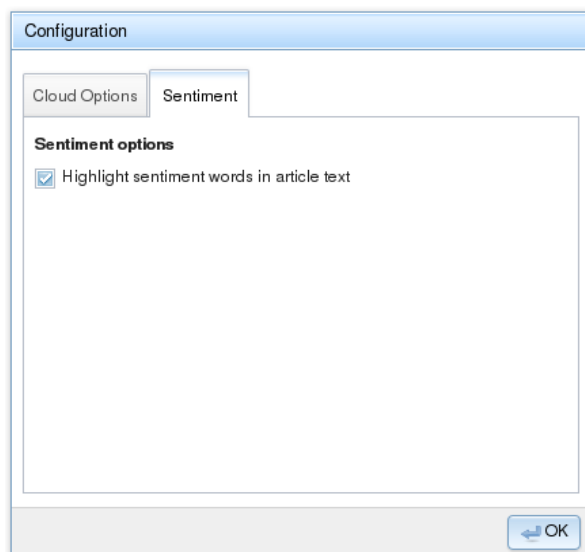


Figure 16: Sentiment option in configuration widget.

This is an article from the query **monstrum**. (Now that we speak of sentiment, should we add **monstrum** to the red list?) The figure also shows that what is highlighted are not whole words, but substrings, which may lead to curious mistakes. And the OCR will never be perfect, which clearly affects the results<sup>2</sup>.

The corresponding article cloud and scan are shown in figs. 18 and 19.

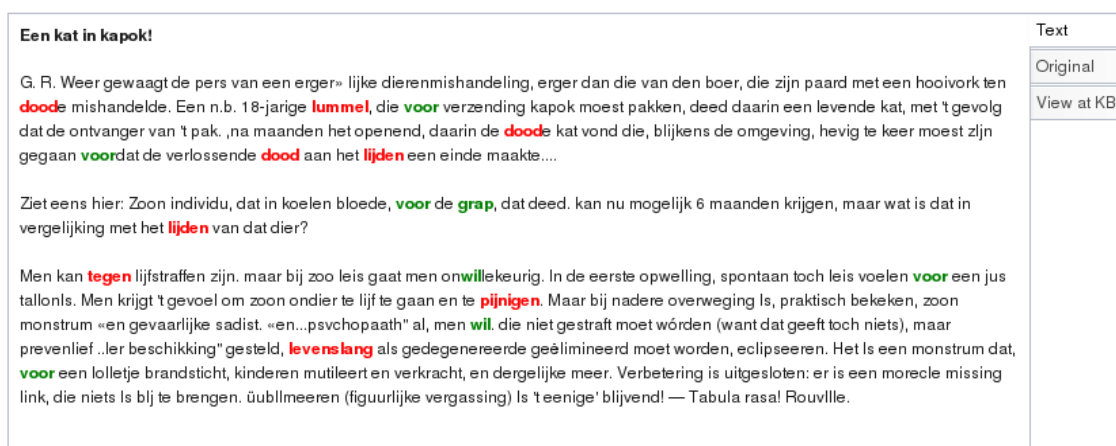


Figure 17: OCR text of the KB article *Een kat in kapok!* with **positive** and **negative** sentiment highlighting.

<sup>2</sup>Apart from OCR mistakes, there is a second shortcoming in the data. The semi-automatic segmentation of the newspaper scans into individual articles is not perfect either, leading to numerous ‘oversegmentation’: ‘articles’ consisting of just their title, their body text having been delegated to the next article. The current settings of the KB search engine imply that short articles come first in the result list.



## 6 Some abbreviations

<i>Abbr.</i>	<i>Meaning</i>
CQL	Contextual Query Language
GUI	Graphical User Interface
KB	Koninklijke Bibliotheek
NER	Named-Entity Recognition
OCR	Optical Character Recognition
SRU	Search/Retrieval via URL
XML	eXtensible Markup Language
xTAS	Text Analysis Service
URL	Uniform Resource Locator
WAHSP	Web Application for Historical Sentiment mining in Public media

Table 1: Abbreviations.

## 7 Acknowledgments

Apart from having received comments from my WAHSP colleagues (DAAN ODIJK, STEPHEN SNELDERS & TOINE PIETERS), I also got contributions from JOSÉ DE KRUIJF and JAAP VERHEUL of Utrecht University, and my new Biland colleague PIM HUIJNEN.