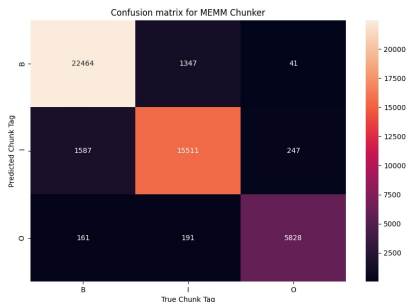# Chunking

Shubham Nemani, 203050011,
Pooja Verma, 203050072,
Anish M M, 203050066

Indian Institute of Technology Bombay

December 1, 2020

Assignment 2: Chunking - MEMM

Confusion matrix for MEMM Chunker

Iteration	Log Likelihood	Accuracy
1	-1.09861	0.132
2	-0.57883	0.851
3	-0.41365	0.928
4	-0.32340	0.939
5	-0.26891	0.943

Table: Training values

	Precision	Recall	F1score
B	0.93	0.94	0.93
I	0.91	0.89	0.90
O	0.95	0.94	0.95
Overall	0.92	0.92	0.92

Table: Tag wise metrics

- Training algorithm used is GIS
- Iterations = 5

Assignment 2: Chunking - Bilstm

Confusion matrix for BiLSTM Chunker
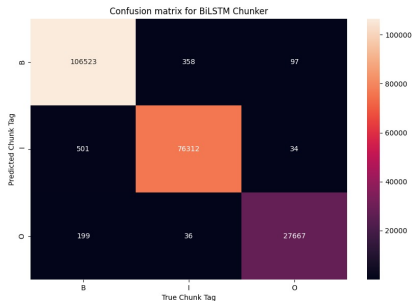
	Precision	Recall	F1score
B	0.99	0.99	0.99
I	0.99	0.99	0.99
O	0.99	0.99	0.99
Overall	0.99	0.99	0.99

Table: Tag wise metrics

- Word Embedding Size = 128
- Batch Size = 32
- Iterations = 10

Assignment 2: Chunking - CRF

Confusion matrix for CRF Chunker
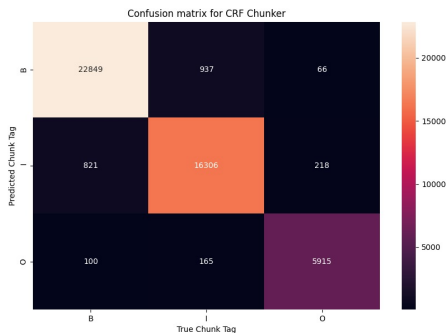
	Precision	Recall	Fscore
B	0.96	0.96	0.96
I	0.94	0.94	0.94
O	0.95	0.96	0.96
Overall	0.95	0.95	0.95

Table: Tag wise metrics

MEMM-Error Analysis

- Very poor performance with punctuation marks like " " " , ! ?
- Ambiguity in comma , causes predicted tag different
- Ellipses in test sentences results in different tag prediction
- Poor performance with interrogative sentences (starting with VBD):
- usage of chunk label O is not jusitfied because sometimes it is assigned to
    1. Conjuctions ,CC
    2. Punctuations
    3. Interrogative sentences (start word VBD)

CRF-Error Analysis

- Like MEMM , CRF is also not able to learn usage of chunk label O.
- Very few occurences of some symbols like #
- Miclassification of words like haven't , aren't.
- Some abnormal assignment of O tags in test sentences
- Due to ambiguity in English for a word to be mostly tagged as noun and verb both, two chunk phrases NP VP are combined and predicted NP as whole.
- The classifier performance on punctuation tags is improved to some extent as comapred to MEMM, but the problem still exist.

Bi-lstm-Error Analysis

- Bi-lstm is also not able to learn usage of chunk label O.
- Some sentences require semantic knowledge
- Like CRF , bilstm is also suffered from words like can't ,doesn't ,year's.
- Wrong true lables in test sentences or abnormal test sentences like -'The Wall Street Journal'
- Bi-Lstm removed the problem of punctuations , O label with cunjuctions. But O label with VBD problem still exists.