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Navigating Arguments and Hypotheses at Scale

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Over the past decades, freely available software for annotating and navigating argument structures have been a staple of the argumentation community. These tools have catered for two main goals: the creation of large corpora of argument; and, enhancing critical thinking and reasoning skills – with the rise in fake news sparking new research in argument technology [3]. The intelligence analysis community has focused on similar lines of research [5]. Specifically, tools are available which allow for the creation of multiple hypotheses and the extraction of evidence to support or contradict using documents from multiple sources such as news articles and social media [1]. There is also a growing demand within the field of argument mining for the creation of large datasets containing argument structures, which has so far been satisfied through crowd-sourced annotation and the construction of dispersed argument annotation teams [4].

Despite the advances in both the intelligence analysis and argument mining areas of the argumentation community, the issue remains of efficiently exploring such argument structures through visual means, and allowing the manual connection of multiple argument analyses. ArgNav[2] provides the ability to visually explore argument structures and further annotate separate analyses within AIFdb [2]. Visual exploration makes use of a combination of centrality measures, collapsing argument sub-graphs, and automatic panning and zooming, whilst annotation utilises simple point and click actions for long distance relation creation (see Figure 1 for the user interface).

A single backend technology, python, is used for the creation of ArgNav with argument structures requested from AIFdb, as either single maps or full corpora, in JSON and SVG format, and subsequently parsed using the networkx library to provide eigenvector centrality scores for propositions. Three front-end technologies (HTML, CSS and JavaScript) display SVG images of the argument structure and D3.js and Jquery allow the collapsing of sub-graphs by clicking propositions, automatic panning and zooming to propositions through clicks in the centrality panel, and annotation of intertextual and intermap correspondence [6] by clicking two nodes which provides a dialogue box for users to select an AIF relation. Finally, analyses can be saved to AIFdb using python which creates an AIF JSON structure from the selected relations. Testing on the US2016

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[2]Website available at https://argnav.arg.tech/ and code at https://github.com/roryduthie/ArgNav
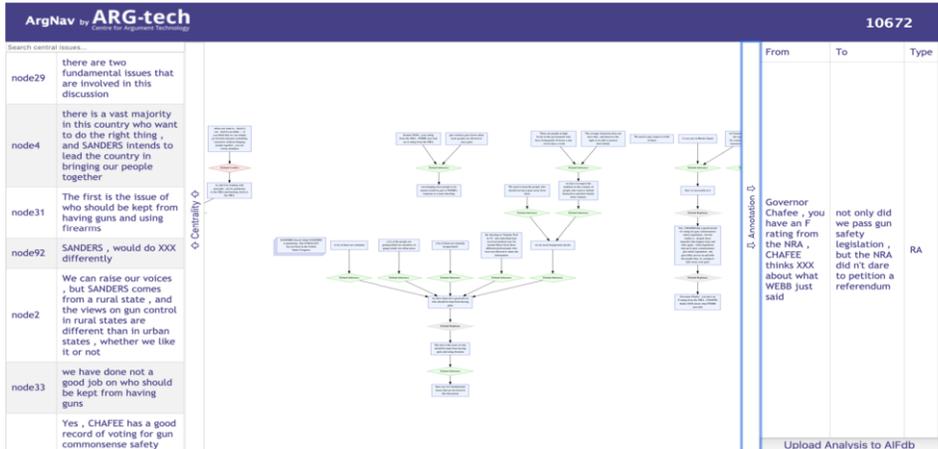
Figure 1. The ArgNav user interface (UI). Central issues are displayed on the left side of the UI ordered by eigenvector centrality, the large-scale argument maps are displayed in the centre of the UI through SVG, and the annotation panel on the right side of the UI shows annotated relations.

corpus in AIFdb containing 8099 propositions and 3772 conflict and support relations shows that ArgNav facilitates the efficient navigation of argument maps and corpora at large scale, in an easy to use way.

Acknowledgements

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