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Subject Code:- ACSE0701/ ACSEH0701

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VII - THEORY EXAMINATION (2024 - 2025)

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. Computer Vision is _____ (CO1,K1) 1

(a) The study of computer graphics

(b) The study of algorithms for visual perception by computers

(c) The study of computer hardware

(d) The study of computer networking

1-b. The component of learning system is (CO1,K1) 1

(a) Model

(b) Learning rules

(c) Goal

(d) All of the above

1-c. List layers of Deep learning algorithms are constructed (CO2,K2) 1

(a) 3

(b) 4

(c) 2

(d) 5

1-d. _____ is Limitation of deep learning(CO2,K1) 1

(a) Obtain huge training datasets

(b) Data labeling

(c) None of the above

(d) All of above

1-e. Define the primary goal of image segmentation (CO3,K1) 1

(a) Image classification
(b) Object recognition
(c) Partitioning an image into meaningful regions
(d) Image compression

1-f. Geometric operations in image processing typically involve transformations such as:(CO3,K2) 1

(a) Scaling, rotation, and translation
(b) Histogram equalization
(c) Median filtering
(d) Edge detection

1-g. List down how do you introduce non-linearity in a Convolutional Neural Network (CNN)(CO4, K2) 1

(a) Using ReLU
(b) Using a Max-Pooling layer
(c) Both of the above
(d) None of the above

1-h. State the primary purpose of the sliding windows technique in object detection(CO4,K2) 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-i. List down of the following is the abbreviation of JPEG(CO5, K1). 1

(a) Joint Photographic Experts Group
(b) Joint Photographs Expansion Group
(c) Joint Photographic Expanded Group
(d) Joint Photographic Expansion Group

1-j. Mention the following filter's responses is based on the pixels ranking(CO5, K2). 1

(a) Sharpening filters
(b) Nonlinear smoothing filters
(c) Geometric mean filter
(d) Linear smoothing filters

2. Attempt all parts:-

2.a. Explain padding in detection(CO1,K2) 2

2.b. Explain the different types of pooling layers in a CNN architecture.(CO2,K2) 2

2.c. Briefly explain concept of geometric operation in image processing with 2

	suitable example .(CO3, K2)	
2.d.	Illustrate is the sliding windows technique in object detection(CO4, K2)	2
2.e.	Mention various applications of Variational Auto Encoders (CO5,K2)	2
SECTION-B		30
3. Answer any five of the following:-		
3-a.	in computer vision research have shown promising potential for real-time applications such as autonomous vehicles or augmented reality? (CO1,K2)	6
3-b.	Discuss computer vision algorithms being applied in healthcare.(CO1,K2)	6
3-c.	Elaborate concept of feed forward in Convolution Neural Network.(CO2,K2)	6
3-d.	Illustrate that hyperparameters be trained in neural networks (CO2,K2)	6
3.e.	Explain the Fully Convolutional Network (FCN) architecture and its significance in semantic segmentation.(CO3, K2)	6
3.f.	Explain is the difference between object detection and object recognition(CO4, K2)	6
3.g.	Explain different types of Deep Generative Models(CO5,K2)	6
SECTION-C		50
4. Answer any one of the following:-		
4-a.	Explain filtering, stride and padding in Convolutional Neural Network (CO1,K2)	10
4-b.	Explain about Auto Encoder? Details about Encoder, Decoder and Bottleneck?(CO1,K2)	10
5. Answer any one of the following:-		
5-a.	In what domains or applications has LeNet-5 demonstrated success, and why is it well-suited for these tasks?(CO2,K3)	10
5-b.	List the advantages and disadvantage of using CNN over DNN(CO2,K3)	10
6. Answer any one of the following:-		
6-a.	Describe the concept of Region-based Convolutional Neural Networks (R-CNNs) and their role in object detection.(CO3, K2)	10
6-b.	Explain the concept of non-linear filtering in image processing and its role in noise reduction and feature enhancement.(CO3,K2)	10
7. Answer any one of the following:-		
7-a.	Explain the role of transfer learning in object detection(CO4, K2).	10
7-b.	Illustrate s the YOLO (You Only Look Once) algorithm work in object detection(CO4, K2)	10
8. Answer any one of the following:-		
8-a.	Explain the basic working principle of a Variational Autoencoder (VAE) in the context of generative modeling (CO5, K2)	10
8-b.	Describe the architecture and components of a typical GAN, including the generator and discriminator networks(CO5, K2)	10