

4/6/2012

SEM (R) - Comp - Soft computing

WS
Con. 4679-12.

(REVISED COURSE)
(3 Hours)

GN-9047
[Total Marks : 100

- N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any four questions out of the remaining.
(3) Figures to the right indicate full marks.

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|---|---|----|
| 1 | A. Explain fuzzy extension principle with the help of an example. | 06 |
| | B. Explain Mc Culloch Pitts Neuron Model with help of an example. | 06 |
| | C. Explain standard fuzzy membership functions. | 08 |
| 2 | Design a fuzzy logic controller for a domestic washing machine with two Inputs dirtiness of the load and weight of the laundry and output as amount of detergent used. Use five descriptors for each linguistic variable. Generate a set of rules for control action and defuzzification. | 20 |
| 3 | A. What is learning in Neural Networks? Compare different learning rules. | 10 |
| | B. Explain error back propagation training algorithm with the help of a flowchart. | 10 |
| 4 | A. Determine the weights after one iteration for hebbian learning of a single neuron network starting with initial weights $w = [1, -1]$, inputs as $X1 = [1, -2]$, $X2 = [2, 3]$, $X3 = [1, -1]$ and $c = 1$.
Use (i) Bipolar binary activation function
(ii) Bipolar continuous activation function | 12 |
| | B. Explain Perceptron Learning with the help of an example. | 08 |
| 5 | A. Explain with examples linearly separable and non-linearly separable pattern classification. | 10 |
| | B. Explain the three types of Fuzzy Inference Systems in detail. | 10 |
| 6 | A. Explain Travelling Salesperson Problem using Simulated Annealing. | 10 |
| | B. Explain RBF network and give the comparison between RBF and MLP. | 10 |
| 7 | Write notes on any two of the following | 20 |
| | A. Derivative based Optimization method of steepest descent | |
| | B. Learning Vector Quantization | |
| | C. ANFIS Application - Printed Character Recognition | |
| | D. Kohonen's Self Organizing Network | |

Con. 4511-12.

(REVISED COURSE)

GN-8492

(3 Hours)

[Total Marks : 100

- N.B.:
1. Question No. 1 is **compulsory**.
 2. Attempt any **four** questions from out of **six** questions remaining.
 3. Assume data if required and state it clearly.

- Q.1:
- a) What are eight security mechanisms to implement security? (5)
 - b) Distinguish between attack, vulnerability and access control (5)
 - c) What is Feistel Cipher? (5)
 - d) What is CAPTCHA? (5)
- Q.2:
- a) What is race condition? Describe an example of a race conditions. (10)
 - b) What is distinction between a polymorphic and a metamorphic worm? (5)
 - c) What is a double transposition cipher? Describe it with example. (5)
- Q.3:
- a) What are block cipher algorithmic modes? Describe any two modes. (10)
 - b) What are firewall design principles? (10)
- Q.4:
- a) What is the principle behind One-Time-Pads (OTP)? Why they are **highly** secure? (10)
 - b) What is biometric authentication? What are two parameters defined for biometric measurement? (10)
- Q.5:
- a) Describe the different vulnerabilities in enterprise network with **real examples**. (10)
 - b) What is Digital Rights Management (DRM)? Describe DRM for P2P application. (10)
- Q.6:
- a) What are strengths and limitations Intrusion Detection System? (10)
 - b) Using the RSA algorithm, encrypt the following: (10)
 - i. $p=3, q=11, e=7, M=12$
 - ii. $p=7, q=11, e=17, M=25$
 - iii. Find the corresponding d_s for (i) and (ii) and decrypt the ciphertexts.
- Q.7: Solve the following: (any three): (20)
- a) AES
 - b) SSL/TLS
 - c) Honeypots
 - d) MD5

(3 Hours)

[Total Marks : 100

N.B. (1) Question No. 1 is compulsory.(2) Attempt any **four** questions out of remaining **six** questions.

- (a) List the entities of mobile IP and describe data transfer from a mobile node to a fixed node and vice versa. 5
- (b) What advantages does the use of IPV6 offer for mobility ? 5
- (c) How much of the original GSM network does GPRS need ? Which elements of the network perform the data transfer ? 5
- (d) What is Hidden and Exposed terminal problem ? Discuss solutions to these problems. 5
2. (a) Explain how the power management is done in IEEE 802.11 infrastructure based and adhoc networks. 10
- (b) Draw and explain architecture of GPRS network. 10
3. (a) Explain IP-in-IP, minimal and Generic encapsulation. Also discuss their merits and demerits. 10
- (b) Explain snooping TCP and mobile TCP with their merits and demerits. 10
4. (a) Why is routing in multi-hop adhoc networks complicated ? What are the special challenges ? 10
- (b) What characteristics do the different orbits have ? What are their pros and cons ? 10
5. (a) Explain Bluetooth protocol stack with neat diagram. 10
- (b) What are the functions of Authentication and Encryption in GSM ? 10
6. (a) Explain WATM reference model with several access scenarios. 10
- (b) What are the main benefits of Spread Spectrum system ? Explain direct sequence spread spectrum in detail. How can DSSS systems benefit from multipath propagation ? 10
7. Write short notes on any **four** of the following :— 20
- (a) Mobile agents
- (b) UMTS architecture and its domain
- (c) WML
- (d) CDMA
- (e) HIPERLAN.

- N.B. :** (1) Question No. 1 is compulsory.
(2) Attempt any **four** questions out of the remaining **six** questions.
(3) Assume **suitable** data if **necessary**.

1. Justify/contradict the following statements 20

- (a) Laplacian is better than gradient for detection of edges.
- (b) For digital image having salt and pepper noise, median filter is the best filter.
- (c) Unit Ramp signal is neither Energy nor Power Signal.
- (d) Lossy compression is not suitable for compressing executable files.

(a) Perform Histogram Equalization for following. Obtain a plot of original as well as Equalized Histogram. 10

Intensity	0	1	2	3	4	5	6	7
No of Pixels	70	100	40	60	0	80	10	40

(b) A Casual FIR system has three cascaded block, first two of them have individual Impulse responses. $h_1(n) = \{1, 2, 2\}$ $h_2(n) = u(n) - u(n-2)$ Find Impulse response of third block $h_3(n)$, If an overall impulse response is $h(n) = \{2, 5, 6, 3, 2, 2\}$ 10

3. (a) Explain in detail enhancement techniques in Spatial Domain used for images. 08
(b) Explain Homomorphic filtering in detail. 06
(c) Find the DFT of the given image. 06

0	1	2	1
1	2	3	2
2	3	4	3
1	3	2	3

4. (a) Define 10
i) Euclidean distance
ii) City block distance
iii) Chess board distance
(iv) m. connectivity

(b) Find DFT of given sequence (Use DITFFT Algorithm) $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$ 10

5. (a) Explain the method of segmentation of images by Region splitting and merging. 10

(b) Given below is the table of 8 symbols and their frequency of occurrences Give Huffman code for each symbol. 10

Symbol	S1	S2	S3	S4	S5	S6	S7	S8
Frequency	0.25	0.15	0.06	0.08	0.21	0.14	0.07	0.04

6. (a) Perform the convolution of the following two sequences using Z-transforms. 08
 $x(n) = (0.2)^n u(n)$ and $h(n) = (0.3)^n u(n)$

(b) Find inverse Z-Transform 06
 $H(z) = 1 / [1 - 3z^{-1} + 0.5z^{-2}] \quad |z| > 1$

(c) What is difference between image restoration and image enhancement? What do they have in common 06

7. Write short notes on : 20

(a) Discrete Cosine Transform

(b) Sampling and Quantization

(c) Hough Transform

(d) Wavelet Transform