

Natural Language Processing

Lab 5

February 12, 2024

This lab sheet is to practice the concepts taught this week: syntax and compositionality.

1. What is syntax and why is it important in NLP?
2. How do NLP systems process syntax?
3. Consider the following sentence:
“Jane likes eating fruits for breakfast, but only on Wednesday.”
If you had to add a negation (“not”, “does/do not”, “never”, etc...) how many different meanings can you obtain?
4. Think about the challenges in processing syntax from the point of view of meaning compositionality. Can you ignore syntax in practical applications?
5. How do LSTM and CNN neural networks process dependencies between words?
6. Consider the following two sentences and their vector representations:
“The blue cat sat on the red mat.”
[0.2, 0.3, 0.4], [0.1, 0.3, 0.5], [0.8, 0.8, 0.6], [0.4, 0.5, 0.1], [0.1, 0.1, 0.2],
[0.2, 0.3, 0.4], [0.2, 0.3, 0.5], [0.7, 0.7, 0.6]

“The red cat jumped on the blue mat.”
[0.2, 0.3, 0.4], [0.2, 0.3, 0.5], [0.8, 0.8, 0.6], [0.4, 0.6, 0.2], [0.1, 0.1, 0.2],
[0.2, 0.3, 0.4], [0.1, 0.3, 0.5], [0.7, 0.7, 0.6]

Can you calculate a vector representation of each of them?

7. What are some differences between Word2Vec and ELMO? How are the vectors calculated?