

ABSTRACT

Argument mining is a subfield of NLP focused on the extraction of argumentative content from unstructured text. One of the key challenges is dealing with implicit information when trying to understand arguments. This project seeks to improve the understanding of arguments by using external factual and commonsense knowledge. By developing new methods to extract knowledge, we hope to be able to better capture the kind of missing information that humans implicitly fill in when trying to understand arguments.

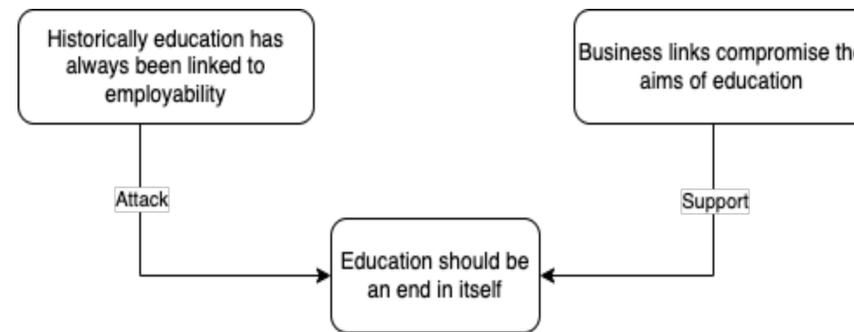
MOTIVATION

- Users often look to other people's opinions when making decisions
- They are often faced with conflicting views which make it difficult to make a decision.
- Echo chambers and lack of structure make this especially difficult.
- This calls for human-centered tools to guide people in their decision-making process.
- In particular, advances are needed in argument mining to be able to extract and reason about the variety of arguments that appear online

MILESTONES

1. Publish current findings
2. Improve upon our current approach for efficiency and accuracy and publish results
3. Investigate other sources of knowledge e.g. evidence retrieval

RELATIONAL ARGUMENT MINING



One of the key tasks in argument mining is the identification of attack and support relationships between argumentative units as depicted above. The majority of our work has focused on improving performance on this task by leveraging external commonsense knowledge. In addition to the identification of these relationships, we have worked on determining their logical validity with the help external knowledge [2].

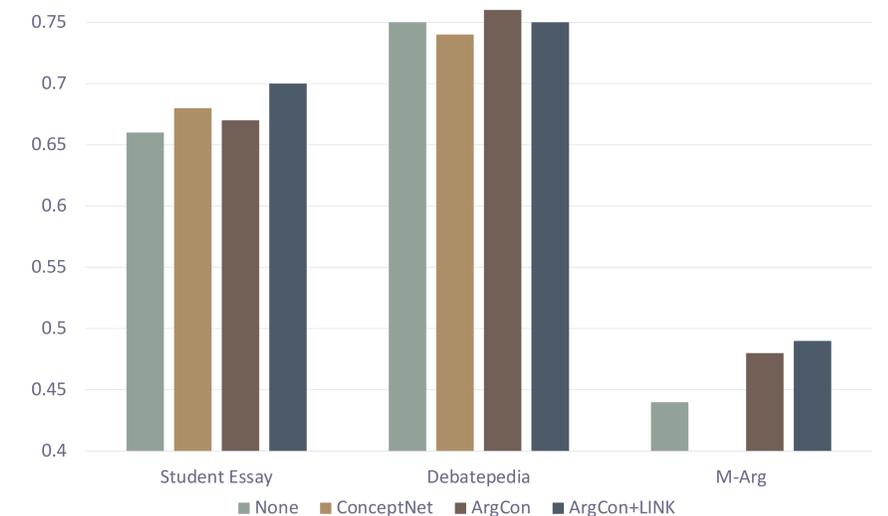
WHY COMMONSENSE?

- Humans often argue based on shared knowledge.
- Premises, conclusions and inference steps are often left implicit.
- Developing a system for argument understanding requires the ability to fill in these gaps.
- This requires commonsense non-monotonic reasoning capabilities that pretrained language models are unable to perform well on their own.
- Initial experiments showed that static commonsense knowledge graphs such as ConceptNet fail to sufficiently cover the topics considered in our datasets
- To alleviate this issue we sought to leverage pre-trained language models to generate relevant commonsense knowledge on the fly

REASONING WITH PLMS

- Our approach uses the Commonsense Transformer to generate deep inference chains between argumentative units (ArgCon)
- And use a relation prediction model to identify new relations (LINK) to connect argumentative units together
- By introducing these plausible connections, our classification models are better able to classify relationships between arguments compared to methods that use no knowledge or use static knowledge graphs such as ConceptNet or ATOMIC [1]

F1 Score for Knowledge Enhanced Argument Mining



REFERENCES

- [1] A. S. Yazdi, J. Z. Pan, and N. K'okciyan, "Uncovering implicit inferences for improved relational argument mining," in Proceedings of The European Chapter of the ACL (EACL), 2022, under review.
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- [3] O. Cocarascu, A. Rago, and F. Toni, 'Extracting Dialogical Explanations for Review Aggregations with Argumentative Dialogical Agents', *Proceedings of the 18th International Conference on Autonomous Agents and MultiAgent Systems*, pp. 1261-1269, 2019.
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