BACHELOR OF TECHNOLOGY (CBCS) (2020 COURSE)
B.Tech.Sem - VI COMPUTER SCIENCE & ENGINEERING : SUMMER : 2024
SUBJECT: NATURAL LANGUAGE PROCESSING

Day : Friday
Date : 24/05/2024

S-24330-2024

Time : 02:30 PM-05:30 PM
Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable **CALCULATOR** is allowed.

Q.1 Discuss various stages of NLP ambiguity with suitable example. **(10)**

OR

Write formula for unigram and biagram model. Solve below example using biagram and trigram model **(10)**
Sentence: "about five minutes form....."

Q.2 Define concept of vector space model. Also solve below example to find cosine similarity of document. **(10)**
D_1= (0.5, 0.8, 0.3)
D_2= (0.9, 0.4, 0.2)
Q= (1.5, 1.0, 0)

OR

Describe the various common techniques used for extracting information form the text. **(10)**

Q.3 Describe the classification of POS- tagger in detail. **(10)**

OR

How ambiguity in POS tag is resolved using HMM-veterbi algorithm. Solve below example. **(10)**
Training corpus with POS Tags:

<S>	Martin	Justin	can	watch	Will	<E>
	N	N	M	V	N	
<S>	Spot	will	watch	Martin	<E>	
	N	M	V	N		
<S>	will	Justin	spot	Martin	<E>	
	M	N	V	N		
<S>	Martin	will	pat	spot	<E>	
	N	M	V	M		

Test Data

<S>	Justin	will	stop	Will </S>
POS Tag	N	N	V	N
		M	N	M

Q.4 Use Cky algorithm for PCFG to find most probable parse tree. **(10)**
Sentence – "The flight includes a meal"
CFG Rutes with Probabilities are:-
S → NP VP [0.8]
NP → Det N [0.3]
VP → V NP [0.20]
V → include [0.05]
Det → the [0.4]
Det → a [0.4]
N → Meal [0.001]
N → flight [0.02]

OR

Define the concept of parsing. Also explain concept of shift reduce parse. Solve below example using shift reduce parser- (10)

Grammar	Input string
$S \rightarrow S + S$	$a_1 - (a_2 + a_3)$
$S \rightarrow S - S$	
$S \rightarrow (S)$	
$S \rightarrow a$	

Q.5 Discuss the concept of Non-Negative Matrix Factorization with suitable example. (10)

OR

Apply concept of singular value decomposition on below matrix. (10)

$$A = \begin{bmatrix} 3 & 1 & 1 \\ -1 & 3 & 1 \end{bmatrix}$$

Q.6 Write a note on Web technologies and ontologies. (10)

OR

Write various library functions of NLTK with suitable example. (10)

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