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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

SUMMER TERM END TERM EXAMINATION– AUGUST- 2024

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| **Semester : Summer Term** | **Date : 06-08-2024** |
| **Course Code : ECE3031** | **Time : 09:30 am – 12:30 pm** |
| **Course Name :Applications of Deep Learning** | **Max Marks :100** |
| **Program :B. Tech. (ECE)** | **Weightage :50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | |
| **ANSWER ANY 3 QUESTIONS 3Q X 5M = 15 M** | | | |
| 1 | Differentiate between Convolutional Nural Network (CNN) and Deep Learning (DL). | (CO 1) | [Knowledge] |
|  | | | |
| 2 | Explain the significance of length and depth of the network. | (CO 1) | [Knowledge] |
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| 3 | Explain the significance of activation function in deep learning. | (CO 3) | [Knowledge] |
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| 4 | Write a short note AND gate problem in simple perceptron. | (CO 2) | [Knowledge] |
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| 5 | Write a short note on dimensionality reduction. | (CO 1) | [Knowledge] |
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| **PART B** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 20M = 40M** | | | |
| 6 | Write a brief note on CNN with respect to following points   1. Perceptron convergence. 2. Activation functions. 3. Back Propagation 4. Curse of Dimensionality 5. Fully connected layers | (CO 3) | [Comprehension] |
|  | | | |
| 7 | For the given confusion matrix compute following parameters   1. True Positive 2. True Negative 3. False Positive 4. False Negative 5. Accuracy 6. F1 Score 7. Positive Recall 8. Negative Recall  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | **Expected Values** | | | | | | **Actual Values** |  | **Class 1** | **Class 2** | **Class 3** | **Class 4** | | **Class 1** | 25 | 5 | 12 | 9 | | **Class 2** | 10 | 25 | 3 | 4 | | **Class 3** | 4 | 8 | 20 | 22 | | **Class 4** | 1 | 2 | 5 | 5 | | (CO 3) | [Comprehension] |
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| 8 | For the given neural network, calculate forward propagation output with Sigmoid and RELU activation function. The required values of weights and bias are as follows (Assume suitable values if needed).  W1= 0.2, W2=0.1, W3=0.7, W4=0.4, W5=0.5, W6=0.45, W7=0.15, W8=0.22, W9=0.81, W10=0.23, b1=1, b2=1, x1=1, x2=3, x3=2, t1=10, t2=1.5. | (CO 3) | [Comprehension] |
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| **PART C** | | | |
| **ANSWER ANY 3 QUESTIONS 3Q X 15M=45M** | | | |
| 9 | 1. Differentiate between DenseNet, PixelNet and VGG19 with any ten points (10M) 2. Which network among the above three will be useful in brain tumor detection application? (5M) | (CO 3) | [Application] |
|  | | | |
| 10 | As a deep network designer, you will be given with the task of developing deep neural network for crack detections in tiles images. Write brief note on deep network design and validation. | (CO 4) | [Application] |
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| 11 | As a deep learning engineer, explain the need of recurrent neural networks in deep network design and explain its various advantages over traditional CNN algorithms. | (CO 4) | [Application] |
|  | | | |
| 12 | Explain in brief note on CNN architecture you need to implement for face recognition. The note should include details about number of convolutional layers, pooling layer and significance of each layer in network design. | (CO 2) | [Application] |
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