NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
B.Tech
SEM: VII - THEORY EXAMINATION (2023 - 2024)
Subject: Computer Vision

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

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*
*1. This Question paper comprises of **three Sections -A, B, & C.** It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*
2. Maximum marks for each question are indicated on right -hand side of each question.
3. Illustrate your answers with neat sketches wherever necessary.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.
6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A 20

1. Attempt all parts:-

1-a. GPU stands for 1

(a) graphics processors unit

(b) graphics parallel unit

(c) global processor unit

(d) None .

1-b. How many layers Deep learning algorithms are constructed 1

(a) 2

(b) 3

(c) 4

(d) 5

1-c. RNN falls under 1

(a) Supervised

(b) Unsupervised

(c) Reinforce learning

(d) None of the above

1-d. What is LeNet-5 primarily used for? 1

(a) Speech Recognition

(b) Image Classification

(c) Machine Translation

      (d)   Natural Language Processing

1-e.   Active Contours, often referred to as "snakes," are used for:(CO3)   1

      (a)   Image sharpening

      (b)   Image encryption

      (c)   Object localization and boundary detection

      (d)   Superpixel segmentation

1-f.   State is the smallest unit of an image(CO3)   1

      (a)   1 sq. mm

      (b)   DPI

      (c)   Pixel

      (d)   None of the above

1-g.   State the primary purpose of the sliding windows technique in object detection(CO4)   1

      (a)   To detect objects of varying sizes and positions within an image.

      (b)   To compress images for faster processing.

      (c)   To enhance the color contrast in images.

      (d)   To remove noise from images.

1-h.   Mention the primary goal of 3-D vision in computer science and engineering(CO4)   1

      (a)   To create 3-D movies and games

      (b)   To capture and understand the three-dimensional structure of objects

      (c)   To enhance 2-D images with visual effects

      (d)   To improve the resolution of digital photographs

1-i.   Mention the following filter's responses is based on the pixels ranking(CO5).   1

      (a)   Sharpening filters

      (b)   Nonlinear smoothing filters

      (c)   Geometric mean filter

      (d)   Linear smoothing filters

1-j.   Which deep generative model is used for dimensionality reduction and feature learning(CO5)   1

      (a)   Variational Autoencoder (VAE)

      (b)   Long Short-Term Memory (LSTM)

      (c)   Convolutional Neural Network (CNN)

      (d)   Extreme Learning Machine (ELM)

2. Attempt all parts:-

2.a.   Point out the diffrence between supervised and unsupervised learning.   2

2.b.   Explain the working of CNN   2

2.c.   State spatial operations in image processing primarily concerned with(CO3)   2

2.d.	Explain some common methods used for object classification with suitable examples(CO4)	2
2.e.	State key components of a GAN (Generative Adversarial Network)(CO5)	2

SECTION-B   30

3. Answer any <u>five</u> of the following:-

3-a.	Explain instance segmentation.with justified answer.	6
3-b.	Elaborate 1x1 convolution mean in a neural network	6
3-c.	Describe computational graph in Deep Learning	6
3-d.	Describe different types of transfer learning inductive	6
3-e.	What are pixel transformations in image processing, and how do they impact image enhancement(CO3)	6
3-f.	Explain the sliding window technique in object detection(CO4)	6
3-g.	Explain Adversarial Autoencoders (AAEs) with architectural diagram.	6

SECTION-C   50

4. Answer any <u>one</u> of the following:-

4-a.	Explain filtering, stride and padding in Convolutional Neural Network	10
4-b.	Differentiate between face detection and face recognition .	10

5. Answer any <u>one</u> of the following:-

5-a.	How neural network architecture is best for image classification	10
5-b.	Differentiate between Convolutional Layers vs Fully Connected Layers	10

6. Answer any <u>one</u> of the following:-

6-a.	Compare the use of Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU) networks in image processing applications.(CO3)	10
6-b.	Explain how Long Short-Term Memory (LSTM) networks are used in image analysis. What advantages do LSTMs offer in sequential data processing(CO3)	10

7. Answer any <u>one</u> of the following:-

7-a.	Explain can you evaluate the predictions in object detection model(CO4).	10
7-b.	How can deep learning techniques like Convolutional Neural Networks (CNNs) be applied to improve object detection accuracy and speed(CO4)	10

8. Answer any <u>one</u> of the following:-

8-a.	Explain the concept of semi-supervised learning and how GANs can be adapted for semi-supervised tasks.(CO5)	10
8-b.	In the context of generative models and AI research, what are some current and future trends that researchers and practitioners should be aware of(CO5)	10