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# The SENSEI Overview of Newspaper Readers' Comments

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**Abstract.** Automatic summarization of reader comments in on-line news is a challenging but clearly useful task. Work to date has produced extractive summaries using well-known techniques from other areas of NLP. But do users really want these, and do they support users in realistic tasks? We specify an alternative summary type for reader comments, based on the notions of issues and viewpoints, and demonstrate our user interface to present it. An evaluation to assess how well summarization systems support users in time-limited tasks (identifying issues and characterizing opinions) gives good results for this prototype.

**Keywords:** User interface, summarization, newspaper, social media

## 1 Introduction

Many current news websites feature comments, so that readers can engage in conversations with each other, discussing aspects of a news story and their reactions. But articles can attract hundreds or even thousands of reader comments within a relatively short time, so users face the problem of making sense of a sprawling, multi-threaded conversation.

Clearly, it would be useful to have a summary or overview of the conversation with the option of drilling down for more details. Generating such overviews manually for every news story is obviously impractical, so automatic summarization is a natural candidate. Several authors have already proposed broadly similar systems for summarizing reader comments (e.g. [1–3]). Such systems are cluster comments by topic, rank comments within clusters, and finally produce an extractive summary from selected highly ranked comments. They assume that topically grouped and ranked comments and extractive summaries are useful to end users; however, we find no attempt to investigate what the end users really want in a comment overview. Furthermore, the evaluations generally proposed—although some have been called user studies—are not task-based evaluations that demonstrate how well systems are meeting user needs.

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## 2 The use case

To help make sense of the sprawling conversations, we apply clustering and summarization techniques and implement a summarization view user interface developed for our use case with *The Guardian* newspaper<sup>1</sup>. This use case aims to give both the general public and news professionals an understanding of the discussion based on the idea of the *town hall meeting summary*: a reporter covering a meeting would summarize it by addressing questions such as the following: what issues were how many people talking about? how did they feel about them? what did they agree or disagree about? how many shared similar views? [4]

The summary parts of the user interface also function as indexes to the underlying comments: they contain links to the relevant comments, with certain parts highlighted, in order to allow the user to drill down to see comments in their original discussion contexts.

## 3 The SENSEI prototype

The SENSEI repository [5] is loaded with crawled data, including the content and metadata (username, timestamp, reply-to structure, etc.) of the first 100 comments under the article. (We limited the comment set size for consistency in the evaluation because different articles attract different numbers of comments, but this is not inherent in our system.)

The offline processing of the crawled data begins with backlinking to sentences in the relevant article, using a linear combination of similarity metrics to link comments to the article; the approach is supervised, but creates training data automatically from comments that contain quotes from the article. [6] We use Markov clustering to distribute the comments over the pre-determined number of topics using topic scores (the probability that a comment was generated by a topic). Like [3] we select the most probable topic for each comment. (The models are trained on around 10,000 news articles also obtained from *The Guardian*.) We extractively summarize the comments from each cluster by ranking all the clusters, and selecting in descending order representative comments from each cluster. [7, 8] The results are stored as meta-documents in the repository.

The page is generated in PHP beginning with a *summary master* document, which contains cross-references to others: the summary's constituents (clusters, labels, extracts), the article, and the comments. The page contains three columns: a pie chart representing the proportion of comments in each topic; balloons with a selected extract for each topic (colour-coded to match the pie chart); and a column initialized with a brief set of instructions. The pie chart is generated from the clusters and labels with the NVD3 library and has the active features described below. Hovering over a pie wedge causes a pop-up to appear with the cluster label and number of comments it contains. Figure 1 also shows that clicking a wedge emphasizes (in the middle column) the extract

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<sup>1</sup> <http://www.theguardian.com/>

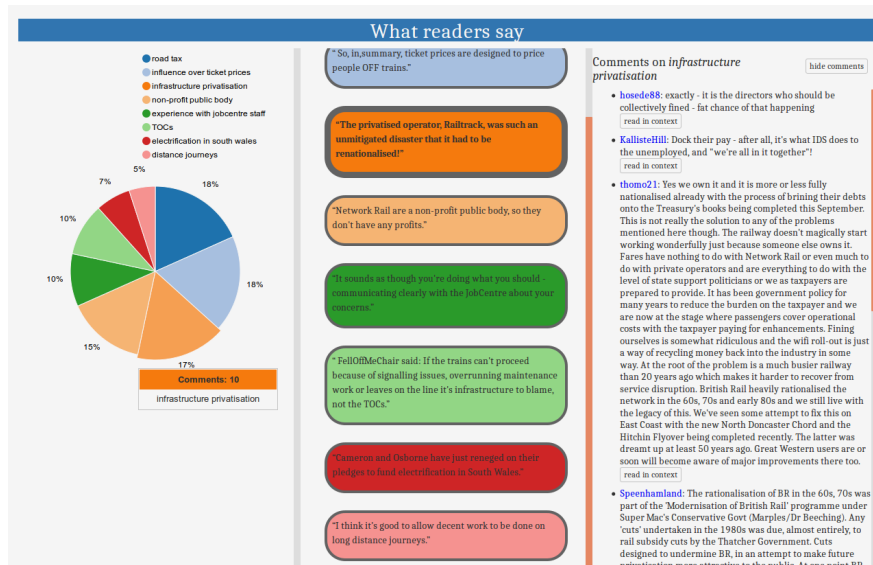


Fig. 1. Screenshot: clicking the pie chart

from that cluster and shows a list of all the comments from that cluster in the right column. (Hidden content is displayed and then altered with JavaScript and CSS so that interaction takes place quickly in the user's browser.) Clicking an extract emphasizes it and brings up the list of that cluster's comments in the right column, as shown in Figure 2, with the additional feature of highlighting in purple the comment from which the extract was taken and scrolling the right column so that comment is visible. Every comment also has a *read in context* button, which brings up a pop-up window with the complete set of comments in thread order, and scrolls the window so the selected comment is visible.

The prototype<sup>2</sup> and a video<sup>3</sup> (which was used as training material in the evaluation) are available on-line.

## 4 Conclusion

We carried out a task-based evaluation with a Latin square design to compare *The Guardian's* comment tree with our UI. We evaluated how well the users carried out the tasks as well as their opinions of the two systems on a questionnaire. As reported in detail elsewhere [9, 10], our results were good.

Further research will focus on providing more useful and coherent clusters of comments and developing a better UI in response to the evaluation. We hypothesize that with such advances people will do better overall on both tasks

<sup>2</sup> <http://sensei.rcweb.dcs.shef.ac.uk/y3C/>

<sup>3</sup> <http://sensei.group.shef.ac.uk/sensei/demos.html>

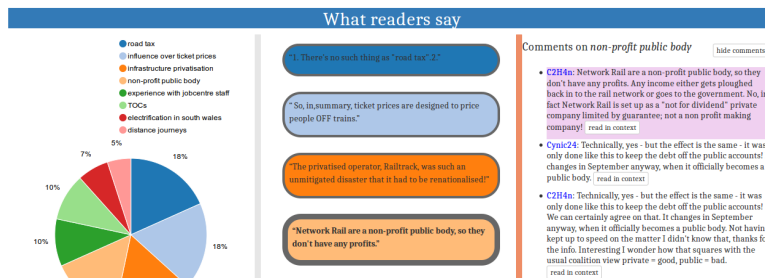


Fig. 2. Cropped screenshot: clicking an extract

(*identifying issues and characterizing opinion*) and be able to answer questions in less time, since good clusters represent issues and gather together related comments about them.

## References

1. Khabiri, E., Caverlee, J., Hsu, C.F.: Summarizing user-contributed comments. In: Proc. of The Fifth International AAAI Conference on Weblogs and Social Media (ICWSM-11), Barcelona (2011) 534–537
2. Ma, Z., Sun, A., Yuan, Q., Cong, G.: Topic-driven reader comments summarization. In: Proc. of the 21st ACM international Conference on Information and Knowledge Management. CIKM '12 (2012) 265–274
3. Llewellyn, C., Grover, C., Oberlander, J.: Summarizing newspaper comments. In: AAAI International Conference on Weblogs and Social Media (ICWSM), Ann Arbor (June 2014)
4. Barker, E., Gaizauskas, R.: Summarizing multi-party argumentative conversations in reader comment on news. In: ACL 3rd Workshop on Argument Mining. (2016)
5. Funk, A., Gaizauskas, R., Favre, B.: A document repository for social media and speech conversations. In: LREC. (2016)
6. Aker, A., Kurtic, E., Hepple, M., Gaizauskas, R., Di Fabrizio, G.: Comment-to-article linking in the online news domain. In: SigDial. (2015)
7. Aker, A., Paramita, M., Kurtic, E., Funk, A., Barker, E., Hepple, M., Gaizauskas, R.: Automatic label generation for news comment clusters. In: International Natural Language Generation Conference (INLG), Edinburgh (September 2016)
8. Aker, A., Kurtic, E., Rajendran, B.A., Paramita, M., Barker, E., Hepple, M., Gaizauskas, R.: A graph-based approach to topic clustering for online comments to news. In: ECIR. (2016)
9. Barker, E., Funk, A., Paramita, M., Kurtic, E., Aker, A., Foster, J., Hepple, M., Gaizauskas, R.: What's the issue here? task-based evaluation of reader comment summarization systems. In: LREC. (May 2016)
10. Danieli, M., Barker, E., Bechet, F., Caramia, C., Celli, F., Favre, B., Gaizauskas, R., Molinari, L., Palumbo, A., Paramita, M., Riccardi, G., Lanzolla, V.: Final report of prototype evaluation. deliverable D1.4, SENSEI Consortium (October 2016)