Abstract: Mapping Increasingly Large Networks of Argumentative Inferences

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Argument diagramming has been a popular and important technique over the years for communicating arguments, exploring their underlying structure, and visually mapping the flow of inferences through a given defeasible knowledge base. However, the increasing use of online argument capture and dialogue tools, and the advent of nascent argument mining techniques to automatically recognise argumentative inferences in texts has exposed deficiencies in current argument diagramming tools [1]. For example, hand-drawn argument diagrams quickly become unwieldy in the space of a dozen or so nodes, computational tools fair little better and are practically useful for visualising argument graphs up to perhaps fifty nodes. However, with the promise of vast, web-scale databases of analysed argument structure containing hundreds, if not thousands of nodes enabling the arguments covering entire topics to be surveyed and explored, it is apparent that improved tools for visually exploring these datasets are required. There is too much information for us to always read every word and argument visualisation is arguably a tool to help us avoid doing so. Instead good visualisation argument techniques should enable us to gain an overview of the domain, to choose what to focus on within the context of the problem we are trying to solve, to explore the detail whilst maintaining an overview, and to incorporate problem and domain specific, ad hoc, meta-data in order to solve problems. Effective visualisation should be a part of the toolset that enables us to deploy argumentative tools to solve tricky real world problems.

There are a number of developments that are compounding problems with current argument visualisation tools. The capture of meta-data about arguments and the contexts in which they are made means that new visualisation techniques must go beyond those found, for example, in Araucaria. New techniques must enable meta-data to be visualised within the diagram to supplement the core argument structure visualisation. This is especially important as argumentation techniques are increasingly adopted by practitioners outside of argumentation theory proper. New problem domains can have different foci and contextual information that it can be necessary to visualise in situ alongside the arguments themselves. For example, being able to visualise which arguments are associated with a specific individual or to visualise how a particular set of arguments has developed, or been revised over time can give insight into the concerns of specific groups within a domain. Furthermore, argument representation tools, such as the Argument Interchange Format, are extensible and enable domain specific meta-data to be captured and stored alongside the arguments [2], however such extra information is frequently ignored by current visualisation tools which generally focus only on the argumentative content. This suggests a need for both improvement in how visualisation tools deal with arguments at scale, but also a need to effectively and easily personalise, extend, filter, and focus the information that is displayed.

In summation, we report on work to develop new argument visualisation techniques, with computational implementations, that aim to support visualisation of arguments at scale, with ad hoc display and filtering of meta-data.

[1] D. Khartabil, S. Wells, & J. Kennedy (2016) "Large-scale Argument Visualization (LSAV)" 18th EG/VGTC Conference on Visualization (EuroVis16), Groningen, Netherlands

[2] C. Reed, J. Devereux, S. Wells, & G. Rowe, (2008), “AIF+: Dialogue in the Argument Interchange Format”, in In A. Hunter (editor): Computational Models of Argument, Proceedings of the Second International Conference on Computational Models of Argument (COMMA 2008). Toulouse, France.