Scope detection - negation

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1. Problem statement

Given a sentence, the problem deals with the detection of negation cues and their respective scopes.

One-slide
Problem statement, solution and benefit

Challenge

Given a sentence, the problem deals with the detection of negation cues and their respective scopes.

Our solution

We divided the problem into two parts:

1. Negation Cue detection
2. Finding the scope of the negated cue detected.

Both of the above tasks are implemented using Support Vector Machines.

Benefits

1. Our model is robust enough to detect cues given a sentence and thereafter predict the scope given the cue word and the corresponding sentence
2. Our model takes into consideration morphological cues(eg. impatient).
3. Our model is also capable of detecting nested scope.

2. Evaluation metrics

Evaluation Metrics

- F1 score for cue detection on dev data: 78.6 %
- F1 score for scope detection on training data: 42.1%

3. Solution approach

1. The identification of negation cues and the determination of their scope are modeled as two consecutive classification tasks using SVM.
2. The model is trained on Sir Arthur Conan Doyle’s work of various stories of Sherlock Holmes.
3. In the first phase, detection of negation cues is achieved which predicts whether a given word is a negation cue or not.
4. In the second phase, scope detection takes place which predicts whether a given word is a part of the scope of that respective cue.

Cue detection: Baseline

Features:

a. lemma
b. pos_tag
c. prev_word_lemma
d. next_word_lemma

Scope Detection: Baseline

Features:

a. (cue, word)
b. shortest_path_length

4. Challenges faced

Challenges faced :

There were two main challenges involved in detecting the scope of negation:

1. A sentence can have multiple instances of negation
2. Scope can be nested

Both of the above stated problems were resolved by:

1. Considering the dependency graph of a given sentence and calculating the shortest path between the *word* and the *cue*.

5. Your view on this hackathon

1. Hands on experience: It gave us an opportunity to work on real life problem statements and get hands on experience.
2. Connect: Philips gave us the platform to connect and meet new people.
3. Experience: Above all, it gave us an awesome experience !

6. How we could have done it better

Suggested Improvements:

It would be even more thrilling and exciting if it would have been an on-site hackathon.


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