OBJECTIVE AND RELEVANCE

Artificial neural networks is introduced and properties & compositions of neural networks and learning process & statistical properties and LMS algorithm and Back propagation algorithms and single & multi layer perceptions, self organized maps and introduces neurodynamcis and Hopfield models.

Scope:- Neural networks, an emerging technique in artificial Intelligence, has a strong appeal for a wide range of applications. Devoted to the science and technology of neural networks, which disclose significant technical knowledge, exploratory developments and applications of n.netlow's from biology to s/w to h/w.

Prequeisites:- Requires the

1. Basic knowledge of networking.
2. Knowledge odf discrete mathematics.

Syllabus – JNTU

UNIT – I
OBJECTIVE:-
Upon completion of this unit the students will know the qualitative terms like neural networks, their properties, compositions and how they relate to artificial Intelligence.

Syllabus:-
INTODUCTION:- What is neural network? Human Brain, Models of a Neuron, Neural Networks viewed as directed graphs, Network Architectures, Knowledge representation, Artificial Intellegence and Neural Networks.

UNIT-II
OBJECTIVE:-
In this unit students will know about the overview of many facts of the learning process and its statistical properties.

Syllabus:- Learning process: Error correction learning, memory based learning, credit assignment problem, memory adaption, statistical nature of the learning process.

UNIT-III
OBJECTIVE:- upon completion of this unit the students understands the simplest class of neural network part and LMS algorithm and and the perception convergence theorem.

Syllabus:- Single layer perceptions.
Adaptive filtering problem, unconstrained optimization techniques, linear least square filters, least mean square algorithm, learning curves, learning rate annealing techniques. Perception – convergence theorem, relation b/w perception and bayes classifer for a Gaussian Environment.

UNIT-IV
OBJECTIVE:- In this unit the students will know about exhaustive treatment of multilayer perceptions trained with the back-propagation algorithm.

Syllabus:-
Multilayer perception:- Back Propagation algorithm XOR problem, Heuristics, Output representation and decision rule, computer experiment, feature detection.

UNIT-V
OBJECTIVE:- The accept of Hessian matrix (used in optimization) is introduced. Network printing techniques to improve performance are discussed.

Syllabus:-
BACK PROPAGATION:- back propagation and differentiation, Hessian matrix, Generalization, cross validation, Network pruning techniques, virtues and limitations of back propagation learning, Accelerated convergence, supervised learning.

UNIT-VI
OBJECTIVE:- End of this unit the students will understands about mapping models, som alogorithm & some simplation techniques and also understands self-organized learning like competitive learning to construct a computational maps known as self organized maps.

Syllabus:-
SELF ORGANIZATION MAPS:Two basic feature mapping models, Self organization map, SOM algorithm, properties of featuere map, computer simulations, learning vector quantization, Adaptive patter classification.

UNIT – VII
OBJECTIVE:
The student is exposed to dynamic systems and stability aspects of such systems. the concepts of attraction is introduced and neurodynamic models are discussed. Relationship between additive and relative models described.

SYLLABUS:- Neuro Dynamics – Dynamcial systems, stavility of equilibrium status, attractors, neuro dynamical models, manipulation of attractors as a recurrent network paradigm

UNIT – VIII
OBJECTIVE:- upon completion of this unit the students understands the associative memory and Hop field models.

SYLLABUS:-
HOPFIELD MODELS:- Hopfield models, computer experiment.

Gate Syllabus:-
NOT Applicable

IES Syllabus:-
NOT Applicable

SUGGESTED BOOKS:

TEXT BOOKS:-
1. Neural networks A comprehensive foundations.
   Simon Hhaykin, Pearson Education, 2nd edition 2004.

REFERENCE BOOKS:-
1. Artificial neural networks – B. Vegnanarayana prentice Hall of India Pvt. Ltd 2005.
2. Neural networks in computer in computer Intelligence, LIMIN FUTMH 2003.
3. Neural Networks James A Freeman David MS Kapura Person Education 2004.

WEBSITES:- 1. http://www.mathworks.com/books/Neural/Fuzzy
2. www.intel.com
3. www.ece.uiuc.edu
4. www.neuralinfo.com
5. www.pearsoned .co.uk
6. www.bbdbestoff.com/importers
7. www.ieee.org
8. www.ieee-cis.org

EXPERTS DETAILS:-

NATIONAL:-
1. Mr. S.Jagannathan and A. Yesildirek
   University of Network : Taylor & Francis
   Email: jaganathan@cs.francis.edu

2. Mr.Jie Huang
   University of Hongkong (Chinese)
   Email: Huang@Hk.chinese.edu

REGIONAL:-

1. Prof. William W.Armstrong
   University of IIT-Banglore
   Website: www.cs.ualberta.ca
2. Jonathan Shapiro
   University of HW-Hyderabad
   Website: www.cs.manchester.ac.in

Sl No.	Topics in JNTU	Modules and sub modules	Lecture Number	Suggest Books	Remarks
		UNIT – I			
1.	Introduction What is Neural Network	Fundamentals of Networks. Benefits of Neural Networks.	L1	T1-Ch1,R1-Ch1	
2.	Human Brain	Human Brain	L2	T1-Ch1,R1-Ch1	
3.	Models of a Neuron	Types of activation function, stochastic model of a Neuron	L3	T1-Ch1,R1-Ch1	
4.	Neural Networks viewed as a directed Graphs	Directed Graphs representation	L4	T1-Ch1,R1-Ch1	
	Network Architecture	Single layer feed forward Networks, multiplayer L4feed forward networks. Recurrent networks	L4	T1-Ch1	
5.	Knowledge representation	How to build prior information into Neural Network design. How to build in variances into Neural Network design	L5	T1-Ch1	
6.	Artificial Intelligence and Neural Networks	About artificial Intelligence and Neural Networks	L6	T1-Ch1,R1-Ch1	
UNIT-II					
7.	Learning Process	-	L7	T1-Ch2,R1-Ch1 R1-Ch2	
8.	Error Correction Learning	-			
9.	Memory based learning	-	L8	T1-Ch2,R1-Ch2	
10.	Hebbian Learning	Mathematical Modes of Hebbian Modifications			
11.	Competitive & Boltzmann learning	-	L9	T1-Ch2,R1-Ch2	
12.	Credit Assignment problem	-	L10	T1-Ch2,R1-Ch2	
13.	Memory	Correction matix memory, Recall			
14.	Adaption		L11	R1-Ch2,T1-Ch2 R1-Ch3	
15.	Statical nature of the learning process	Bias/Variance Dilemma			
UNIT-III					
16.	Single layer	-	L12	T1-Ch3	

	perceptions			R1-Ch4	
17.	Adaptive filtering problem	-			
18.	Unconstrained organization Techniques	Method of steepest descent, Newtons method, Gauss-Newton Method	43	T1-Ch3 R1-Appendix B	
19.	Linear least squares filter	Wiener Fitter			
20.	Least-Mean Square Algorithm	Signal flow graph representation of LMS Alg. Convergence considerations of the LMS algorithm virtues and limitations of LMS Alg.	L14	T1-Ch3 R1-Appendix B	
21.	Learning curves	-	L15	T1-Ch3 R1-Appendix	
22.	Learning rate annealing techniques				
23.	Perception	Perception convergence theorem	L16	T1-Ch3,R1-Ch4	
24.	Relation b/w the perecetion and Bayes classifier for a Guassian Environment	Bayes classifier, Bayes classifier for a Guassian Distribution	L17	T1-Ch3,R1-Ch7	
		UNIT – IV			
25.	Multilayer perception	Notation	L18	R1-Ch4,T1-Ch4	
26.	Back propagation Algorithm	Two passes of composition, Activation function rate of learning, Sequential & Batch modes of Training			
27.	X-OR problem	-	L19	T1-Ch4,R1-Ch7	
28.	Heuristics	Back-propagation Alg. Perform better	L20	T1-Ch4,R1-Ch4	
29.	Output representation & decision rule	-	L21	T1-Ch4	
30.	Computer Experiment	Bayesian Decision Boundary Optimal no. of hidden neurons. Optical learning & momentum constants	L22	T1-Ch4,R1-Ch8	
31.	Future Detection	Evalution of optimal Network design Relation to Fisher's linear Discriminent	L23	T1-Ch4	
		UNIT-V			
32.	Back Propagation	Back propagation and differentiation	L24	T1-Ch4	
33.	Hessian Matrix	-	L25	R1-Appendix A T1-Ch4,R1-Ch4	
34.	Generalization	Sufficient Training. Set size for a valid Generalization			
35.	Cross Validation	Model Selection Early stopping method of training Variants of cross-Validation	L26	T1-Ch4 R1-Appendix D	
36.	Network Pruning Techniques	Complexity Regularization Weight. Deccay Weight Elimination.	L27	T1-Ch4,R1-Ch7	

		Approximate Smoother			
		Hessian-based Network Pruning, computing the inverse Hessian matrix	L28	T1-Ch4 R1-Appendix B	
37.	Virtues and limitations of back propagation learning	Connectionsim, feature detection, function approximation, computational efficiency.	L29	T1-Ch4	
		Sensitivity Analysis, Robustness, convergence, local minima, scaling	L30	T1-Ch4	
38.	Accelerated Convergence	-	L31	T1-Ch4,R1-Ch4	
39.	Supervised learning	Conjugate-Gradient Method			
UNIT-VI					
40.	Self organizing maps	-	L32	T1-Ch9,R1-Ch6 R1-Ch7	
41.	Two basic feature mapping models	-			
42.	Self-organizing map	Competitive process Cooperative process Adaptive process	L33	T1-Ch9,R1-Ch6	
43.	SOM Algorithm	Two phases of the adaptive process Summary of SOM Algorithm	L34	T1-Ch9,R1-Ch6	
44.	Properties of feature map	-	L35	T1-Ch9,R1-Ch6	
45.	Computer simulations	Two dimensional lattice Driven by a Two-dimensional distribution One-dimensional lattice division by Two-dimensional Distribution	L36	T1-Ch9,R1-Ch6	
		Parameter specifications for the simulations	L37	T1-Ch9	
46.	Learning vector quantization	-	L38	T1-Ch9,R1-Ch6	
47.	Adaptive pattern classification	-	L39	T1-Ch9,R1-Ch2	
UNIT-VII					
48.	Neuro Dynamics	Introduction	L40	T1-Ch14	
49.	Dynamical systems	State space, Lipschitz condition, Divergence Theorem	L41	T1-Ch14 R1-Appendix	
50.	Stability of equilibrium status	Definition of stability examples	L42	T1-Ch14 R1-Ch2, Ch3	
51.	Attractors	Hyperbolic Attractors	L43	T1-Ch14,R1-Ch2	
52.	Neurodynamical models	Additive model Related models	L44	T1-Ch14 R1-Ch2	
53.	Manipulation of attractors as a recurrent network paradigm	-	L45	T1-Ch14	
UNIT-VIII					
54.	Hopfield models	-	L46	T1-Ch14	
		Relation b/w the stable status of the discrete and continuous	L47	T1-Ch4,R1-Ch5	

		versions of the Hopfield model			
		The discrete Hopfield model as a content addressable memory	L48	T1-Ch14,R1-Ch5	
55.	Computer Experiment-1	-	L49	T1-Ch14	
		Examples	L50	T1-Ch14	

QUESTION BANK

UNIT-I

1 (a)How do you Justify that brain is a parallel distributed processing system?
(b)Explain the structure of a brain? [Feb-2007]

2 (a)Explain about biological neuron with neat diagram?
(b) Explain detail the properties of biological neuron?
(c)Compare:biological neuron and artificial neuron?[Feb 2007] supply

3 (a)with the help of a neat diagram explain the analogy of a logical neuron?
(b)Explain what is an artificial neural network and show how a basic ANN is constructed using a biological neuron?[Feb-2007 supply]

4 Discuss the classification of neural nets based on training architecture and activation functions used?[Feb-2007]

5 (a)Explain the significance of acting potential and resting potential in the neural cells?
(b)explain briefly how information in processed in neural networks?[Feb-2007]

6 What is neural Networks? And explain benefits of neural networks?[T1-ch1]

7 Explain the models of neuron?[T1-ch1]

8 Explain about main role of artificial intelligence in neural networks?[T1-ch1]

9 Explain about knowledge representation in neural networks.Write briefly about rules of knowledge representation[T1-ch1]

10 (a)Explain about single layer&multilayer feed forward networks?
(b)Explain about recurrent networks?[T1-ch1]

11 Construct fully recurrent network with 5 neurons,but with no self-feed back? [T1-ch1]

12 Consider a mutilayer feedforward n/w all the neurons of which operate in their linear regions?Justify the statement that such a n/w is equivalent to a single layer feed forward n/w [T1-ch1]

13 A fully connected feedforward n/w has 10 source nodes,2 hiddenlayers,one with 4 neurons and the other with 3 neurons, and a single o/p neuron.Construct an arichitectural graph of this network?[T1-ch1]

14 Consider the following two functions?

(a) $\varphi(\vartheta) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\tilde{}} \exp(-\frac{x2}{2})dx$

(b) $\varphi(\vartheta) = \frac{2}{\pi} \tan\text{-}1\,(\vartheta)$ [T1-ch1]

Explain why both of these functions fit the requirements of a sigmoid functions.How do these two functions differ from each other?

15 an odd sigmoid function is defined by {T1-ch1]

$$\varphi(\vartheta) = \frac{1-\exp(-a\vartheta)}{1+\exp(-a\vartheta)}$$

$$= \tanh(\frac{a\vartheta}{2})$$

Where tanh denotes a hyperbolic tangent.The limiting values of this second sigmoid functions are -1 and -1 shows that derivative of $\varphi(\vartheta)$ with respect to ϑ is given by

$$\frac{d\varphi}{d\vartheta} = \frac{a}{2}[1-\varphi^2(\vartheta)$$

16 Explain about stochastic model of a neuron?[T1-ch1]

17 Explain about Network Architecture?[T1-ch1]

18 How to build into Neurol Network design?[T1-ch1]

19 Neuron model based on the logistic function? $\varphi(\vartheta) = \frac{1}{1+\exp(-\vartheta)}$

20 Consider function: $\varphi(\vartheta) = \frac{2}{\pi}\tan^{-1}(\vartheta)$

This function fit the requirements of Signoid function? [T1-ch1]

21 Describe various types of activation function with their expression and benefits.

[T1-ch1]

UNIT-II

1 Explain in detail the concepts of transient state,steady state equilibrium state and stable state? [T1-ch2]

2 Explain in detail the differences between competitive learning and differential competitive learning? [Feb-2007]

3 Write notes on: [Feb-2007]
(a) Error correction learning
(b) Reinforcement learning

4 Explain the Kohonen's method of un supervised learning?Discuss any example as its application? [Feb-2007]

5 (a)what is meant by learning process?
(b)Explain about error correction learning? [T!-ch2]

6 Explain about memory-based learning? [T!-ch2]

7 Explain about Hebbian learning? [T1-ch2]

8 Explain about mathematical models of Hebbian modifications? [T1-ch2]

9 Explain about competitive learning? [T1-ch2]

10 Explain about bottzmann learning? [T1-ch2]

11 Explain about credit assignment problem? [T1-ch2]

12 (a)Explain about memory of neural networks? [T1-ch2]
(b)Explain correction matrix memory? [T1-ch2]

13 Consider the correction matrix memory problem [T1-ch2]

$X=[0.8,-0.15,0.15,-0.20]^T$
(a)Calculate the memory response Y?
(b)Show that the response Y is closest to the stored pattern Y_1 Eculidean sense?

14 Consider the following Orthogonal sets of key pattern applied to a correction matrix memory

$X_1=[1,0,0,0]^T$
$X_2=[0,1,0,0]^T$
$X_3=[0,0,1,0]^T$ [T1-ch2]
(a)Calculate the memory matrix M?
(b)Show that the memory associative perfectly?

15 An autoassociative memory is trained on the followed key vectors

$$X_1 = \frac{1}{4}[-2,-3,\sqrt{3}]^T$$

$$X_2 = \frac{1}{4}[-2,-2,-\sqrt{8}]^T$$

$$X_3 = \frac{1}{4}[3,-1,\sqrt{6}]^T$$

(a)Caculate the angels between these vectors?How close are they to othogonality with respect to each other? [T1-ch2]

16 The Hebbian Synapse described in eq[2-9] involves the use of positive feedback.Justify the validity of this statement? [T1-ch2]

17 (a)Explain about Hebb's hypothesis? [T1-ch2]
(b)Covariance hypothesis?

18 Explain about reinforcement learning or neurodynamic programming? [T1-ch2]

19 Explain about [T1-ch2]
(a)pattern association
(b)pattern recognition

20 Explain about [T1-ch2]
(a)memorytechniques
(b)Beainforming
(c)Control
(d)Filtering

21 Describe briefly delta rule and Hebb's rule and how these rules differ from each Other

UNIT-III

1 State and prove perception convergence theorem? [Feb-2007]

2 Write and discuss about R-category discrete perception training algorithm [Feb-2007]

3 Explain the backpropogation algorithm and derive the expressions for weight up date relations? [Feb-2007]

4 Write and discuss about single layer continuous perception Training Alogorithm? [Feb-2007]

5 Describe why a single layer perception network can't learn the EXCLUSIVE-OR Logic.Show how a two layer n\w can accomplish such a tasks? [Feb-2007]

6 The perception may be used to perform numerous logic functions.Demonstrate the implementation of binary logic functions AND,OR and COMPLEMENT [T1-ch3]

7 A basic limitation of the perception if that it cannot implement the EXCLUSIVE OR function.Explain the reasons for this limitation [T1-ch3]

8 Explain about adaptive filtering problem? [T1-ch3]

9 Explain Optimization Techniques? [T1-ch3]

10 Explain gauss-Newton method? [T1-ch3]

11 Explain about least-mean square algorithm? [T1-ch3]

12 (a)Explain about limitations of the LMS algorithm? [T1-ch3]

(b)Explain about learning rate anneaing schedules? [T1-ch3]

13 Write brief notes on Bayersclassifier? [T1-ch3]

14 Explore the methods of steepest descent involving a single weight ω by considering the following cost function?

$$\varepsilon(\omega) = \frac{1}{2}\sigma^2 - rxdw + \frac{1}{2}r_x\omega^2$$

Where σ^2, r_{xd}, and r_x are constants

15 Consider two one-dimensional,Guassian-distributed dasses θ_1 and θ_2 that have a common variable equal to 1.Their mean values are

$\mu_1 = -10 \quad \mu_2 = +10$

These two classes are essentially linearly saparable.Design a classifier that Saparable these two classes? [T1-ch3]

16 Write about signal-flow graph representation of the LMS algorithm? [T1-ch3]

17 In the LMS Newton algorithm the gradiant vector 'g' is replaced by its instantaneous value.Show that this algorithm incorporating a learning rate parameter η is described by

$$\hat{\omega}(n+1) = \hat{\omega}(n) + \eta R_x^{-1} x(n)(d(n) - x^T(n)\omega(n))$$

18 Eq (3.86)(3.87) define the weight vector and bios of the Bayes classifier for a guassian environment.Determine the composition of this classifier for the case when the co-variance matrix C is defined by [T1-ch3]

$C = \sigma^2 I$

Where σ^2 is constant

19 Explain(or) write about applications of Gauss-newton method and weight update Method [T1-ch3]

20 What are the advantages and disadvantages of single layer as well as multilayer Percepsions [T1-ch3]

UNIT-IV

1 Write a neat block diagram and flowchart of explain error back propagation algorithm? [Feb-2007]

2 Derive the learning rule for back propagation n\w what are the major Drawbacks? suggest solution to overcome these drawbacks? [Feb-07]

3 Demonstrate the main features of error back propagation algorithm applied to two layer n\w with an example? [Feb-07]

4 Explain about X-OR problem? [T1-ch4]

5 Explain about
(a)Activation function (b) Rate of learning [T1-ch4]

6 Write a notes on sequential and batch modes of training? [T1-ch4]

7 The momentum constant α is normally assigned a '+' ve value in the range of $0 \le \alpha < 1$ investigate the difference that would be made in the behavior of eq[4.41] with respect to time t if α was assigned a '-'ve value in the range $-1 < \alpha \le 0$ [T1-ch4]

8 Explain about Heuristics for making the back propagation algorithm [T1-ch4]

9 How can you represent the output representation and decision rule? [T1-ch4]

10 Explain and write Bayesian decision boundary? [T1-ch4]

11 Explain about optimal number of hidden neurons? [T1-ch4]

12 Explain about optimal learning and momentum constants? [T1-ch4]

13 explain about two passes of computation in back propagation algorithm? [T1-ch4]

14 Explain about evaluation of optimal network design? [T1-ch4]

15 Explain about feature learning detection in back propagation learning? [T1-ch4]

16 What is the relation to Fisher's Linear Discriminent? [T1-ch4]

17 Use the Back-propagation algorithm for computing a set of synaptic weights and Bias rules for a neural network structured in fig 4.8 to solve X-OR problems Assume use of logistic function for the non-linearity [T1-ch4]

18 what is the difference between Antisymmetric activation function and non-symmetric activation function? [T1-ch4]

19 Explain about sequential Vs Batch updates?[T1-ch4]

20 Explain the back-propagation learning algorithm with signal-flow graph [T1-ch4]

UNIT-V

1 Discuss how vector field method can be used to illustrate the real time phenomena in n\w's with finite gain neurons? [Feb-07]

2 Explain about the recursive asynchronous update of corrupted digit 4? [Feb-07]

3 Explain about crass validation in back propagation algorithm? [T1-ch4]

4 Explain about generalization technique?

5 Write about
(a) Sensitivity analysis (b) Robustness [T1-ch4]

6 Explain about
(a) Convergence (b)local minima (c) Scaling [T1-ch4]

7 Write brief description about Hessian matrix? [T1-ch4]

8 Write comparisons b\w Quasi-Newton methods with conjugale-gradient methods? [T1-ch4]

9 Explain about accelerated convergence? [T1-ch4]

10 Write about virtues and limitations of back propagation learning? [T1-ch4]

11 Write short notes on conjugate-gradient method? [T1-ch4]

12 Explain about back propagation and differentiation? [T1-ch4]

13 Explain about appropriations of functions? [T1-ch4]

14 Write a notes on
(a) Weight Decay (b) weight climination
(c) Approximate Smoother [T1-ch4]

15 Compute the method of inverse Hessian matrix? [T1-ch4]

16 Explain about
(a) Function approximation (b) Computational efficiency [T1-ch4]

17 Write the Heuristics of accelerated convergence of back propagation learning? [T1-ch4]

18 Write descriptions about convolutional networks? [T1-ch4]

19 Starting from the cost function defined in eq(4.70) derive the minimizing solution of eq(4.72) and the min value of the cost function defined in eq(4.73)? [T1-ch4]

20 statistical criterion for model selection,such as Rissanens minimum description Length (MPL) criterion and an inf- theoretic criterion(AIC) due to akaike share a Common form of composition

$$\begin{pmatrix} \text{mod } elcomplexity \\ criterion \end{pmatrix} = \begin{pmatrix} \log - likelihood \\ function \end{pmatrix} + \begin{pmatrix} \text{mod } elcomplexity \\ penality \end{pmatrix}$$

Discuss how the weight decay and weight elimination methods used for network Pruning fit into this formalism? [T1-ch4]

21 Explain the Kohen's method of unsupervised learning.discuss any example as it's Application? [Feb-07]

UNIT-VI

1 Describe how a neural networks may be trained for a pattern recognition task Illustrate with an example [Sep-07]

2 What are kohonen's self-organizing maps?Explain the architecture and the Training algorithm used for kohenen's SOMS? [Sep-07]

3 Write a short notes on Grossberg layer and its training.Explain with an Example?[Sep-07]

4 Explain the operation of counter propagation with suitable network model and

give the equations for training [Sep-07]

5 Explain the architecture of ART-1 neural networks with emphasis on the function Of each part.What is the importance of the vigilance parameter in its working [Sep-07]

6 Write about two basic feature mapping models? [T1-ch9]

7 Explain about self organizing-map? [T1-ch9]

8 Explain about
(a) Competitive process (b) cooperative process [T1-ch9]

9 Explain about adaptive process? And also explain two phases of adaptive Process? [T1-ch9]

10 Explain about kohenen's SOH algorithm with some factors? [T1-ch9]

11 Explain about properties of the feature map? [T1-ch9]

12 Explain about Density matching? And Topological ordering? [T1-ch9]

13 Explain about two-dimensional lattice distribution? [T1-ch9]

14 Explain about one-dimensional lattice distribution? [T1-ch9]

15 Explain about parameters effected for simulations? [T1-ch9]

16 What is meant by learning vector quantization,explain briefly? [T1-ch9]

17 Explain about adaptive pattern classification with examples? [T1-ch9]

18 Explain about hierarchical vector quantization?with example? [T1-ch9]

19 Explain about contextual maps? [T1-ch9]

20 Explain (or) compare the self organizing map and hebb's postulate of learning? [T1-ch9]

UNIT-VII

1. Draw the architecture of feed forward type and recurrent type neural network and explain that difference? [Feb-07]
2. Discuss about the stability property of the dynamical system taking example? [Feb-07]
3. What are the various active building blocks of neural networks? Explain the current mirror and inverter based neuron in detail? [Feb-07]
4. ART network exploits in full one of the inherent advantages of neural computing technique, namely parallel process Explain? [Feb-07]

5. Describe the architecture and operation of ART2 networks? [Feb-07]
6. Explain the architecture of ART-1 neural networks with emphasis on the function of each part. What is the importance of the vigilance parameter in its working? [Feb-07]
7. State the linear programming problem? Explain how to solve optimization problems using neural networks? [Feb-07]
8. Explain how neurocomputing circuits can be modeled using digital and analog circuits? [Feb-07]
9. Derive a numerial solution for finding the solution of differntial equation? [Feb-07]
10. Explain about dynamically systems give real time example? [T1-Ch-14]
11. Explain about
    a. Lipschitz condition b. Divergence theorem [T1-Ch14]
12. Explain about stability of equilibrium states? [T1-Ch14]
13. Explain about hyapunov's theorems? [T1-Ch14]
14. Explain about attractors & Hyperbolic attractors? [T1-Ch14]
15. Explain about additive model in neuro dynamical models [T1-Ch14]
16. Explain about related model in neurodynamical models [T1-Ch14]
17. Restate hyapunov's theorems for the state vector x(0) as the equilibrium state of a dynamical system? [T1-Ch14]
18. Verify block diagrams of Figs. 14-8a and 14.8b for the neurodynamical equations respectively? [T1-Ch14]
19. a) Explain BSB model briefly? [T1-Ch14]
    b) What are the various Trajectories for computer experiment in BSB model? [T1-Ch14]
20. Explain characteristic of Chaotic Dynamics? [T1-Ch14]

UNIT-VIII

1. What are the limitation of Hopfield network? Suggest methods that may overcome there limitations? [Feb-07]

2. A Hopfield network made up of five neurons is required to store the following three fundamental memories.

   $\xi 1 = [+1, +1, +1, +1, +1]^T$
   $\xi 2 = [+1, -1, -1, +1, -1]^T$
   $\xi 3 = [-1, +1, -1, +1, +1]^T$

Evaluate the 5 by 5 sympatic weight matrix of the network?[Feb-07]

3. What are the general equations for the hyper-planes in two and three dimensions in space? What geometric figures do these equations describe?
   [Feb-07]
4. What do you understand by finite resolution and conversion error?
   [Feb-07]
5. Explain the circuit producing a single digitally programmable weight employing a multiplying D/A converters? [Feb-07]
6. Explain template matching networks in neural processing. Draw a template bit map and the corresponding circuit diagram? [Feb-07]
7. Explain about discreate Hopfield model as a content addressable memory?
   [Feb-07]
8. Discuss about relation between the stable states of the discrete and continuous version of the Hopifield model? [T1-Ch14]
9. Explain about Hopified modle briefly? [T1-Ch14]
10. Explain about-
    a. Spurious states b. Storage capacity of the Hopfield network
11. Explain about COHEN-GROSSBERG theorem? [T1-Ch14]
12. Explain about brain-state in a box model? [T1-Ch14]
13. Explain about Dynamcis of the BSB models? [T1-Ch14]
14. Explain about clustering? [T1-Ch14]
15. Explain about STRANGE attractors and CHAOS? [T1-Ch14]
16. Explain about hyapunov exponents? [T1-Ch14]
17. What is meant by chaolic process? [T1-Ch14]
18. Explain about recursive prediction? [T1-Ch14]
19. Investigate the use of synchronues updating for the retrieval performance of the hopified network describe them p.b[14.4]? [T1-Ch14]
20. Consider the hyapunov function E defined in Eq. [14.57]
    Show that
    $$DE/Dt \leq 0$$
    Provided the conditions in Eqs. (14.59) & (14.61) are satisfied prove it?
    [T1-Ch14]