Machine Learning Question Bank
Module3

1. Define ANN. Explain the different types of ANN. Give some examples of the Applications of ANN.
2. Compare the Biological Neurons (Neural Network) with Artificial Neurons (Neural Network).
3. Explain the working ALVINN System.
4. What are the appropriate problems of Neural Network?
5. **Explain the following with examples:**
    a. **Artificial Neural Networks**
    b. **Perceptron**
    c. **Single and Multilayer Perceptron (NN)**
    d. **Activation Function**
    e. **Sigmoid Threshold Unit**
    f. **Error Gradient for Sigmoid unit**
6. When one must consider Neural Network
7. Describe "Neural Network Representation"
8. With neat diagram explain the following:
    a. Perceptron
    b. Representational Power of Perceptron
    c. Perceptron Training rule and Learning in Perceptron.
    d. Gradient Descent and Delta Rule
9. Derive the Gradient Descent Rule for the linear unit
10. Discuss "*Gradient Descent Algorithm for the linear unit*".
11. Write a note on Convergence of "*Gradient Descent Training Rule* "
12. Discuss Remark on Gradient Descent Training Rule. What are the practical difficulties in applying gradient descent.
13. Explain Stochastic approximation to gradient descent.
14. Differentiate between Standard Gradient Descent and Stochastic Gradient Descent.
15. Explain with example Multilayer Neural Networks (Multilayer Perceptron).
16. What is Sigmoid Threshold Unit? Derive the relation for Error gradient for Sigmoid Unit.
17. Write and explain Back Propagation Algorithm. Derive the following of the Backpropagation Rule:
    a. Error at the output unit
    b. Error at the hidden unit
    c. Weight to be updated
18. Discuss all remarks of Backpropagation Algorithm.
19. What is linearly in separable problem? Design a two-layer network of perceptron to implement A OR B , A AND B & NOT A.
20. Consider a multilayer feed forward neural network. Enumerate and explain steps in back propagation algorithm use to train network
21. What are the steps in Back propagation algorithm? Why a Multilayer neural network is required?

22. What is Multilayer perception? How is it trained using Back propagation? What is linear separability issue? What is the role of hidden layer?

23. Explain how back propagation algorithm works for multilayer feed forward network.

24. Explain perceptron and Delta training rule.

25. Explain the differential sigmoid threshold unit.

26. Consider two perceptron's defined by the threshold expression w0+w1x1+w2x2>0 , perceptron **A** has weight values w0=1 , w1= 2 w2 = 1 and perceptron **B** has weight values w0 = 0 , w2 = 2 and w2 = 1.

a. TRUE/FALSE: Perceptron A is more general than perceptron B.

27. Explain the back-propagation algorithm. Why is not likely to be trapped in local minima.

28. Explain Stochastic approximation to gradient Descent

29. What are the advantages and limitations of gradient descent.

30. Derive the Following:

a. Gradient Descent Rule

b. Back Propagation Rule

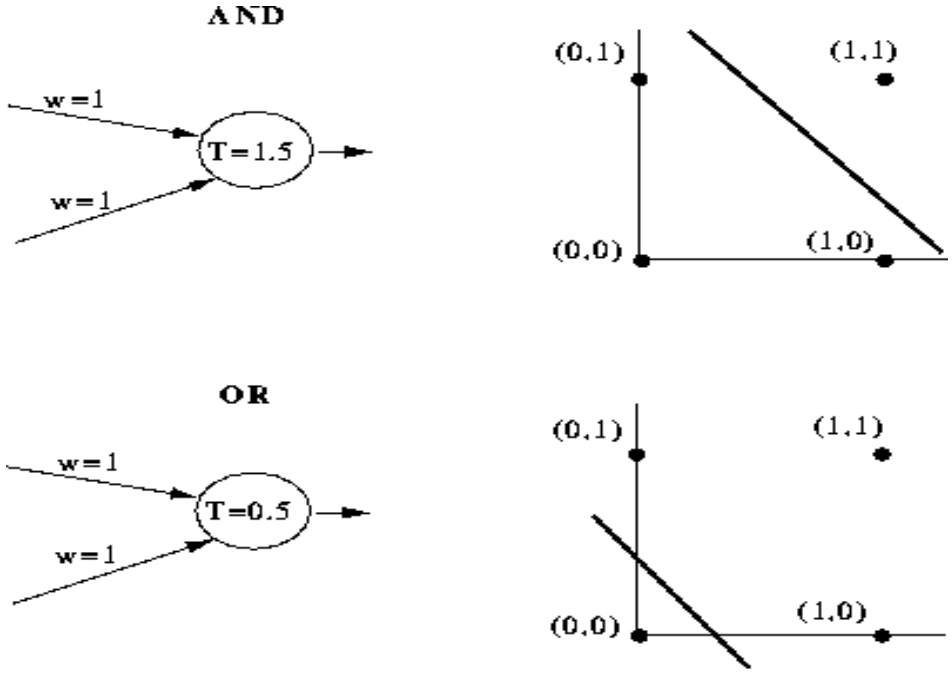
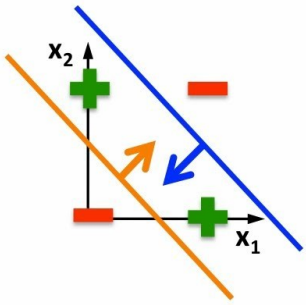
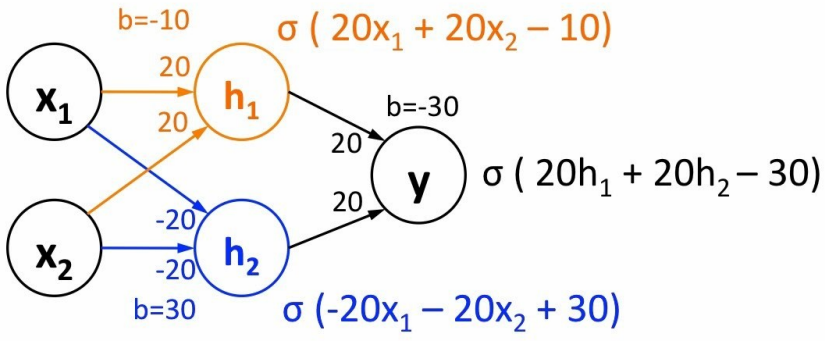


Fig: Representing OR and AND using Perceptron

Solving XOR with a Neural Net

Linear classifiers
cannot solve this





σ(20*0 + 20*0 – 10) ≈ 0
σ(20*1 + 20*1 – 10) ≈ 1
σ(20*0 + 20*1 – 10) ≈ 1
σ(20*1 + 20*0 – 10) ≈ 1

σ (-20*0 – 20*0 + 30) ≈ 1
σ (-20*1 – 20*1 + 30) ≈ 0
σ (-20*0 – 20*1 + 30) ≈ 1
σ (-20*1 – 20*0 + 30) ≈ 1

σ (20*0 + 20*1 – 30) ≈ 0
σ (20*1 + 20*0 – 30) ≈ 0
σ (20*1 + 20*1 – 30) ≈ 1
σ (20*1 + 20*1 – 30) ≈ 1

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