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The *Skeptic* Web Service: Utilising Argument Technologies for Reason-Checking

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Abstract. *Skeptic* is a web service aimed at automatically providing pointers for the critical assessment of a persuasive text. That is, with a natural language text as input, the web service returns a ranked list of questions designed to help readers reason-check fake news and other contentious texts. Internally, *Skeptic* maps argumentative features of the text to methods for critical assessment, such as the critical questions of argument schemes, ways of evaluating different types of propositions, and signs of possible biased reasoning. The argumentative features are retrieved by utilising extant techniques for argument mining and classification.

Keywords. argument mining, critical literacy, fact-checking, fake news, reason-checking

While deliberate misinformation, disinformation, and deception are by no means new societal phenomena, the recent rise of fake news [1] and information silos [2] has become a growing international concern, with politicians, governments and media organisations regularly lamenting the issue. Efforts to combat such disinformation dressed up as genuine news focus too often exclusively on the factual correctness of the claims made. Whilst the truth of purported facts is clearly of crucial importance, there are other, often overlooked, aspects to consider here. It is, after all, very possible to argue from true factual statements to blatantly false or misleading implications by applying skewed, biased, or otherwise defective reasoning. Furthermore, the categorical corrections on factual impropriety delivered by fact-checkers can both alienate readers who believe they are being told what to think and raise questions around the impartiality of the fact-checkers themselves [3]. For these reasons, attention is increasingly turning to the extension of fact-checking to the broader concept of reason-checking: checking not just factual statements, but the full reasoning underpinning the persuasive text [4].

Skeptic is aimed at addressing these concerns by automatically providing pointers for the critical assessment of a persuasive text beyond checking the veracity of factual statements. The software tool is implemented as a web service[2] that takes an input natural language text and returns a ranked list of questions designed to help readers reason-check the argumentation. The questions are meant to be used as pointers, empowering the readers' critical literacy skills, helping them to draw their own conclusions as to

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whether or not they should accept what they are reading. Actively involving the reader in the reason-checking process should help avoid the instinctive enmity engendered by authoritative fact-checks, while simultaneously broadening the critical spectrum.

The web service maps argumentative features of the persuasive text to methods for critical assessment, such as the critical questions of argument schemes, ways of evaluating different types of propositions, and signs of possible biased reasoning. We employ a pipeline of extant argument technologies [5], all developed to work with the AIF ontology [6], using JSON as a common file type to facilitate handover between the different pipeline components. The combined argument mining and classification techniques provide a reconstruction of the argumentative features of the text, such as the structure of the argumentation, the proposition types of premises and conclusions, and the argument schemes instantiated in the text. These features are then mapped to potential areas of concern, which the *Skeptic* web service returns as a ranked list of prompts for readers to investigate further.

Looking at the overall argumentation structure allows us to identify potential areas of bias where only one side of an argument is being exposed. The argumentation structure also allows us to identify the most central propositions in an argument. These are then classified into one of three proposition types: statements of fact, value, or policy [7]. This classification results in a powerful expansion upon mere fact-checking by broadening the range of proposition types to be checked. Where factual statements can be checked for veracity, policy statements could be checked for consistency or appropriateness, while value statements could be checked for, e.g., popularity. Finally, identified instances of argument schemes are mapped to their associated critical questions [8].

By combining the identification of argumentative features and mapping these to potential flaws in the reasoning, the software allows the user to enter a piece of text and receive a ranked list of questions that they may wish to consider further. The developed software offers a range of potential applications in, for instance, critical literacy education, tools to improve persuasive writing, and the identification of misinformation and fake news.

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