- Assignment 3
- Sentiment Analysis on Amazon with Intensity

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Input Sentence to Constituency Parse Tree

```
# Loading spaCy's en model and adding benepar model to its pipeline
nlp = spacy.load('en')
nlp.add_pipe(BeneparComponent('benepar_en2'))

text='This code has been made by us.'

# Generating a parse tree for the text
list(nlp(text).sents)[0]._.parse_string
```

```
'(S (NP (DT This) (NN code)) (VP (VBZ has) (VP (VBN been) (VP (VBN made) (PP (IN by) (NP (PRP us)))))) (. .))'
```

We have used Allennlp and Spacy parser to get the Constituency parse tree.

Converting CP to DP

We have successfully Converted the Constituency parse tree to dependency Parse tree using Rule based Approach.

We have built both labelled and unlabelled dependency tree for the Constituency Parse tree.

```
***Constituency Parse Tree***

 (S (NP (NNS Students)) (VP (VBP are) (VP (VBG playing) (ADVP (RB very) (RB well)))))

***Tree Construction***

S => NP VP
NP => NNS
NNS => Students
VP => VBP VP
VBP => are
VP => VBG ADVP
VBG => playing
ADVP => RB RB
RB => very
RB => well
```

```
***Dependency Tree***

playing => Students     >> playing {VMOD} Students
playing => are  >> playing {AUX} are
playing => well >> playing {VMOD} well
well => very    >> well {ADVMOD} very
```

Error analysis

Unlabelled Dependency Tree

Our approach works fine for getting unlabelled dependency tree.

We are getting almost similar tree when compared with the output of Spacy,Stanford and Allennlp parser.

We have tested on many examples and very few of them vary from the actual output.

Since we have used simple rules our parser may not give most accurate answer for the long dependency structures.

Labelled Dependency Tree

We have used the labelling algorithm based on the research paper {Guidelines for the Clear Style Constituent to Dependency Conversion} by Jinho D. Choi and Martha Palmar.

Since parsers like spacy ,allennlp does not provide function tags and this algorithm requires function tags.

We are able to assign the basic labels.

Analysis

```
***Dependency Tree***

playing => Students     >> playing {VMOD} Students
playing => are  >> playing {AUX} are
playing => well >> playing {VMOD} well
well => very    >> well {ADVMOD} very
```

Universal dependencies

```
nsubj(playing-3, Students-1)
aux(playing-3, are-2)
root(ROOT-0, playing-3)
advmod(well-5, very-4)
advmod(playing-3, well-5)
```

```
***Dependency Tree***

talking => i    >> talking {VMOD} i
talking => am   >> talking {AUX} am
talking => to   >> talking {VMOD} to
to => you       >> to {ADVMOD} you
talking => only >> talking {VMOD} only
```

Universal dependencies

```
nsubj(talking-3, i-1)
aux(talking-3, am-2)
root(ROOT-0, talking-3)
case(you-5, to-4)
obl(talking-3, you-5)
advmod(talking-3, only-6)
```

Converting DP to CP

We are using spacy library for converting sentence to dependency parse Tree.

e.g) The boy is eating with a hand

The dependency parse Tree using using spacy :

The => det => boy, boy => nsubj => eating, is => aux => eating, eating => ROOT => eating, with => prep => eating, a => det => hand, hand => pobj => with .

We developed some rules for converting from dependency parse tree to constituency parse tree but there is problem in conversion. We are currently working on the algorithm and adding few more rules.

The correct constituency parse tree should be :
(S (NP (DT The) (NN boy)) (VP (VBZ is) (VP (VBG eating) (PP (IN with) (NP (DT a) (NN hand))))))
but the algorithm is returning parse tree as
(S (NP(The DT)(boy NN))(VP(VP(is AUX)(eating VPStarting))(PP(with IN))(NP(a DT)(hand NN)))

Project : Sentiment and Emotional Intensity Analysis

We have completed Data Pre-Processing Part for Amazon Review Dataset and currently implementing Neural Network model for Sentiment Analysis.

The papers we have referred so far for the project :

- A Multi-task Ensemble Framework for Emotion, Sentiment and Intensity Prediction : Md Shad Akhtar, Deepanway Ghosal , Asif Ekbal, Pushpak Bhattacharyya , Sadao Kurohashi
- Adjective Intensity and Sentiment Analysis : Raksha Sharma, Mohit Gupta, Astha Agarwal, Pushpak Bhattacharyya
- Determining Emotion Intensity Using a Bi-directional LSTM-CNN Model : Yuanye He, Liang-Chih Yu, K. Robert Lai and Weiyi Liu