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Value-Sensitive Disagreement Analysis for Online Deliberation

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Abstract. Disagreements are common in online societal deliberation and may be crucial for effective collaboration, for instance in helping users understand opposing viewpoints. Although there exist automated methods for recognizing disagreement, a deeper understanding of factors that influence disagreement is currently missing. We investigate a hypothesis that differences in *personal values* influence disagreement in online discussions. Using Large Language Models (LLMs) for estimating both profiles of personal values and disagreement, we conduct a large-scale experiment involving 11.4M user comments. We find that the dissimilarity of value profiles correlates with disagreement only in specific cases, but that incorporating self-reported value profiles changes these results to be more undecided.

Keywords. perspectives, values, natural language processing, hybrid intelligence

1. Introduction

A large number of users participate in online deliberations on societal issues such as climate change [1] and vaccination hesitancy [2]. Disagreement is important to deliberation [3,4], since it helps users understand the opposing viewpoints [5,6]. Measuring disagreements may therefore be useful for measuring deliberation quality [7]. However, recognizing the level of disagreement in a discussion is hard because a deeper understanding of factors that influence disagreement is currently missing [8].

To a degree, automated methods can be used to analyze disagreement in opinions expressed through text. Contemporary approaches are usually based on LLMs, and encompass a variety of tasks like Sentiment Analysis [9], Stance Detection [10], and Argument Mining [11]. However, these methods are shown to disregard diverse opinions [12,13,14], and only paint a partial image of the opinions at play. Analyses of deliberations require a more accurate description of the diverse opinions to be effective [15,16].

We propose to instead use a proxy for disagreement by focusing on *value conflicts*, a potential root cause for disagreement [17]. Preferences among values are used for representing the motivations underlying opinions and actions. In this abstract, we briefly describe how we tested the hypothesis that when users with conflicting values engage in a discussion, diverging views come up [18].

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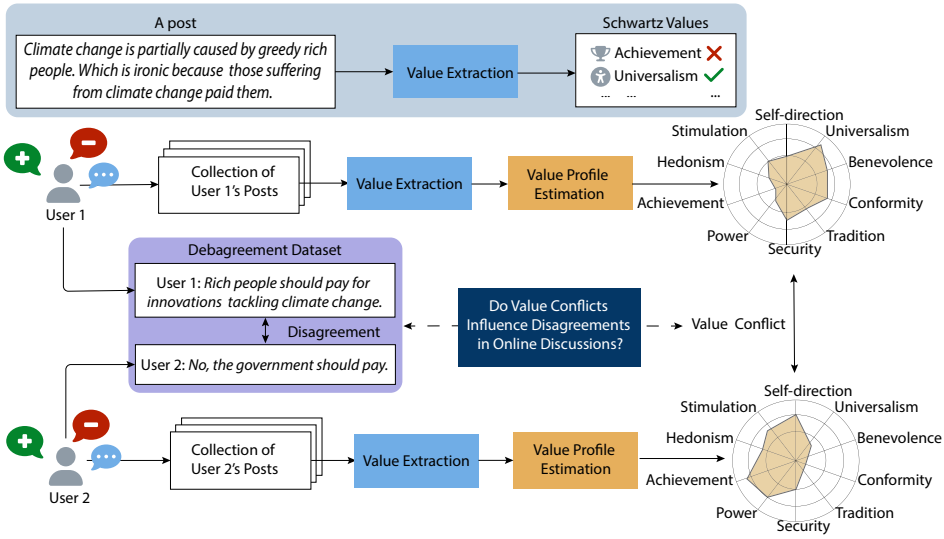

Figure 1.: Analyzing disagreement & value conflicts via Value Profile Estimation (VPE).

2. Value-Sensitive Disagreement Analysis

To evaluate our hypothesis, we estimate individual value profiles based on user comments on Reddit, a social media platform. A value profile captures the relative importance a user ascribes to values from the well-known Schwartz theory of basic values [19]. We compare the similarities among profiles to cases of (dis-)agreement among users. This allows us to investigate the association between value conflict (low similarity) and disagreement. Figure 1 shows a detailed overview of our approach. We train a classifier to perform Value Extraction on individual user comments. We aggregate predictions for a single user and construct the value profile by scoring the relative frequency of value mentions. We test if there is a significant difference among the profiles of user pairs that have been shown to agree with each other versus those that disagree with each other.

We gather 11.4M comments from 19K users on Reddit to construct value profiles. We perform up to 200 tests with different settings to investigate our hypothesis. We further experiment with replacing *estimated* value profiles with *self-reported* ones. To do so, we collect 572 judgments from 26 annotators in combination with self-reported value profiles. We mostly observe negative evidence of a correlation between profile similarity and disagreeing users when using VPE. This corroborates the difficulty of solely automated discussion analysis with LLMs. When including self-reports, the results change for a majority of the cases, alluding to differences in how profiles are obtained. The specific cases in which value conflicts correlate with disagreements are those where values are likely to be relevant and diverse. Therefore, while value conflicts may not be directly related to disagreement, they signal the diversity of the underlying motivations of participants. How context influences the meaning and relevance of values is usually unknown, though Hybrid Intelligence (HI) approaches can be used to inform decision-making [20]. This opens up human-machine collaboration opportunities for a more constructive conversation [21,22,23].

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