Towards Modelling Dialectic and Eristic Argumentation on the Social Web

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Abstract. Modelling arguments on the social web is a key challenge for those studying computational argumentation. This is because formal models of argumentation tend to assume dialectic and logical argument, whereas argumentation on the social web is highly eristic. In this paper we explore this gap by bringing together the Argument Interchange Format (AIF) and the Semantic Interlinked Online Communities (SIOC) project, and modelling a sample of social web arguments. This allows us to explore which eristic effects cannot be modelled, and also to see which features of the social web are missing. We show that even in our small sample, from YouTube, Twitter and Facebook, eristic effects (such as playing to the audience) were missing from the final model, and that key social features (such as likes and dislikes) were also not represented. This suggests that both eristic and social extensions need to be made to our models of argumentation in order to deal effectively with the social web.

Keywords. eristic argumentation, rhetorical force, social web, social media, AIF, SIOC

1. Introduction

The social web consists of the people, tools and communities that form over the world wide web, and is a way for individuals to share content, ideas and information. The social web presents a number of challenges for extracting and analysing arguments, particularly due to the lack of clear "indicators" of argument or structure. This problem is compounded by the type of language used; often highly informal, incorporating slang and irregular punctuation and grammar [1]. Kaplan et al. identify six distinct categories of social media, each with their own constraints and cultures: collaborative projects, blogs, content communities, social networking sites, virtual game worlds and virtual social worlds [2]. As the social web becomes more and more ubiquitous, the potential for using it to investigate how truly massive communities interact, communicate and argue increases dramatically.

Many theoretical models of argumentation are based on the assumption of a dialectic argument (that is, the participants are engaged in rational discourse with the aim of either discovering the particular truth behind a matter, or formulating a solution or resolution for a set of circumstances [3]). However, on the social web there is a clear proliferation of eristic argumentation; an argument in which there is no clear goal and the participants are not trying to come to a resolution but are quarrelling with the aim of being seen to win, either in the eyes of their opponent or, more usually, in the eyes of spectators [4].

In this paper we tie together Walton's observation of the closeness of dialectic and rhetoric [5] with Schneider et al.'s recommendation for bringing together the Semantically Interlinked Online Communities (SIOC) project and the Argument Interchange Format (AIF) [6] in a preliminary study to explore our current capability of representing informal argument on the social web.

2. Current Models

The AIF is a framework for representing argumentation as a directed graph [7]. The data, claims and conclusions are modelled by I-Nodes. Relationships between I-Nodes are represented by S-Nodes: these are subdivided into rule of inference applications (RA-Nodes), conflict applications (CA-Nodes) and preference applications (PA-Nodes). In their work on an extension to the AIF, dubbed AIF+, Reed et al. differentiate between two separate notions of argumentation [8]: the first, which they term argument$_1$, is a logically constructed set of claims and evidence used to back these claims (or attack other claims). The second, termed argument$_2$, refers to a dialogue – the exchange of ideas and opinions between two or more people. A result of this work was to introduce a new set of nodes. The first, a subset of I-Nodes dubbed L-Nodes, models a locutionary act (or utterance) in an argument$_2$. The second, a subset of S-Nodes dubbed TA-Nodes, represents transitions between L-Nodes (with associated forms such as a challenge or response). Thirdly YA-Nodes, also a subset of S-Nodes, represent the "illocutionary force" and serve to link the argument$_1$ to the argument$_2$.

SIOC, a semantic-web vocabulary for representation social media, aims to enable the cross-platform, cross-service representation of data from the social web [9]. This allows for semantic representations of Sites, which hold Forums, which contain Posts, authored by the owner of a UserAcount and is often used in conjunction with the Friend of a Friend (FOAF) ontology, to show how individuals map to their online personas. While an extension to SIOC for the purposes of capturing and representing argumentation does exist [10], it is based on the Issue Based Information System (IBIS), a highly dialectic approach, and therefore struggles to model eristic arguments.

The approach described in this paper aims to bring together the AIF and SIOC, to capture more complete argumentation data from the social web, by linking the concept of a Post with that of a Locution. By linking the two ontologies in this way we decide to see each post as an atomic unit of the dialogue. If two users post identical statements, they still contribute two distinct locutions. However, they will often both link to the same YA-Node, and therefore the same argument$_1$. In the majority of cases, a single locution will translate to a single self-contained argument$_1$. In some cases however, such as the constraints imposed by the character limit on Twitter, a User will invoke multiple L-Nodes to construct their argument$_1$.

3. Initial Work

3.1. Data Collection and Annotation

To examine how arguments evolve across different communities on the web, and how these can be recorded using AIF and SIOC, a single topic was chosen to be examined

across different social web services. To ensure the stimulation of debate, the selected post needed to be publicly accessible, contain a controversial topic and have a large number of respondents. The Oct. 2013 United States government shutdown caused by Congress's failure to agree on a budget, and the following condemnation this received from the presidency, was a suitable match for these requirements.

This topic was then tracked across three of Kaplan's social media categories: YouTube, a content creation site where users can create and upload videos, or playlists of videos; Twitter, a microblogging service that allows users to publish messages of up to one-hundred and forty characters; and Facebook, a social network, that allows users to create a network of "friends" and share text or images. The former account is managed by the White House press office; the latter two are Barack Obama's "official" profiles (though managed by a third party).

The discussions surrounding these posts were acquired by collecting comments replying to each initial post, and those replying to subsequent posts in the discussion, with the use of the public YouTube, Twitter and Facebook APIs respectively. This data was translated to an RDF triple-store using SIOC to record the data specific to the social media platform, such as which User created which Post and which Thread stores which Posts. This was used in conjunction with the DCTerms ontology, which held supplementary data such as timestamps. The AIF was used to indicate replies between posts or comments using TA-Nodes.

Because of the volume of the data produced over the course of the tracked event and the time-intensive nature of manually annotating the data, it was necessary to sample the data to a more manageable size before annotation could take place. As noted in [6], the reliable automation of this (and similar tasks) is another important area for future work in the field of argumentation research. To prevent information being lost when the dataset was scaled down, it was important to ensure that the sampled graph maintained properties (such as diameter and average path length) similar to those of the raw data. To maintain these characteristics, "forest fire" sampling [11,12] was used to create a sub-graph that preserved the overall structure of the parent.

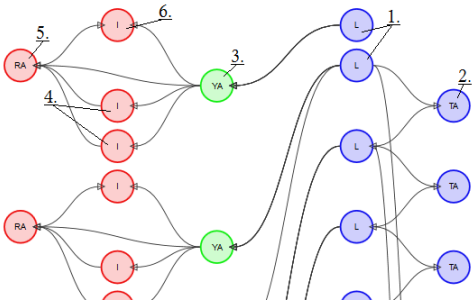
Thirty posts from within each discussion were selected using this method. This data was then manually annotated with the extracted argument$_1$ information. Posts are treated as enthymemes; arguments in which one or more premises (or sometimes, even the conclusion) is left implicit. Both explicit and implicit information was modelled as I-Nodes and the conclusions were joined with S-Nodes where appropriate.

3.2. Results

Table 1 shows the statistics collected after annotating the data with premises and conclusions, represented as AIF nodes. Given this data it can be seen that Twitter is the only sample that contains intra-thread links; that is, replies to other posts within the thread. While this may appear to suggest that the platform is used more for debate than the others, it is possible this is down to deficiencies in the APIs of the other platforms, which often do not accurately highlight replies. It can also be observed that the debates on Twitter and Facebook have a higher information content (in terms of number of I-Nodes per Locution) than that of YouTube. The resulting structures can then be visualised, as in Figure 1.

Table 1. Count of different AIF nodes found in discussions collected from YouTube, Twitter and Facebook

Metric	YouTube	Twitter	Facebook
L-Nodes	30	30	30
TA-Nodes	0	20	0
YA-Nodes	31	30	41
I-Nodes	88	116	110
S-Nodes	13	30	26
L- to I-Node ratio	15:44	8:29	3:11



1. Locution/Post: what a participant actually posted
2. Transition (reply) between two Locutions/Posts
3. Anchor between the argument_1 and the argument_2.
4. Premises
5. Inference between premises and conclusions
6. Conclusion

Figure 1. A visualisation of a Twitter discussion

4. Limits of existing models and proposed extensions

During the manual annotation process, it became apparent that the AIF, while a powerful tool for modelling (dialectic) argument, lacked the ability to capture certain aspects of social argumentation. While some logical fallacies, such as the *ad hominem attack* can be suitably modelled within the AIF, the rhetorical force of simple abuse is difficult to capture. This isn't to say, however, that it is not valuable to do so. A heckler in a debate, for example, may not have any well-reasoned argument to hand and resort to throwing vulgarities, but by simply disrupting the proceedings they are voicing their dissent at the positions offered. This is reason enough not to discard the contribution; however, it can also act to catalyse further argumentation on the subject between the main participants. Likewise, a participant in a debate may, instead of putting forth their own argument or attacking their opponent's, make some sort of joke to endear themselves to the audience. While the AIF can model the locution, the rhetorical force behind it goes uncaptured. This raises the question of how to suitably record this; whether to add some form of "Audience" node that can be influenced by existing S-Nodes, or to add a new class of "Rhetoric" nodes. The former aligns well with the notion of incorporating SIOC (which already models Users), whereas the latter may be more in keeping with the goals of the original AIF.

In addition, there is also the "meta-rhetoric" of social media to consider; that is, the feature of posts other than their content. For example, the number of "Likes" or "Retweets" a post has demonstrates popular (or audience) support for this opinion or position. It could be argued that these up- (or down-) votes acts as a Locution containing no information but implicitly supporting (or attacking) the conclusions they vote on.

There are further aspects of argumentation, both on the social web and in other spheres, that are difficult to assess (and virtually impossible to asses automatically) such

as the credibility of a claim, the trustworthiness of the source or the relevance of a contribution. However, additional extensions to capture these aspects are left to future work.

5. Conclusions and future work

Rhetoric and logic are both important aspects of online social argumentation; to accurately model how arguments occur and evolve across social media it is important to take into account all the techniques and tactics that are employed. Being able to accurately record all aspects of argumentation on social media will be the first step towards being able to accurately analyse informal argument on an enormous scale.

While the features described above are difficult to detect automatically, given enough data it may be possible to draw correlations between these features and the meta-rhetoric described above to give an estimation of the weight or impact a given post will have on the overall argumentation structure.

Bringing rhetorical and logical models of argumentation together for the social web has huge potential in terms of large-scale analysis, but also in terms of tools that could help communities manage argumentation, helping to solve diverse problems from trolling to groupthink. Our hope is that the initial work described in this paper will start discussion over the best ways of modelling eristic alongside logical argumentation, and draw attention to this important problem area.

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