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SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2023

(2020 SCHEME)

Course Code : 20CST384

Course Name: Concepts in Deep Learning

Max. Marks : 100 **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. Distinguish between unsupervised learning and reinforcement learning. Illustrate with an example.
2. Compare overfitting and underfitting. How it can affect model generalization?
3. Why does a single perceptron cannot simulate simple XOR function? Explain how can we overcome this limitation?
4. Explain perceptron and delta rule. What is the role of chain rule in training of a neural network.
5. Illustrate the input type and output type of convolutional neural networks.
6. Let X=[-1, 0, 3, 5] W=[.3 ,.5 .2,.1] be the the input of i^{th} layer of a neural network and apply ReLU function as the activation function. What should be the output of it?
7. How many parameters are there in VGG16? List the advantages of VGG network.
8. Sketch diagram of recursive neural networks and Explain.
9. Illustrate the use of deep learning concepts in computer vision.
10. What is an autoencoder? Give one application of an autoencoder.

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. Discuss the following applications of neural network: i) Sequence learning ii) Classification iii) Regression iv) Recommender systems v) Tagging (14)

OR

12. a) A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P, if its performance at tasks in T, as measured by P, improves with (10)

experience E. What is your understanding of the terms task, performance and experience. Explain with two examples.

b) Define the following i) bias ii) variance iii) hyperparameter iv) validation set. (4)

MODULE II

13. Explain five activation functions and derivatives of each by sketching corresponding graph. (14)

OR

14. Write the back-propagation algorithm in multilayer perceptron with one hidden layer. Assume the network is using Tanh activation function. Trace the algorithm with an example. (14)

MODULE III

15. Sketch the diagram exhibiting the structure of Convolutional neural network and illustrate the working of different layers in a stage of the network. (14)

OR

16. Explain practical challenges in common deep learning architectures. (14)

MODULE IV

17. a) Explain recurrent neural network design patterns by sketching diagrams (10)

b) Sketch the gated recurrent neural network and explain. (4)

OR

18. a) Sketch the diagram of Long Short-Term Memory (LSTM) cell and explain it's working. (10)

b) Explain the applications of recurrent neural network. (4)

MODULE V

19. a) Illustrate the use of representation learning in object classification. (7)

b) Explain use of Auto encoders in natural language processing (7)

OR

20. a) What is the application of Boltzmann Machine in Deep Belief Network. (7)

b) Explain any two Word Embedding techniques (7)

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