Finolex Academy of Management and Technology, Ratnagiri

Department of Information Technology

Subject:	**Intelligent Systems (BEITL703)**		
Class:	**BE IT / Semester – VII (CBCGS) / Academic year: 2019-20**		
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Roll No:	**29**	**Date of performance (DOP) :**	
Assignment/Experiment No:	**10**	**Date of checking (DOC) :**	
Title: Case study on Natural Language Processing using Vlabs			
Marks:		**Teacher's Signature:**	

Aim: To study Natural Language Processing in artificial intelligence.

2. Prerequisites:

1. Learn basics of artificial intelligence.
2. Knowledge and reasoning in artificial intelligence.

3. Hardware Requirements:

1. PC with minimum 2GB RAM

4. Software Requirements:

1. Windows installed
2. Swi ProDT

5. Learning Objectives:

1. To study an expert system.
2. To Analyze the current expert system.

6. Course Objectives Applicable: CO 6

7. Program Outcomes Applicable: PO 2, PO 3, PO 4, PO 5, PO 6, PO 7, PO 8, PO 9, PO 11

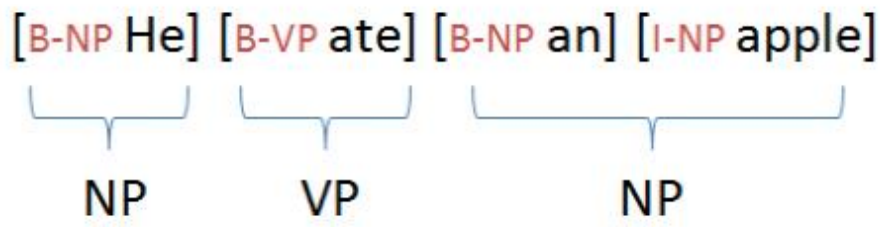
8. Program Education Objectives Applicable: PEO 2, PEO 3, PEO 4, PEO 5, PEO 6

Theory:

Chunking of text invloves dividing a text into syntactically correlated words. For example, the sentence 'He ate an apple.' can be divided as follows:

[NP He] [VP ate] [NP an apple]

Each chunk has an open boundary and close boundary that delimit the word groups as a minimal non-recursive unit. This can be formally expressed by using IOB prefixes.



Chunking of text invloves dividing a text into syntactically correlated words.

Eg: He ate an apple to satiate his hunger.

[NP He] [VP ate] [NP an apple] [VP to satiate] [NP his hunger]

Chunk Types

The chunk types are based on the syntactic category part. Besides the head a chunk also contains modifiers (like determiners, adjectives, postpositions in NPs).

The basic types of chunks in English are:

Chunk Type Tag Name

1. Noun NP

2. Verb VP

3. Adverb ADVP

4. Adjectivial ADJP

5. Prepositional PP

The basic Chunk Tag Set for Indian Languages

1 . Noun Chunk- NP

2.1 Finite Verb Chunk -VGF

2.2 Non-finite Verb Chunk -VGNF

2.3 Verb Chunk (Gerund) -VGNN

3. Adjectival Chunk- JJP

4. Adverb Chunk -RBP

1. NP Noun Chunks

Noun Chunks will be given the tag NP and include non-recursive noun phrases and postposition for Indian languages and preposition for English. Determiners, adjectives and other modifiers will be part of the noun chunk.

Eg:

(इस/DEM किताब/NN में/PSP)NP
'this' 'book' 'in'

((in/IN the/DT big/ADJ room/NN))NP

2. Verb Chunks

The verb chunks are marked as VP for English, however they would be of several types for Indian languages. A verb group will include the main verb and its auxiliaries, if any.

For English:

I (will/MD be/VB loved/VBD)VP

The types of verb chunks and their tags are described below.

2.1. VGF Finite Verb Chunk

The auxiliaries in the verb group mark the finiteness of the verb at the chunk level. Thus, any verb group which is finite will be tagged as VGF. For example,

Eg: मैंने घर पर (खाया/VM)VGF
'I erg''home' 'at''meal' 'ate'

2.2. VGNF Non-finite Verb Chunk

A non-finite verb chunk will be tagged as VGNF.

Eg: सेब (खाता/VM हुआ/VAUX)VGNF लड़का जा रहा है
'apple' 'eating' 'PROG' 'boy' go' 'PROG' 'is'

2.3. VGNN Gerunds

A verb chunk having a gerund will be annotated as VGNN.

Eg: शराब (पीना/VM)VGNN सेहत के लिए हानिकारक है sharAba
'liquor' 'drinking' 'heath' 'for' 'harmful' 'is'

3. JJP/ADJP Adjectival Chunk

An adjectival chunk will be tagged as ADJP for English and JJP for Indian languages. This chunk will consist of all adjectival chunks including the predicative adjectives.

Eg:

वह लड़की है (सुन्दर/JJ)JJP

The fruit is (ripe/JJ)ADJP

Note: Adjectives appearing before a noun will be grouped together within the noun chunk.

4. RBP/ADVP Adverb Chunk

This chunk will include all pure adverbial phrases.

Eg:

वह (धीरे-धीरे/RB)RBP चल रहा था
'he' 'slowly' 'walk' 'PROG' 'was'

He walks (slowly/ADV)/ADVP

PP Prepositional Chunk

This chunk type is present for only English and not for Indian languages. It consists of only the preposition and not the NP argument.

Eg:

(with/IN)PP a pen IOB prefixes

Each chunk has an open boundary and close boundary that delimit the word groups as a minimal non-recursive unit. This can be formally expressed by using IOB prefixes: B-CHUNK for the first word of the chunk and I-CHUNK for each other word in the chunk. Here is an example of the file format:

Tokens POS Chunk-Tags

He PRP B-NP

ate VBD B-VP

an DT B-NP

apple NN I-NP

to TO B-VP

satiate VB I-VP

his PRP$ B-NP

hunger NN I-NP

Objective

The objective of this experiment is to understand the concept of chunking and get familiar with the basic chunk tagset.

Procedure

STEP1: Select a language

STEP2: Select a sentence

STEP3: Select the corresponding chunk-tag for each word in the sentence and click the **Submit** button.

OUTPUT1: The submitted answer will be checked.

Click on **Get Answer** button for the correct answer.

Result:

---Select Language---

---Select a sentence---

John gave Mary a book.

LEXICON	POS	CHUNK		
John	NNP	B-NP		
gave	VBD	B-NP		
Mary	NNP	B-NP		
a	DT	B-NP		
book	NN	B-NP		

Submit

English

John gave Mary a book.

LEXICON	POS	CHUNK		
John	NNP	B-NP	✓	
gave	VBD	B-VP	✓	
Mary	NNP	B-NP	✓	
a	DT	B-NP	✓	
book	NN	I-NP	✓	

Submit

10. Learning Outcomes Achieved

1. Understanding the natural language processing using artificial intelligence.
2. Studying how chunking of words are done.

11. Conclusion:

Natural Language Processing focuses on interaction between computer and human .

References:

[1] Artificial Intelligence: A modern approach, Stuart Russel and Peter Norvig, Pearson.
[2] Artificial Intelligence, Elaine Rich and Kevin Knight, Tata McGraw.
[3] Principles of Artificial Intelligence, Nils J. Nilson, Narosa Publications.

Viva Questions

1. What is NLP?
2. What are the components of NLP?
3. What is programming analysis in NLP?
4. What are the functional areas of NLP?