

2016

M.Sc.

3rd SEMESTER EXAMINATION

COMPUTER SCIENCE

PAPER—COS-303

Full Marks : 50

Time : 2 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

(Natural Language Processing)

Answer any four questions.

- 1. Describe the principle of Naive Bayes classifier for text classification in details. 10**
- 2. Define Noisy Text with example. Define Morpheme and Root Word with proper example. 4+(3+3)**
- 3. Briefly describe the major tasks that are to be performed to generate MCQ from natural language text. Describe the importance of stem generation or identification in MCQ generation task. 6+4**

(Turn Over)

4. Write short note on following topics : 5+5
- (a) Machine Learning ;
 - (b) Opinion Mining.
5. Draw the parse structure of the following sentences :
- (a) Indian Master Blaster Sachin Tendulkar holds the record of hitting most number of centuries, 6 in the history of World Cup Cricket.
 - (b) The General Theory of Relativity, one of the pillar of modern Physics was introduced in 1915 by the famous German born Scientist Albert Einstein.
- 5+5
6. Write down the importance of POS information in Named Entity Recognition Task. Write short note on Spelling Errors. 5+5

[Internal Assessment — 10 Marks]

(Pattern Recognition)

Answer any *four* questions : 4×10

1. (a) What do you mean by pattern recognition? Describe the components of pattern recognition system. 2+4
- (b) Describe unsupervised learning process. 4

2. (a) What do you mean by speech recognition? 3
(b) Write the categories of speech recognition system.
Describe template matching procedure. 2+5
3. (a) What is the meaning of Eager Learning? Give an
example of Eager Learner Method. 2+3
(b) Describe K-NN method for classification. 5
4. (a) What is cluster analysis? Write its applications. 2+3
(b) Describe the partitioning approach in clustering. 5
5. Write short notes (any four) : $4 \times 2 \frac{1}{2}$
(a) Feature selection ;
(b) Feature extraction ;
(c) ANN ;
(d) Supervised learning ;
(e) Good clustering ;
(f) Perplexity ;
(g) Arpabet.
6. What do you mean by synthetic pattern recognition?
Explain with block diagram. 3+7

7. (a) Write the differences between feature reduction and feature selection? 3
- (b) What is LDA? How LDA use in feature reduction and feature selection techniques? 2+5

[Internal Assessment — 10 Marks]

(Image Processing)

Answer any four questions : 4×10

1. Explain the fundamental steps of digital image processing. Explain neighbours of pixel and adjacency of pixel. 8+2
2. Explain the following techniques which are used in morphological operation : 4×2 $\frac{1}{2}$
 - (i) Erosion ;
 - (ii) Dilation ;
 - (iii) Opening ;
 - (iv) Closing.
3. Explain any two smoothing filter techniques in spatial domain and two sharpening filter technique in frequency domain with diagram. 5+5

4. (a) Compute the median value of the marked pixels shown below using 3×3 mark : 5

$$\begin{bmatrix} 18 & 22 & 33 & 25 & 32 & 24 \\ 34 & 128 & 24 & 172 & 26 & 23 \\ 22 & 19 & 32 & 31 & 28 & 26 \end{bmatrix}$$

- (b) Perform histogram equalization : 5

$$\begin{bmatrix} 4 & 4 & 4 & 4 & 4 \\ 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 4 & 4 & 4 & 4 \end{bmatrix}$$

5. (a) Define 4-connectivity, 8-connectivity and m-connectivity. 3
- (b) Explain bit plane slicing. 2
- (c) Explain various order statistics filters in image processing. 5
6. Write short notes on (any two) : 2×5
- (a) Power-low transformation ;
- (b) Thresholding ;
- (c) Image Segmentation ;
- (d) Chain code.

7. (a) What is image sampling and Quantization? 2
 (b) Find D_f and D_m for the following 2-D section with
 $V = \{0, 1\}$ and $V = \{1, 2\}$ between P and q : 6

	5	4	3	1	1	(q)
	5	4	0	2	0	
	3	2	0	2	4	
	2	1	1	3	5	
(P)	1	3	5	1	3	

- (c) What is the importance of image enhancement? 2

[Internal Assessment -- 10 Marks]

(Cloud Computing)

Answer Q. No. 1 and any *three* from the rest.

1. Answer any *five* : 5×2
- (a) Define cloud.
- (b) What do you mean by 'Service' in 'Service-Oriented Computing'?
- (c) What is Web 2.0? Give few examples of Web 2.0 applications.
- (d) What is Hybrid / Inter clouds?

- (e) How is feature 'Aggregation' are implemented in Virtualization of the execution environment ?
- (f) What is Utility Computing ?
- (g) List some of the challenges in cloud computing.
2. (a) Briefly summarize the cloud computing reference model.
- (b) What are the major distributed computing technologies that led to cloud computing.
- 5+5
3. (a) Briefly explain the different service models of cloud computing.
- (b) Describe the vision introduced by cloud computing.
- 5+5
4. (a) What is Virtualization and what are its benefits ?
- (b) Discuss the characteristics of Virtualized environments.
- (2+3)+5
5. (a) Discuss machine reference model of execution Virtualization.
- (b) Briefly explain the three theorems that hardware instructions need to satisfy in order to efficiently support Virtualization.
- 4+6

6. Write short notes on (any four) :

$4 \times 2\frac{1}{2}$

- (a) Amazon Web Services (AWS) ;
- (b) Manjrasoft Aneka ;
- (c) Hadoop ;
- (d) Hypervisor ;
- (e) Microsoft Azure ;
- (f) Quality of Service (QoS).

[Internal Assessment — 10 Marks]
