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CS563 NLP Assignment 1

Codalab Link :
https://colab.research.google.com/drive/1dxA3JasQT5X5UU30UaZzO1jrmpRQ1XOY?usp=sharing

Output Files - HMM_36_results.csv, HMM_4_results.csv
Output

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HMM for 36 tags :
Evaluating 783 sentences.

100%|██████████| 783/783 [16:22<00:00,  1.26s/it]
HMM Model Accuracy = 0.8360031915546554

Class-wise Accuracies

| Class (Tag)    |   Accuracy |
|----------------+------------|
| #              |   0        |
| ''             |   0        |
| ,              |   0        |
| -LRB-          |   0.55     |
| -RRB-          |   0.473684 |
| :              |   0.037037 |
| CC             |   0.816495 |
| CD             |   0.841705 |
| DT             |   0.925174 |
| EX             |   0.588235 |
| FW             |   0        |
| IN             |   0.909812 |
| JJ             |   0.776578 |
| JJR            |   0.78481  |
| JJS            |   0.733333 |
| LS             |   0.666667 |
| MD             |   0.908046 |
| NN             |   0.849123 |
| NNP            |   0.841945 |
| NNPS           |   0.382979 |
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| NNS            |   0.818031 |
| PDT            |   0.285714 |
| PRP            |   0.898734 |
| PRP$           |   0.913386 |
| RB             |   0.822547 |
| RBR            |   0.5      |
| RBS            |   0.4      |
| RP             |   0.5      |
| SYM            |   0        |
| TO             |   0.879896 |
| VB             |   0.800416 |
| VBD            |   0.809122 |
| VBG            |   0.622302 |
| VBN            |   0.722595 |
| VBP            |   0.739837 |
| VBZ            |   0.863081 |
| WDT            |   0.7375   |
| WP             |   0.682927 |
| WP$            |   1        |
| WRB            |   0.611111 |
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HMM for 4 tags :
Evaluating 783 sentences.

100%|██████████| 783/783 [00:03<00:00, 238.43it/s]HMM Model Accuracy =
0.8695145154360768

Class-wise Accuracies

| Class (Tag)    |   Accuracy |
|----------------+------------|
| A              |   0.774813 |
| N              |   0.852632 |
| O              |   0.939556 |
| V              |   0.805544 |
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We achieve better accuracy for the 4-tag model as compared to 36-tag model. Increasing number of tags demands finer distinction among tags which lead to lower accuracy. Also 4-tag tag consumes less time as time complexity of viterbi algorithm is O(P*P*L) where P is number of tags