

Seat No.: _____

Enrolment No. _____

NATIONAL FORENSIC SCIENCES UNIVERSITY
M.TECH. ARTIFICIAL INTELLIGENCE & DATA SCIENCE (SPECIALIZATION IN
CYBER SECURITY)
SEMESTER - II – JULY 2024

Subject Code: CTMTAIDS SII P3

Date: 12/07/2024

Subject Name: Natural Language Processing.

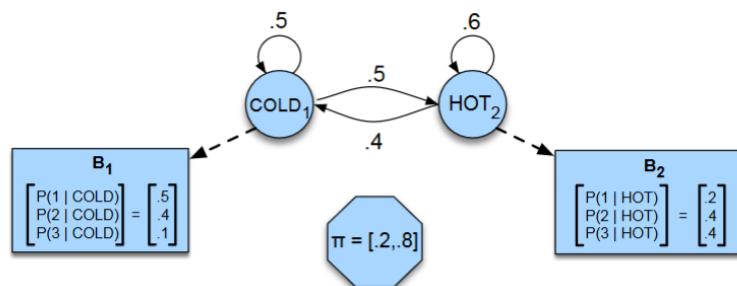
Time: 02:30 PM to 05:30 PM

Total Marks: 100

Instructions:

1. Write down each question on separate page.
2. Attempt all questions.
3. Make suitable assumptions wherever necessary.
4. Figures to the right indicate full marks.

		Marks
Q.1	Attempt any three.	
(a)	What are the advantages and Disadvantages of NLP. List and explain the challenges of NLP	8
(b)	Explain different types of Ambiguity.	8
(c)	Write an algorithm for the Minimum Edit Distance and Explain with example.	8
(d)	What is Markov Model and Markov Property. Explain with example	8
Q.2	Attempt any three.	
(a)	With a Neat Diagram Explain NLP Pipeline	8
(b)	Explain with example the Bag of Words.	8
(c)	Compute the best path through the hidden state space for the ice-cream eating events 3 1 3.	8



(d)	Define Mathematically Hidden Markov Model and explain with simple example.	8
Q.3	Attempt any three.	
(a)	Check whether the following grammar is valid or not for the given sentence of "baaba" using CKY. Show all the intermediate steps and show it in a table.	8

$S \rightarrow AB \mid BC$
 $A \rightarrow BA \mid a$
 $B \rightarrow CC \mid b$
 $C \rightarrow AB \mid a$

- (b) Write the First Order Logic for following statements. 8
 "All humans are mortal."
 "Some students are brilliant."
 "No dogs can fly"
 "If a person is a parent, then they have a child."
- (c) Draw the all possible top-down and bottom-up parsing tree for the given 8
 grammar. Show which tree is/are valid.
 "Book that flight"
 $S \rightarrow NP VP$
 $S \rightarrow VP$
 $VP \rightarrow V NP$
 $NP \rightarrow Det N$
 $Det \rightarrow \text{'that'}$
 $N \rightarrow \text{'flight'}$
 $V \rightarrow \text{'Book'}$
- (d) What is graph-based methods for Word Sense Disambiguation (WSD) and 8
 how to use them.

Q.4

Attempt any two.

- (a) What is Context Free Grammar. Formally define and explain with examples 7
 (b) Write formulae of any four N-gram Language Modelling (Probabilistic 7
 Model).
 (c) Convert the Following CFG into CNF Form. 7
 1. $S \rightarrow Aba$ 2. $S \rightarrow bA \mid aB$
 $A \rightarrow aab$ $A \rightarrow bAA \mid aS \mid a$
 $B \rightarrow Ac$ $B \rightarrow aBB \mid bS \mid b$

Q.5

Attempt any two.

- (a) List and explain with example about type of Word Senses 7
 (b) What is Penn Tree bank and what are its feature. List some Penn Treebank 7
 POS Tags
 (c) Explain Coherence and Coherence Reference Phenomena. 7

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