COMP 6751 Natural Language Analysis

Project Report 4

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Expectations of originality:

I, Md Sakib Ullah Sourav (student id 40264066), certify that this submission is my original work and meets the Faculty's Expectations of Originality.

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Q1 Explanation and critique on grammar design for complex declarative sentences

The grammar for Project 3 has been improved in this current project to handle complex sentences. It identifies the sentiment of a sentence mainly through adjectives and specific nouns.

The grammar focused on identifying three sentiment classes: pos (positive), neg (negative), and neut (neutral). These sentiment features move up from lexicons to the root of the tree through phrases like Noun Phrases and Verb Phrases.

The sentiment at the top of the tree is assigned to the whole sentence. The parser can generate multiple trees for a sentence, each classifying it as positive, negative, or neutral. To combine results, a voting module counts trees for each sentiment category, and the sentence's sentiment is determined by the category with the most trees.

Q2. Explain and critique your grammar design for conjunction (and, or, but) of sentiment bearing adjectives or nouns with and without negation

Considering the situation when a sentence with an "and" or "or" conjunction have either positive or negative sentiments in adjectives or nouns, the whole sentence/phrase will get the same sentiment. If there are opposing sentiments on each side, the sentiment is considered neutral here. When there is a "but" conjunction, the sentiment of the second phrase determines the overall sentiment, a choice commonly seen in English. For instance, the sentence "this does not have gut-wrenching impact but it’s a compelling story" is positive due to the positive adjective "compelling" in the second phrase.

To deal with negation, RB-N in my grammar represents the adverb "not," which can reverse the sentiment of a word or phrase. So, any Noun Phrase, Verb Phrase, or Sentence following an RB-N has its sentiment reversed. For instance, if the Noun Phrase "a good film" (positive) is preceded by an RB-N, the overall phrase would have a negative sentiment. However, this approach has a downside, as phrases like "not happy" will now have a positive sentiment although it should be neutral.

Q3. Explain and critique your grammar design for conjunction (and, or, but) of sentiment bearing sentences with and without negation

The conjunction of sentiment-bearing sentences in my grammar follows a similar methodology to the one previously outlined for words and phrases mentioned above. Just as with individual words and phrases, specific rules are applied to the existing sentence generation rules to determine the overall sentiment of a composite sentence.

Q4. Compare SSAP and your grammar-based sentiment analysis of small paragraphs of text that contain sentiment words

Table 1: Comparison between my Project 4's Grammar and SSAP Baseline

Representative sentences	**SSAP baseline**	**Grammar developed for this project**
He is not happy	3	**neg**
This does not have gut-wrenching impact but it's a compelling story	-2	**pos**
This compelling story with gut-wrenching impact	-2	**neut**
Well-intentioned movie making	0	**pos**
It has gut-wrenching impact and it is a compelling story	-2	**neut**
It has low impact but it's a compelling story	0	**neut**

Table 1 compares my Project 4's grammar-based sentiment analyzer with the SSAP baseline using representative examples. As illustrated from the examples here, the results in Table 1 show that this project's grammar performs better than the SSAP baseline for the five sentences discussed.

Q5. Explaining and critiquing your approach for stance assignment

I divided this task into two steps. As the first step, to assign stance, the method involved identifying all named entities in the sentence. Secondly, assigning the sentence's sentiment based on those entities accordingly.