HotAM: An Argument Mining Framework

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Overview

What is Argument Mining?

A Persuasive Essay [7]

International tourism is now more common than ever before the last decade has seen an increasing number of tourists traveling to visit natural wonder sights, ancient heritages and different cultures around the world. While some people might think that this international tourism has negative effects on the destination countries, i would contend that it has contributed to the economic development as well as preserved the culture and environment of the tourist destinations. Firstly, international tourism promotes many aspects of the destination country 's economy in order to serve various demands of tourists. Take cambodia for example, a large number of visitors coming to visit the angkowat ancient temple need services like restaurants, hotels, souvenir shops and other stores. These demands trigger related business in the surrounding settings which in turn create many jobs for local people improve infrastructure and living standard. Therefore tourism has clearly improved lives in the tourist country. Secondly, through tourism industry, many cultural values have been preserved and natural environments have been protected. For instance, in vietnam, many cultural costumes and natural scenes, namely ' trong dong ' drum performance and ' ha long ' bay, are being encouraged to preserve and funded by the tourism ministry. Without this support and profit from tourism, many traditional cultures would disappear due to its low income works. Thus, tourism has survived many non - tangible cultural values and beauty scenes. To conclude, as far as i am concerned, international tourism has both triggered economic development and maintained cultural and environment values of the tourist countries. In addition, the authorities should adequately support these sustainable developments.

Lets identify the argumentative parts

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Lets find out of which type the argumentative parts are

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Argument Component Types: Claim: ■ Premise: ■ MajorClaim: ■

Lets identify relations between the parts

international tourism has both triggered economic development and maintained cultural and environment values of the tourist countries

it has contributed to the economic development as well as preserved the culture and environment of the tourist destinations

tourism has clearly improved lives in the tourist country

tourism has survived many non-tangible cultural values and beauty scenes

These demands trigger related business in the surrounding settings which in turn create many jobs for local people improve infrastructure and living standard

Without this support and profit from tourism, many traditional cultures would disappear due to its low income works

international tourism promotes many aspects of the destination country's economy in order to serve various demands of tourists

through tourism industry, many cultural values have been preserved and natural environments have been protected
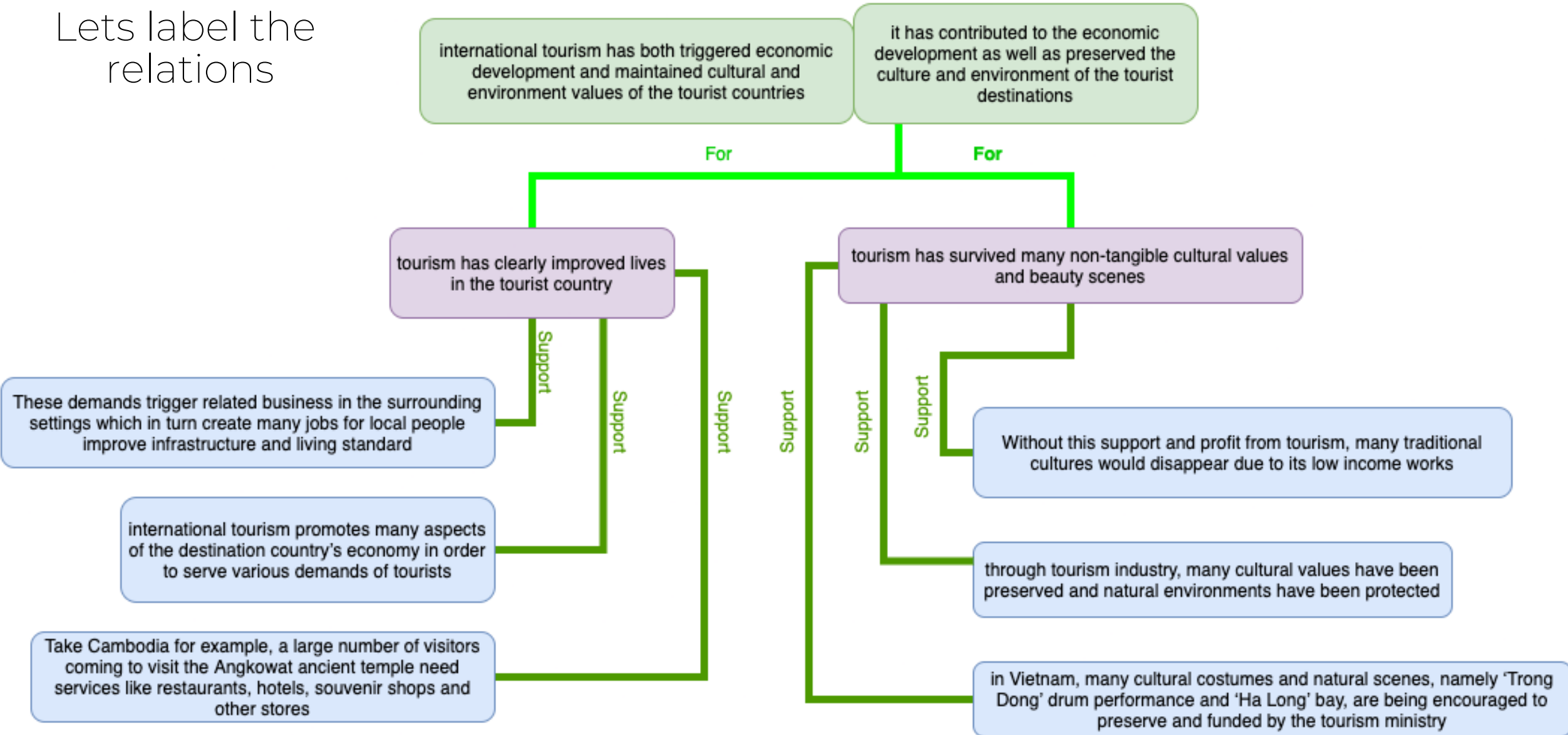
Take Cambodia for example, a large number of visitors coming to visit the Angkowat ancient temple need services like restaurants, hotels, souvenir shops and other stores

in Vietnam, many cultural costumes and natural scenes, namely 'Trong Dong' drum performance and 'Ha Long' bay, are being encouraged to preserve and funded by the tourism ministry

Lets label the relations

international tourism has both triggered economic development and maintained cultural and environment values of the tourist countries

it has contributed to the economic development as well as preserved the culture and environment of the tourist destinations

For

For

tourism has clearly improved lives in the tourist country

tourism has survived many non-tangible cultural values and beauty scenes

Support

Support

Support

Support

Support

Support

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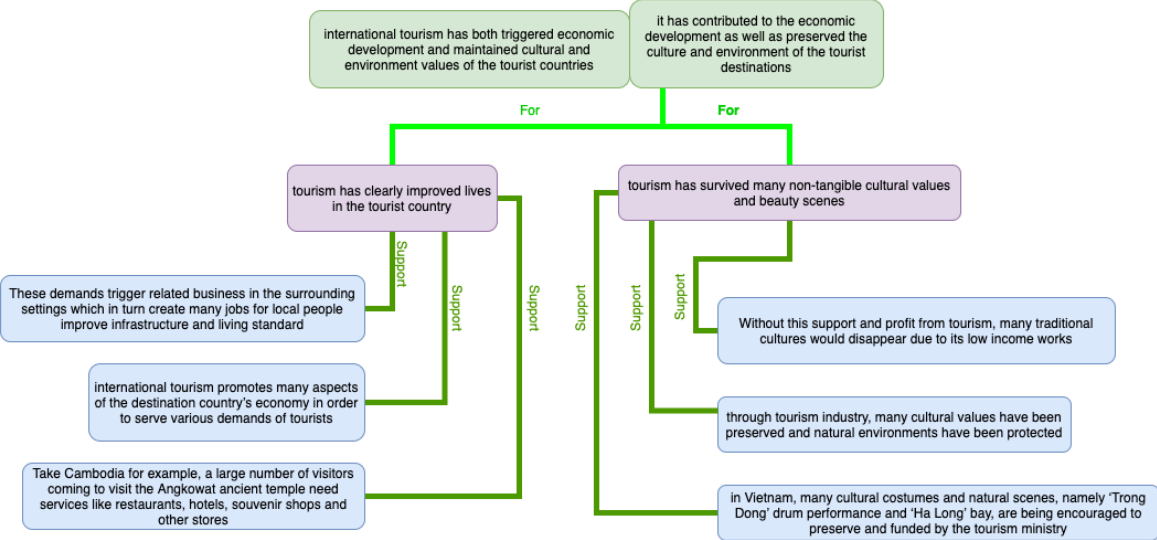
Argument Mining turns text

into argument structures

International tourism is now more common than ever before the last decade has seen an increasing number of tourists traveling to visit natural wonder sights, ancient heritages and different cultures around the world. While some people might think that this international tourism has negative effects on the destination countries, i would contend that it has contributed to the economic development as well as preserved the culture and environment of the tourist destinations. Firstly, international tourism promotes many aspects of the destination country 's economy in order to serve various demands of tourists. Take cambodia for example, a large number of visitors coming to visit the angkowat ancient temple need services like restaurants, hotels, souvenir shops and other stores. These demands trigger related business in the surrounding settings which in turn create many jobs for local people improve infrastructure and living standard. Therefore tourism has clearly improved lives in the tourist country. Secondly, through tourism industry, many cultural values have been preserved and natural environments have been protected. For instance, in vietnam, many cultural costumes and natural scenes, namely ' trong dong ' drum performance and ' ha long ' bay, are being encouraged to preserve and funded by the tourism ministry. Without this support and profit from tourism, many traditional cultures would disappear due to its low income works. Thus, tourism has survived many non - tangible cultural values and beauty scenes. To conclude, as far as i am concerned, international tourism has both triggered economic development and maintained cultural and environment values of the tourist countries. In addition, the authorities should adequately support these sustainable developments.

Argument Mining

Eger et al. [2] defines Argument Mining as :

"Computational argumentation mining (AM) deals with finding argumentation structures in text. …"

"This involves several subtasks, such as: …"

".. (a) separating argumentative units from non-argumentative units, also called 'component segmentation'"

"(b) classifying argument components into classes such as "Premise" or "Claim"

"(c) finding relations between argument components"

"(d) classifying relations into classes such as "Support" or "Attack" "

Argument Mining Tasks

- Component Segmentation

- Component Classification

- Relation identification

- Stance Detection:

- Combinations? Always these?

Argument Mining Perspectives
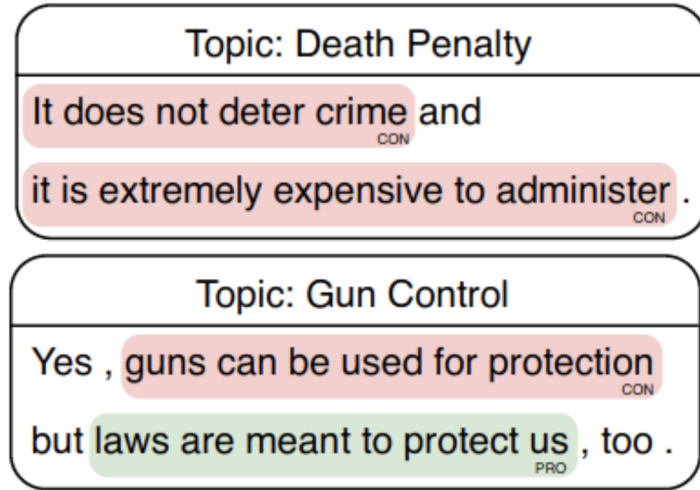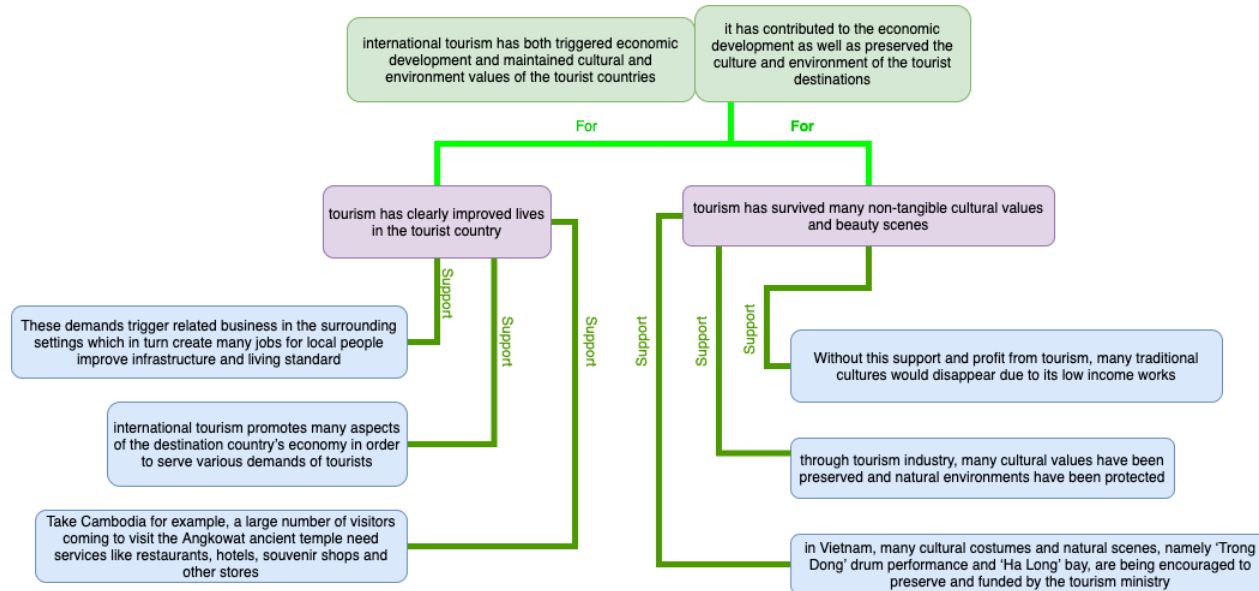
Information Perspective [3]

Figure 1: Annotation of argumentative spans and stance. Each of the two sentences contains two arguments.

Discourse Perspective

What about datasets?

- Most used:
  - Persuasive Essays
  - Micro-texts (blogs)

- .. then a lot more.

- Many with seemingly dubious quality?

What model have been applied to AM?

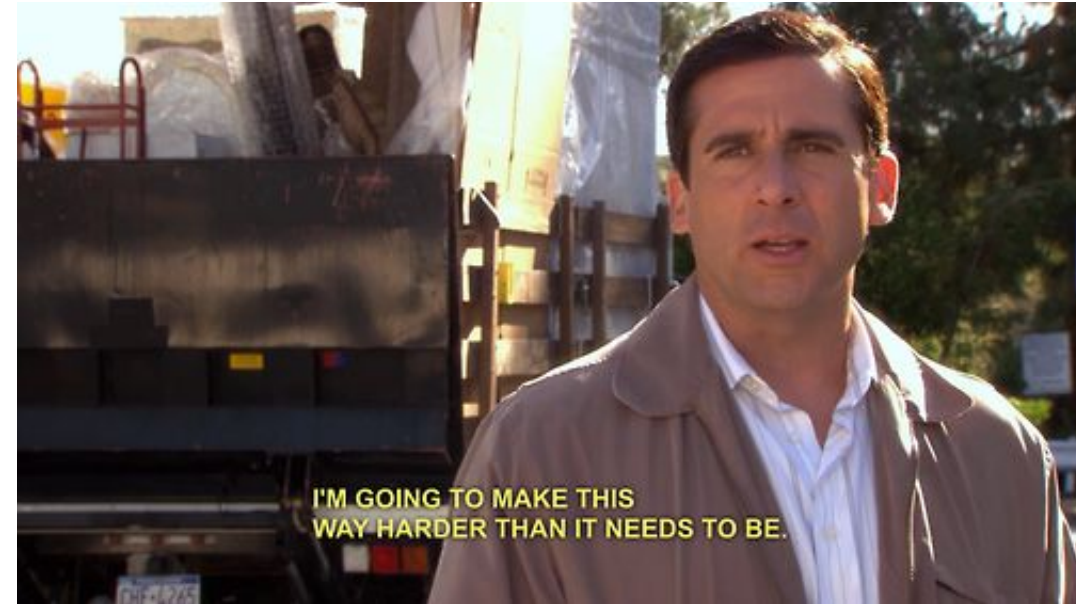|	Component Segmentation	Component Classification	Relation Identification	Stance Detection	Code available	Language	Framework
LSTM-CNN-CRF [2]	✓	✓	✓	✓	✓	c	-
LSTM-ER [2]	✓	✓	✓	✓	✓	c	-
LSTM-DIST [4]	✗	✓	✓	✓	✓	python	-
Joint Pointer Network [1]	✗	✓	✓	✗	?	python?	-
LSTM-CRF [6]	✓	✗	✗	✗	by request	Python	FlairNLP
BiLSTM* [5]	✓	✗	✗	✗	?	?	-
BERT** [3]	✓	✗	✗	✗	?	Python	Huggingface
BERT+CRF** [3]	✓	✗	✗	✗	?	Python	Huggingface

Blue marks Argument Mining Tasks
* it not only a BiLSTM. Not a very good name.
** Applied on information perspective dataset

How to compare these models?

1. We can try to use what is provided, i.e. code from papers/authors.

   - What about papers with no code?

   - Can we even ensure they are all evaluated the same?

   - Real reproduction?

2. or, we can build a Python framework that does it all for us in a few simple steps!

I'M GOING TO MAKE THIS WAY HARDER THAN IT NEEDS TO BE.

Benefits of building a Argument Mining Framework

- Makes AM easier

- Makes AM more accessible

- Successfully building such a framework could say something about how NLP frameworks can be structured, and hence prove a guidelines for building frameworks for NLP tasks

- Its fun and educational

What does an AM framework need to be able to do?

- Support different models

- Support a diverse set of datasets

- Support different experiment configurations
  - e.g. tasks or sample levels

- Support different features

While we are at it we can make it:

- easy to add new models

- easy to add new datasets

- easy to add new features

- have some nice visualizations

- easy to use for non-python experts

- keep track on SOTA results

- easy to reproduce results

- easy to keep track of experiments

How do we build something like this?

- Do not reinvent the wheel!

- Use open-source Machine Learning / NLP / Visualization libraries
  - Pytorch
  - Pytroch Lightning
  - FlairNLP
  - Dash
  - HuggingFace

- Integrate open-source libraries in a novel way to create new functionality

Difficulties

- structuring and maintaining code

- Replication of SOTA
  - Not always straight forward

- Fitting all models needs under one deep learning pipeline
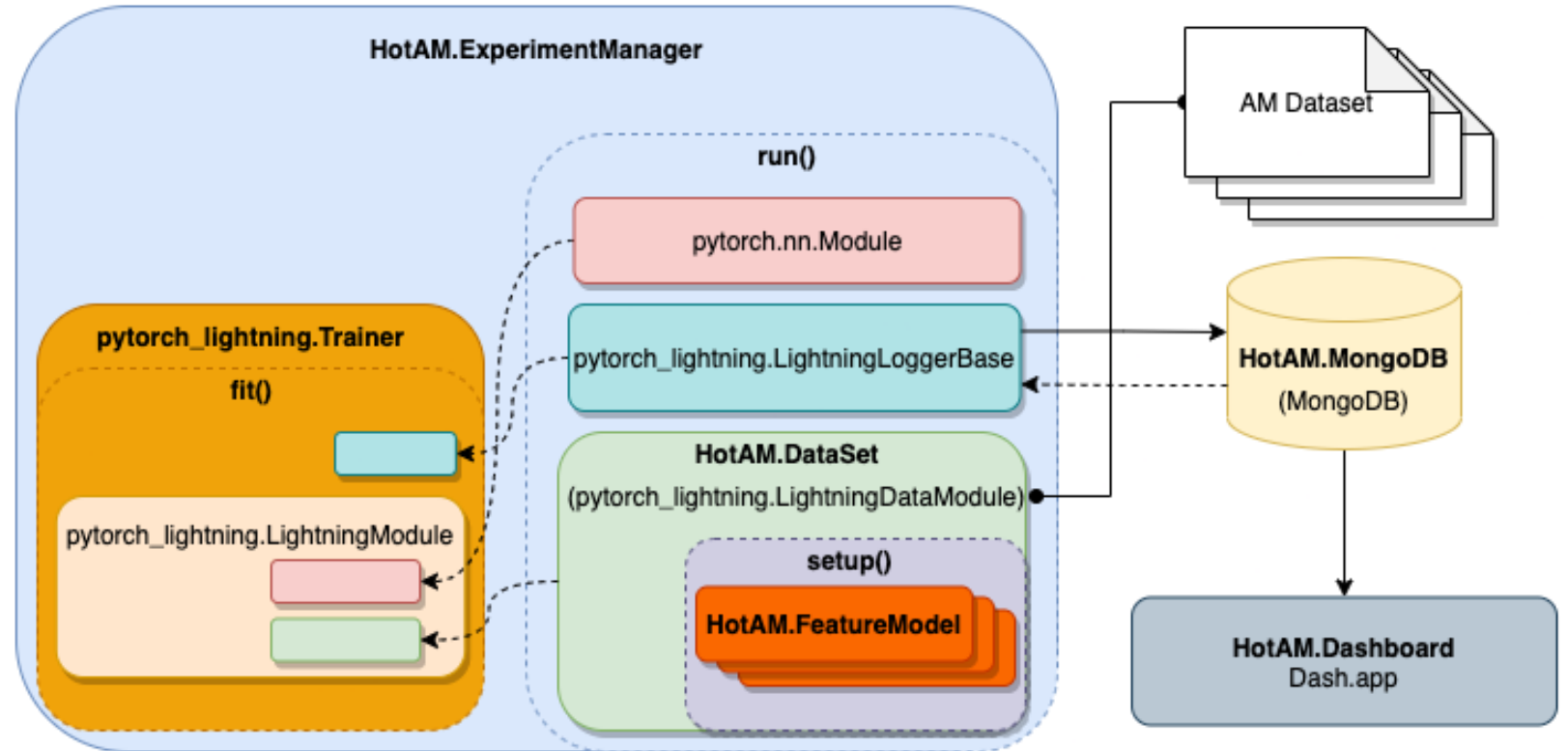
- Make it easy to use

What did I end up building?

https://github.com/AxlAlm/HotAM

Overview of Modules in the framework

Each box is a module except AM Dataset. AM Dataset is any Argument Mining dataset in any supported format. Dashed boxes are functions. Modules within dashed boxes are inputs to the function. Dashed lines also show inputs. Solid lines show communication. A box within a box that is not dashed shows that module is inside a larger module. Line with circled endings show transformation/loading, which could be done in numerous way.

HotAM: Features (current)

- Datasets

- Models
  - LSTM-CNN-CRF [2]
  - LSTM-CRF [6]
  - LSTM-DIST [4]
  - LSTM-ER [2]
  - Joint Pointer network [1]

- Features

- Preproccessing

- Data handling

- Deep Learning Training

- Experiment Managing

- Evaluation

- Experiment Logging

- Live Experiment Visualizations

- Experiment comparison

What can we do that we couldn't do before?

- Reproduce studies in Argument Mining with a few lines of code

- Log experiments

- Compare experiments

- Visualize data and results

What we hope to do in the future?

- Inference

- Chaining models

- Pretrained models

- Pipeline for non-NLP people that can be used to to explore other research topics than just AM.

Questions?

References

1   Peter Potash, Alexey Romanov, & Anna Rumshisky. (2017). Here's My Point: Joint Pointer Architecture for Argument Mining.

2   Eger, Steffen & Daxenberger, Johannes & Gurevych, Iryna. (2017). Neural End-to-End Learning for Computational Argumentation Mining. 10.18653/v1/P17-1002.

3   Dietrich Trautmann, Johannes Daxenberger, Christian Stab, Hinrich Schütze, & Iryna Gurevych. (2019). Fine-Grained Argument Unit Recognition and Classification.

4   Kuribayashi, K. (2019). An Empirical Study of Span Representations in Argumentation Structure Parsing. In Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics (pp. 4691–4698). Association for Computational Linguistics

5   Ajjour, B. (2017). Unit Segmentation of Argumentative Texts. In Proceedings of the 4th Workshop on Argument Mining (pp. 118–128). Association for Computational Linguistics.

6   Petasis, G. (2019). Segmentation of Argumentative Texts with Contextualised Word Representations. In Proceedings of the 6th Workshop on Argument Mining (pp. 1–10). Association for Computational Linguistics.

7   Steffen Eger, Johannes Daxenberger, Christian Stab and Iryna Gurevych. 2018. Cross-lingual Argumentation Mining: Machine Translation (and a bit of Projection) is All You Need! In Proceedings of the 27th International Conference on Computational Linguistics (COLING 2018), pages 831–844.