Training Argumentation Skills with Argumentative Writing Support

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Abstract

We present an writing support system for assessing written arguments. Our system incorporates three analysis models allowing for rich feedback about argumentation structure, quality of reasons, and presence of opposing arguments.

1 Introduction

Persuasive essay writing is an established method for training argumentation skills. By analyzing different views on a (predefined) controversial topic, the author trains to recognize logical flaws in arguments, to anticipate counter arguments, and to formulate sufficient reasons for strengthening the own standpoint (to name only some of these skills). The effective development of argumentative abilities requires, however, formative feedback, which indicates particular flaws in the argumentation and provides guidelines for correcting them. So far, the provision of feedback about argumentation has been considered a manual task. While existing *Automated Essay Evaluation* (AWE) systems provide feedback about grammar, discourse structure, and lexical richness (Shermis and Burstein, 2013), they are not yet capable of assessing written arguments.

In order to bridge this gap, we developed an *Argumentative Writing Support* (AWS) system, that complements existing AWE systems with argument analysis methods. In particular, our AWS system incorporates three different argument analysis models that allow for feedback about the argumentation structure, the sufficiency of reasons, and the consideration of opposing arguments. In this paper, we introduce the feedback types of our AWS system and describe how the results of the analysis models are converted to human understandable feedback.

2 Argumentative Writing Support

Our AWS system builds upon three argument analysis models. The first model (`struct`) identifies the argumentation structure of the essay as a connected tree using an ILP-joint model (Stab and Gurevych, 2017a). It first segments the text into argument components, classifies each component as major claim, claim or premise and finally links the argument components using support and attack relations. The second model (`suff`) recognizes if the premises of an argument are sufficient for supporting its claim (Stab and Gurevych, 2017b). It is based on the sufficiency criterion proposed by Johnson and Blair (1977) and classifies a given argument as sufficient or insufficient. The third model (`bias`) recognizes if the author ignores opposing arguments (Stab and Gurevych, 2016), which is known as *myside bias*. It has been shown that guiding authors to include opposing arguments in their argumentation significantly improves the argumentation quality and the precision of claims (Wolfe and Britt, 2009).

2.1 Argumentative Feedback

Given the results of the analysis models, our AWS system generates (1) *document level feedback* about the entire essay well as (2) *paragraph level feedback* for each paragraph separately.

At the document level, the system first checks if the essay has a title and if it includes at least four paragraphs (introduction, two body paragraphs, and a conclusion) by examining line breaks.[1] In addition, the bias model recognizes opposing arguments to indicate myside biases.

At the paragraph level, the AWS first compares the argumentation structure identified with the struct model to the common rules of writing

[1]Note that a proper essay structure guarantees the best possible results of our argument analysis models.

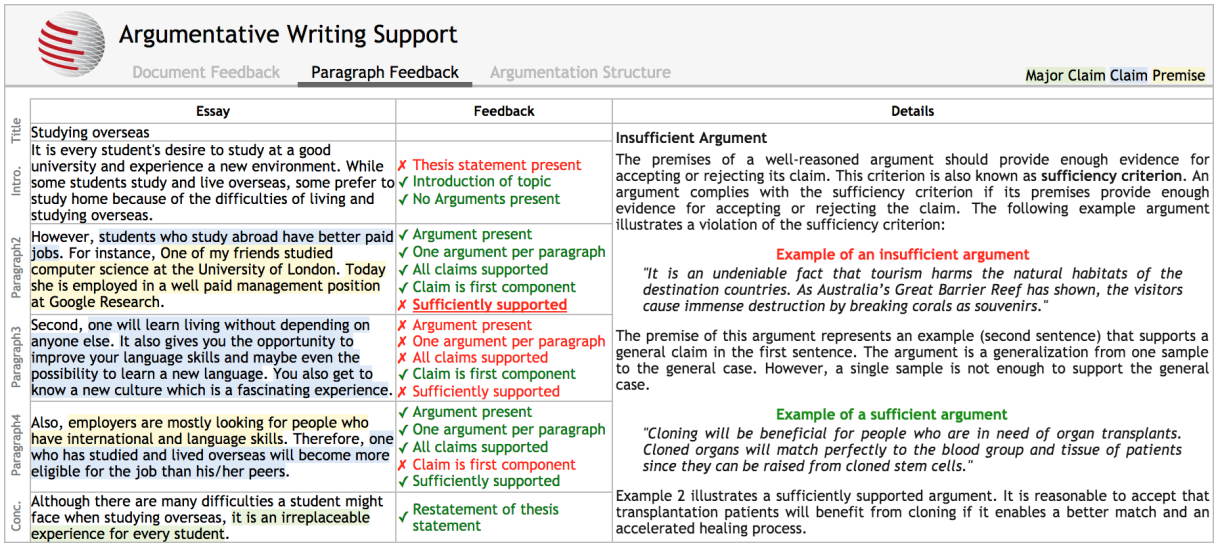

Figure 1: UI showing the paragraph level feedback of an essay about the topic studying abroad.

guidelines. It estimates whether the author takes a stance by checking the presence of a major claim in the introduction and conclusion, and if the introduction includes a non-argumentative description of the controversy. Furthermore, the system verifies if a body paragraph includes a single argument, i.e. a claim supported (or attacked) by at least one premise and whether a body paragraph includes unwarranted claims. Since presenting the claim before premises significantly improves the recall and comprehension of arguments (Britt and Larson, 2003), we also check the order of argument components. The suff model finds logical sufficiency flaws and verifies whether the premises of an argument are enough to support the claim.

2.2 User Interface Design

The user interface of our AWS system consists of three components (columns in Figure 1). The first column shows the paragraphs of the essay with the identified argument components. The feedback component in the second column is based on a checklist metaphor which shows positive (green) and negative (red) feedbacks. For easily spotting the location in the essay, we implemented a brushing-and-linking method that highlights the argument components affected by an entry in the feedback list. The third column provides a description of the selected feedback type and a guideline for improving the argumentation. The user interface also visualizes the argumentation structure in an interactive tree visualization.

3 Conclusion

For the first time, we presented an AWS system that provides rich feedback about written arguments. We described the feedback types which are generated using the results of three argument analysis models. In future work, we plan to conduct user studies to investigate the effectiveness of our AWS for improving argumentation skills.

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