

An Argumentation Based Approach for Design Change Management in Aerospace Projects

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Introduction

Large-scale engineering projects such as those performed within the Aerospace industry produce and store large volumes of information such as project requirements, technical design specifications and test strategies. Many of these data are stored as unstructured text. Understanding and managing this information is important as these data contain vital information on business and manufacturing processes. Therefore, this research proposes an argumentation based approach to handle design change management, in which large amounts of information need be effectively and efficiently processed. A use case based within the Aerospace domain has been developed.

Argumentation

Argumentation is an interdisciplinary field applied in various areas such as philosophy, linguistics, communication, law and sociology [1]. Computational Argumentation involves the detection of various elements of an argument such as the claim, facts, rebuttals, warrants, backing and qualifiers as outlined in Toulmin's influential model of argumentation [2]. Relationships between these elements are built by leveraging natural language processing and computational reasoning. Important approaches applied to formalize argumentation are:

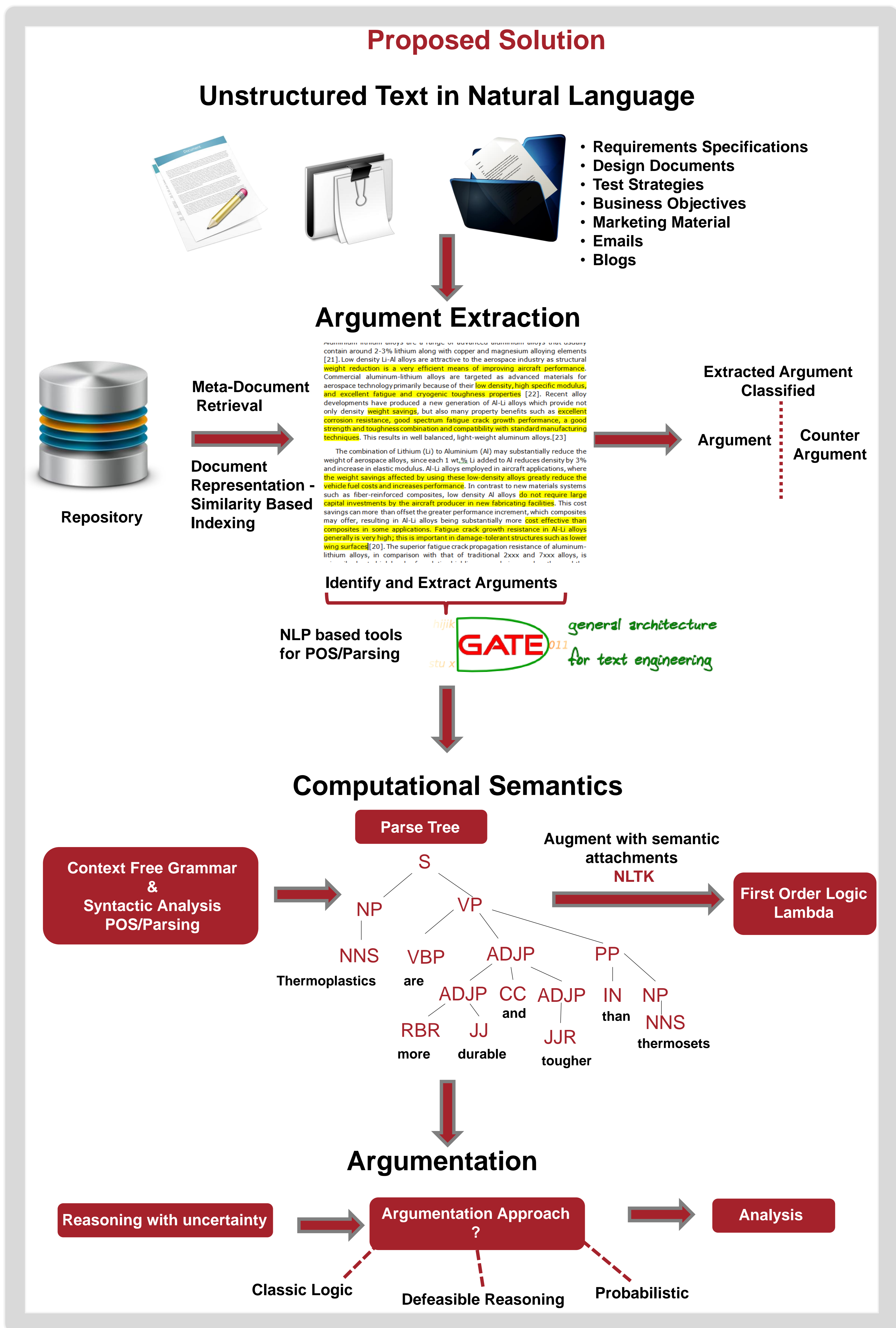
- Classical Logic
- Defeasible Reasoning
- Probabilistic Argumentation

Use Case

An Aerospace use case: Thermoplastics vs. Thermosets is presented. This use case compares and contrasts the rationale for selecting a particular composite material for the construction of an aircraft wing applying argumentation within a PLM setting.

Conclusion

By applying an argumentation based approach we aim to provide decision support to PLM users by enabling partial automation of decision capture and extracting and reasoning with arguments from unstructured text.



[1] Haenni, R.: Probabilistic argumentation. Journal of Applied Logic 7, 155-176 (2009)
 [2] Toulmin, S.E.: The Uses of Argument. Cambridge University Print (1958)

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