Modeling Interactions in Product Reviews

Utilizing Formal Argumentation to Assess Strengths and Weaknesses of Products Across Different Aspects

Ji Qi, Research Software Engineer, Social Science and Humanities Section, Netherlands eScience Center, The Netherlands

Atefeh Keshavarzi Zafarghandi, Human-Centered Data Analysis, Centrum Wiskunde & Informatica; Vrije Universiteit Amsterdam, The Netherlands

Davide Ceolin, Human-Centered Data Analysis, Centrum Wiskunde & Informatica, The Netherlands

j.qi@esciencecenter.nl, akz@cwi.nl, davide@cwi.nl

Introduction

This study focuses on the creation of a valuable resource powered by formal argumentation for new users by effectively analyzing product reviews and highlighting the strengths and weaknesses associated with different aspects of a product.

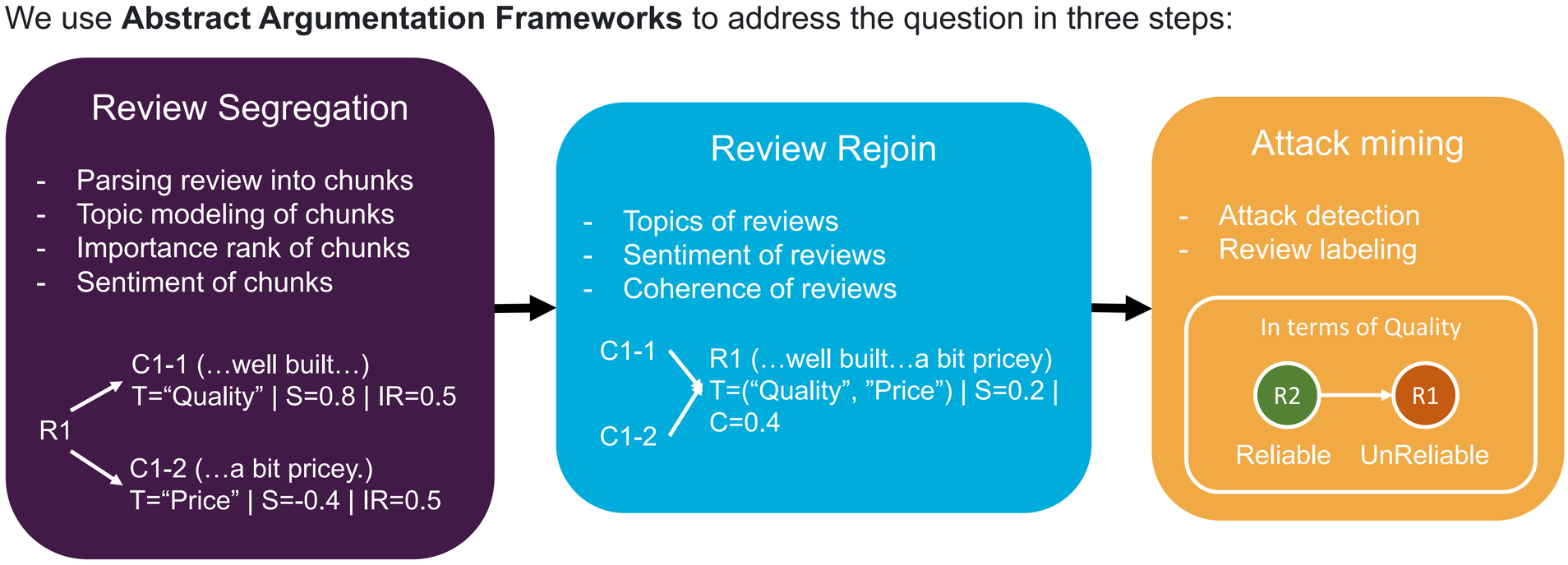
Imagine that there are three reviews given for shoes:

★★★★☆ R1: "*They are always well built and last me quite a few years. The only downside is they tend to be a bit pricey.*"
★☆☆☆☆ R2: "*My shoes are damaged in its warranty but the team has no response. Don't buy, very expensive.*"
★★★★☆ R3: "*Largely my fault for not reading carefully, but it is very uncomfortable.*"

They describe the shoes on different aspects, e.g., quality, price, service, and comfort. Here is the question we aim to answer: In case reviews conflict regarding one aspect (*well built* vs. *damaged in its warranty* regarding the quality of the shoes), which ones should we trust?

Methods

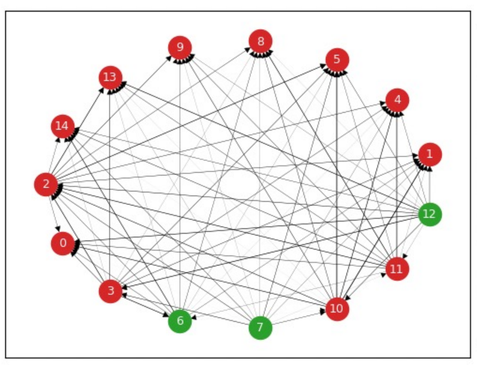
We use **Abstract Argumentation Frameworks** to address the question in three steps:



Implementation

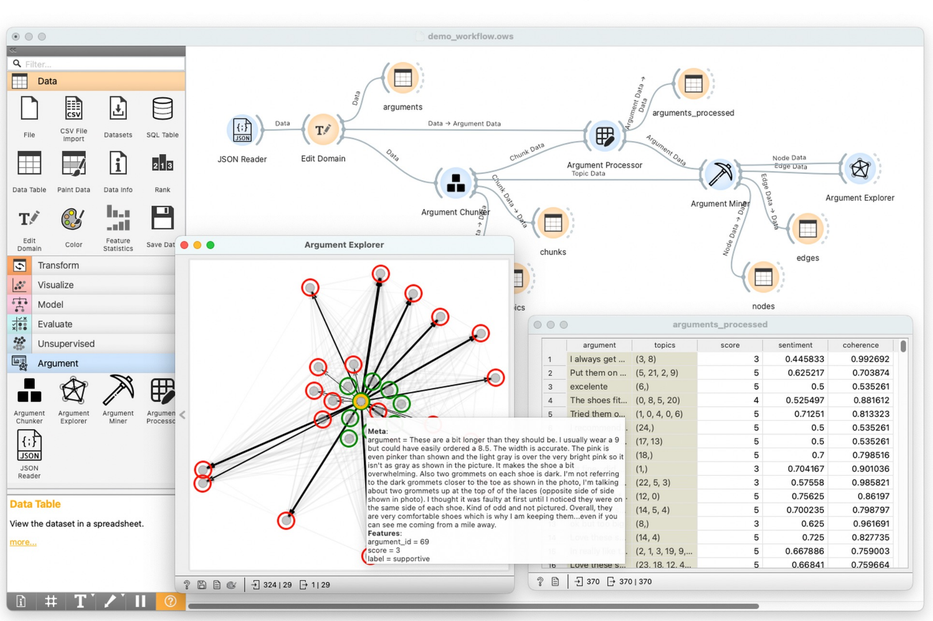
A Python package is developed to implement the pipeline, as well as GUIs for user-friendly interaction.

```python
from orangearg.argument.miner import reader, chunker, processor, miner
import matplotlib.pyplot as plt

arguments = df_arguments["reviewText"]
arg_scores = df_arguments["overall"]

# Split reviews into chunks
chunk_arg_ids, chunks = chunker.get_chunk(docs=arguments)

# Compute polarity score of chunks
chunk_p_scores = chunker.get_chunk_polarity_score(chunks=chunks)

# Compute topics of chunks
chunk_topics, chunk_embeds, df_topics = chunker.get_chunk_topic(chunks=chunks)

nx.draw_networkx_edges(DG, pos, width=df_edges["weight"])

# draw labels
labels = {i: i for i in arg_selection.index}
nx.draw_networkx_labels(DG, pos, labels, font_size=9, font_color="whitesmoke")

plt.show()
```



	reviewText	overall
0	I always get a half size up in my tennis shoes...	3
1	Put them on and walked 3 hours with no problem...	5
2	excelente	5
3	The shoes fit well in the arch area. They are ...	4
4	Tried them on in a store before buying online ...	5
...	...	...
365	Favorite Nike shoe ever! The flex sole is exce...	5
366	I wear these everyday to work, the gym, etc.	5
367	Love these shoes! Great fit, very light weight.	5
368	Super comfortable and fit my small feet perfec...	5
369	Love these shoes!	5

370 rows × 2 columns



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