

Roll No.

67104-N

**MCA 3rd Semester (MCA 2 Year
Programme) w.e.f. 2021-22
Examination – December, 2024**

COMPUTER VISION ELECTIVE 1 (i)

Paper : 21MCA23DA1

Time : Three hours]

[Maximum Marks : 80

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) How do active contours contribute to shape modelling and recognition ? $8 \times 2 = 16$
- (b) What are thresholding techniques and how are they used to segment images ?
- (c) What is the Generalized Hough Transform (GHT) and how does it differ from the standard Hough Transform ?

- (d) Provide examples of real-world applications where the Hough Transform is used for image analysis.
- (e) What is motion in the context of computer vision?
- (f) Explain the triangulation method used in motion estimation.
- (g) Explain some applications of computer vision in agriculture and environmental monitoring.
- (h) How is computer vision applied in surveillance systems?

UNIT - I

2. (a) What are edge detection techniques and how are they used to identify object boundaries in images? 8
- (b) How are size filtering techniques applied to extract objects of interest from images? 8
3. Explain the process of skeletonization in image processing. How does thinning help in extracting the essential features of shapes? Discuss algorithms for skeletonization and their applications. 16

UNIT – II

4. Give examples of real-world applications where Hough Transform is used for object detection and recognition. How does Hough Transform contribute to solving practical problems ? 16
5. Describe the speed problem associated with traditional Hough Transform for circle detection. How does it affect the efficiency of circle detection algorithms ? 16

UNIT – III

6. Discuss methods for 3D object recognition in computer vision. How do techniques like feature matching and geometric hashing identify objects in 3D scenes ? 16
7. (a) Discuss spline-based motion representation techniques. How do spline curves model smooth and continuous motion trajectories ? 8
- (b) Describe different projection schemes used in 3D vision systems. How do techniques like perspective projection and orthographic projection represent 3D scenes ? 8

UNIT – IV

8. Discuss the role of computer Vision in in-vehicle vision systems. How do such systems locate roadways, road markings, road signs and pedestrians ? 16

9. (a) Discuss the Chamfer matching technique for object tracking and recognition. 8
- (b) Explain how computer vision is used in creating a photo album application. 8
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