Computational Models of Argument
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deliberate – Online Argumentation with Collaborative Filtering

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Abstract. We demonstrate *deliberate*, a full-stack web application to exchange arguments with other users. Collaborative filtering utilizing a specialized metric, which considers the structure of the argumentation tree, is used to suggest arguments which the user is likely to accept.

Keywords. online argumentation, artificial intelligence, collaborative filtering

1. Introduction

Exchanging arguments and keeping track of counter-arguments is important in a world of filter bubbles. *deliberate* is a tool which focuses on providing a broad overview of arguments to reduce the bias due to selective exposure, reduce insecurity about one's opinion, and possibly also change one's opinion when seeing other arguments.

A new concept in our application is pre-filtering the presented arguments using algorithms which use collaborative filtering to show arguments the user will probably accept.

2. *deliberate* – A (Neutral?) Webapp for Exchanging Arguments

deliberate is built around a central statement which is being discussed. The user is first asked for their initial opinion on it, how sure they are about their opinion, and what their most important argument is. They can select an argument from a list of arguments already given by other users, search the database of all arguments, or add a new one, which is similar to other applications for online argumentation.

Using the collected information about the user's opinion, more pro and/or contra arguments previously provided by other users are suggested. The user can indicate that they like or dislike these arguments, sort their arguments by importance, and go deeper into the argumentation graph by selecting a statement. The argumentation graph is based on the IBIS model [2], where nodes are statements and edges are arguments, but the user has not to be aware of this theoretical background.

Unlike similar applications, every list of suggested arguments is pre-filtered using collaborative filtering, which has several advantages. The user only sees arguments which

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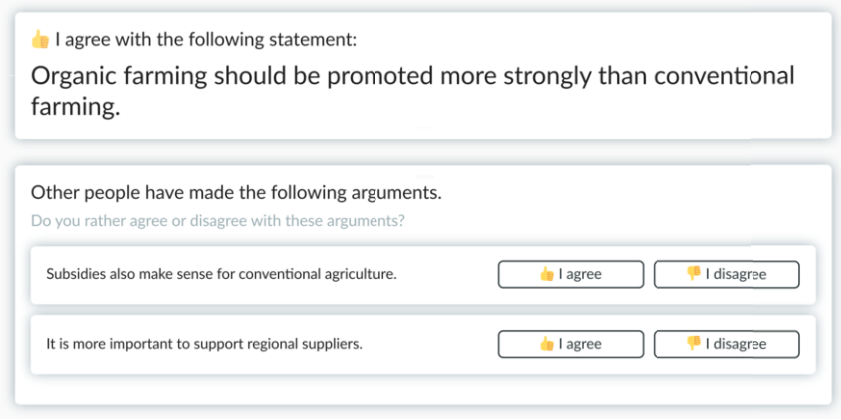

Figure 1. Screenshot of *deliberate*, depicting confrontation with other arguments in a confrontational mode.

are more relevant for them first; thus, they have to read less text, can concentrate on personally relevant arguments, and do not have to read arguments which might be uninteresting.

The filtering uses a new pseudo-metric which takes the characteristics of an argumentation graph into account. For instance, it considers opinions for arguments deeper in the graph as less important, takes into account which arguments are used, and which arguments are rated more important for one's opinion than others. Using this metric, users which are most similar to oneself are determined, and a weighted-average of those users' opinions is calculated. The arguments which have the highest agreement in this average are displayed first.

In a currently running study, we are evaluating the effects of different filtering methods (including and excluding collaborative filtering, showing only arguments against one's own opinion, and others) on the formation of opinion and perception of neutrality.

3. Related Work

In kialo[2], users can exchange arguments in hierarchical pro/con lists, where arguments are sorted by impact, but unlike in our application, the lists are not pre-filtered or sorted based on the users' profile. The mobile application introduced in [1] uses collaborative filtering to predict the agreement of a user with a not yet rated statement; they use, however, a simpler cosine metric which does not incorporate the graph structure, and do not use it for pre-selecting the arguments displayed.

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