Argument Mining and Social Debates

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Abstract. With this demonstration we introduce *AFAlpha*, a prototype of an Argument Mining tool, working in unison with *Quaestio-it*, an online social debating platform. While *AFAlpha* extracts arguments from text, as well as attack and support relations between arguments, *Quaestio-it* is concerned with visualising and evaluating interactive debates. We thus use *Quaestio-it* to represent and visualise output from *AFAlpha*, with the goal of taking plain text, in our case online reviews, and representing it in the form of a debate.

Keywords. Argument Mining, Social Argumentation, Social Debates, AFAlpha, Quaestio-it

Introduction

We present *Quaestio-it* [1] (`www.quaestio-it.com`), a Q&A debating platform, and *AFAlpha*, an Argument Mining tool, as well as ways of how we may fruitfully combine such systems. *Quaestio-it* and *AFAlpha* both aim to create structured representations of arguments, yet the means of doing so differ considerably. While with *AFAlpha* we aim to automate the process of creating *Argument Frameworks (AF)*, *Quaestio-it* instead automates the process of visualising and evaluating AFs that are created manually. What if we could build a single, automated pipeline, using the two systems in unison? With this demonstration we will show our first steps in using *AFAlpha* to automatically extract arguments and relations between arguments from text, which are then visualised using the front end of *Quaestio-it* and evaluated using its algorithms [1].

AFAlpha & Quaestio-it

AFAlpha is an Argument Mining prototype which represents customer reviews as trees of arguments. We analyse noun phrases and entity mentions that appear frequently in a set of reviews of a product. Sentences containing such noun phrases or entity mentions are ordered according to the time they were posted and their location within a review. We assume a child-parent relation between two sentences if they refer to the same concepts or entities, where the child is the sentence that has been posted *later*. A sentence is represented as a set of features, which include semantic characteristics of the sentence, as well as syntactic and lexical ones. Semantic features include meta data about the review in which the sentence in question appears, similarity measures between a child-parent pair

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etc. Syntactic and lexical features include occurrences of certain words, phrase types, etc. A feature vector thus represents each pair of sentences and is classified using a model trained on a data set comprised of data taken from *Quaestio-it*, imdb (`www.imdb.com`) and other sources. We are exploring a number of classifiers, including Mulitlayer Perceptrons, a modification of the Perceptron originally introduced in [2]. We also consider a rule-based approach in which the features influence an *support score* and a *attack score*. The score that is weighted to be higher determines the class label of a pair of statements.

Quaestio-it is a Q&A debating platform that allows users to open topics, ask their own questions, post answers, comment and vote. It provides an interactive way of engaging in conversation. Through an evaluation algorithm, the best answers and best comments, having the highest evaluation strength, are highlighted. Within the platform, each answer is open for discussion and users can post their comments, as supporting or attacking arguments, expressing their agreement or disagreement with an answer and/or comment. The process of posting attacks and supports on existing comments creates a debate. In order to obtain the relations between arguments within a debate, each user has to explicitly state whether their comment is an attack or a support.

Bringing it all together

So what are we demonstrating? Consider the following excerpt of a customer review:

> "(...) I'd read a few Steinbeck books prior to East of Eden, including Grapes of Wrath, which is often referred to as his masterpiece. In my opinion, however, East of Eden is his most impacting story because the characters were even more vivid than in his other books. (...)

Somehow we want to take this review and process it so that it lets us represent it in a way that is shown in figure 1. In a first step we use *AFAlpha* to try and extract arguments from this review; in our case two sentences, one advocating *Grapes of Wrath* to be *John Steinbeck's* masterpiece, the other saying the same about *East of Eden*. Another problem *AFAlpha* has to solve is to determine that the second sentence attacks the first one. Assuming *AFAlpha* has been able to achieve this we then pass the results to *Quaestio-it*, which we use to both visualise the argument structure provided by the *AFAlpha* output and to determine the winning argument.

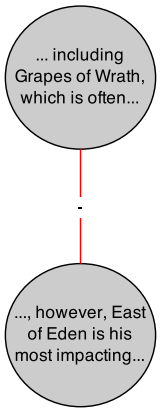

Figure 1.: Example of a Quaestio-it graph

References

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