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**SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)**

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

**FIFTH SEMESTER B.TECH DEGREE EXAMINATION (Regular), DECEMBER 2022****(2020 SCHEME)****Course Code : 20CST393****Course Name: Neural Networks and Deep Learning****Max. Marks : 100****Duration: 3 Hours****PART A*****(Answer all questions. Each question carries 3 marks)***

1. Distinguish between over fitting and under fitting. What measures are to be taken to achieve appropriate fitting?
2. What is Bias and Variance? How do they change as the capacity of the Neural Network increases?
3. What is an activation function? Distinguish between Sigmoid and ReLU.
4. Illustrate any 3 practical issues in Neural Network Training.
5. What is the advantage of Nesterov Accelerated Gradient Descent over normal Gradient Descent?
6. Compare Dropout with Early Stopping.
7. Illustrate convolution operation on a 5x5 image with a kernel of size 3x3 with a stride of 2. What will be the output volume?
8. Distinguish between Max Pooling and Average Pooling.
9. Distinguish between word embedding and one hot encoding.
10. Discuss the relevance of LSTM over RNN.

**PART B*****(Answer one full question from each module, each question carries 14 marks)*****MODULE I**

11. a) Illustrate Confusion Matrix with a sample data set and calculate Accuracy, Precision and Recall. (7)
- b) Compare linear regression and logistic regression with suitable examples. (7)

**OR**

12. a) Compare and contrast different types of learning algorithms. (7)
- b) Illustrate Receiver Operating Characteristic curve (ROC) and Area Under Curve (AUC) with an example. (7)

**MODULE II**

13. a) Illustrate forward propagation and backward propagation with a shallow neural network using suitable inputs, weights, biases and activation function. (8)
- b) Discuss any 3 practical applications of Neural Networks. (6)

**OR**

14. a) Discuss any 4 practical difficulties in Neural Network Training. (8)
- b) Discuss about any 3 Loss functions. (6)

**MODULE III**

15. a) What are Optimization Techniques used for in Machine Learning? Compare and contrast AdaGrad, RMSProp and Adam. (8)
- b) What are the main differences between Machine Learning and Deep Learning? (6)

**OR**

16. a) What is the purpose of Regularization? Discuss about Parameter sharing and tying, Injecting noise at input and Ensemble methods. (8)
- b) 'Though Artificial Neural Networks were discovered many decades back, Deep Learning started taking off in a big way only after 2010'. Explain the reasons for this. (6)

**MODULE IV**

17. a) What is the relevance of Convolutional Layers in Neural Networks when most of the tasks can be achieved by Dense Layers? (6)
- b) Illustrate the practical use cases of CNN by discussing the workflow of a specific application. (8)

**OR**

18. a) What is the relevance of pooling and strides in CNN? (6)
- b) Draw a CNN Model and explain the various layers that are normally used in it. (8)

**MODULE V**

19. a) Explain how RNN can be represented as an unfolded Computational Graph. (7)
- b) Illustrate the practical use cases of RNN by discussing the workflow of a specific application. (7)

**OR**

20. a) Illustrate the encoder-decoder sequence to sequence architecture in the context of RNN. (7)
- b) What is GRU and how does it address the drawbacks of RNN? (7)

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