AY: 2025-26

Class:	**BE-AI&DS**	**Semester:**	**VII**
Course Code:	**CSDOL7011**	**Course Name:**	**NLP Lab**

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Roll No. :	61
Experiment No.:	**5**
Title of the Experiment:	**Performing Part-of-Speech Tagging and Syntactic Analysis using NLTK**
Date of Performance:	
Date of Submission:	

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Performance	5	
Understanding	5	
Journal work and timely submission	10	
Total	20	

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Performance	4-5	2-3	1
Understanding	4-5	2-3	1

Journal work and timely submission	8-10	5-8	1-4

Checked by

Name of Faculty :
Signature :
Date :

Aim: To perform Part-of-Speech tagging on sentences using NLTK and understand syntactic categories of words.

Objective: • To apply Part-of-Speech tagging for syntactic analysis of sentences using NLTK.

Tools Required:

1. Python (Jupyter Notebook or Google Colab)
2. nltk

Procedure:

1. Install and import libraries:
    a. import nltk
    b. Run nltk.download('punkt') and nltk.download('averaged_perceptron_tagger')

2. Input or define a sample sentence.

3. Tokenize the sentence into words:
    a. Use nltk.word_tokenize(sentence)

4. Apply POS tagging:
    a. Use nltk.pos_tag(tokens) to assign part-of-speech tags to each token.

5. Display the results:
    a. Print each word along with its corresponding POS tag.

6. Optional: Visualize the tagged structure using nltk.tree.Tree or nltk.ne_chunk().

Description of the Experiment:

This experiment introduces POS tagging, where each word in a sentence is labeled with its grammatical category. It helps in syntactic understanding of the sentence structure and prepares students for further syntactic and semantic parsing tasks.

Detailed Description of the NLP Technique:

Part-of-Speech (POS) Tagging:

POS tagging is the process of assigning a grammatical category (like noun, verb, adjective, etc.) to each word in a sentence.

POS Tags Examples (Penn Treebank Tagset):

NN: Noun

VB: Verb (base form)

JJ: Adjective

RB: Adverb

IN: Preposition

PRP: Pronoun

DT: Determiner

Why POS Tagging is Important:

- Enables syntactic parsing.
- Helps in understanding sentence structure.
- Aids downstream tasks like Named Entity Recognition (NER), chunking, parsing, and machine translation.

Techniques Used in POS Tagging:

- Rule-based taggers: Apply hand-written rules to assign tags.
- Statistical taggers: Use models like Hidden Markov Models (HMMs).
- Machine learning-based taggers: Train classifiers (e.g., Maximum Entropy, CRF).

NLTK Tagger:

- The nltk.pos_tag() function uses a pre-trained Averaged Perceptron tagger.
- It uses the context of the word and its features to assign the most probable POS tag.

Conclusion:

The results obtained using NLTK (Natural Language Toolkit) show that it is a powerful library for performing various text processing tasks such as tokenization, stemming, lemmatization, stop-word removal, and part-of-speech tagging. The outputs confirm that NLTK efficiently breaks down text into meaningful components and helps in understanding linguistic patterns. Overall, the experiment demonstrates that NLTK provides a strong foundation for building and analyzing Natural Language Processing models.

CSDOL7011: Natural Language Processing Lab