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MASTER OF COMPUTER APPLICATIONS
(Specialization in Artificial Intelligence & Machine Learning)
EXAMINATION : JANUARY-2025
SEMESTER - III

Sub: Deep Learning (MCAI 23-301)

Date : 07/01/2025

Total Marks :60

Time: 10.00 am to 12.30 pm

Instruction:

1. All questions are compulsory unless and otherwise stated.
2. Bold figures to the right of every question are the maximum marks for that question.
3. Candidates are advised to attempt questions in order.
4. Answers written illegibly are likely to be marked zero.
5. Use of scientific calculators, Log tables, Mollier Charts is allowed.
6. Draw neat and labelled diagram wherever necessary.

Q.1. Answer the following in 2-3lines. (Any 5) (10)

1. Define Deep Learning and provide a brief overview of its core components.
2. Identify two optimization algorithms commonly used in training deep neural networks.
3. Name a popular variant of Boltzmann Machines that is widely used in pre-training deep neural networks. Discuss features of this new variant.
4. What are the three main types of learning in Machine Learning? Give one real life example of each.
5. Explain the bias-variance tradeoff in machine learning.
6. Describe the exploration-exploitation tradeoff in reinforcement learning.
7. Discuss role played by adjusting weights during back-propagation in ANN.

Q. 2. Answer the following in short. (Any 4) (20)

1. What is overfitting in Neural Network? Suggest and discuss any two widely used methods to overcome the problem of overfitting.
2. What are the limitations of ML algorithms. How DL algorithms helps us in overcoming these limitation?
3. Explain the concept of softmax regression and its application in deep learning.
4. Discuss the Boltzmann Machine in the context of unsupervised deep learning.
5. Provide an example scenario where DenoisingAutoencoders are useful in unsupervised learning.
6. What is the purpose of Padding in a Convolutional Layer? Explain the concept of Stride in a Convolutional Layer and its impact on output size.

Q. 3. Answer the following in detail. (Any 3) (30)

1. Describe a real-world application where computer vision plays a crucial role, and explain the deep learning techniques commonly employed in such applications.
2. What is the difference between Predictive and Descriptive learning? Give one example of each giving main features of both the examples.

3. Give working principles of Self-Organizing Maps (SOM), in what way it differs from K-means clustering – compare. Mention any two application of SOMs.
4. Provide architecture and working of General Adversarial Networks (GANs). Explain in brief any one application of GAN.
5. Write important features of :
 - i) Vanishing Gradient
 - ii) Exploding Gradient
 - iii) LSTM and GRU in the context of RNN.
