



R20 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 3P6GC

B.Tech VI Semester Regular Examinations, June/July 2023

ADVANCED COMPUTER VISION (CSE(AI&ML))

Maximum Marks: 70

Date: 27.06.2023 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Which operator is used to perform edge detection in image processing?
- 2 What is the purpose of image pyramids in computer vision?
- 3 What is image segmentation?
- 4 What is the primary application area of Pose estimation in computer vision?
- 5 Define Structure From Motion (SFM).
- 6 What is Dense Motion Estimation?
- 7 Define Image Stitching.
- 8 What is the purpose of image matting and compositing in Computational Photography?
- 9 Define the concept of "Shape from X".
- 10 What is the primary goal of Object Detection in the field of Recognition?

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 A. Explain the concept of geometric transformations in computer vision and provide an example of a commonly used geometric transformation technique in computer vision? [5]
B. Explain the concept of linear filtering in computer vision and provide an example of a commonly used linear filter. [5]
- OR
- 12 A. Explain the concept of Fourier transforms in computer vision and discuss an application where Fourier transforms are commonly used. [5]
B. Describe the concept of image pyramids in computer vision and discuss their significance in multi-scale image analysis. [5]
- 13 Explain the principles, advantages, disadvantages, and application areas of Active contours, Split and merge, Mean shift and mode finding, and Normalized cuts techniques in the context of image segmentation? [10]
- OR
- 14 A. Explain the principles, advantages, disadvantages, and application areas of feature detection and matching techniques such as Points and Patches, Edges, and Lines? [5]
B. Explain the difference between 2D and 3D feature-based alignment, and discuss their respective applications and challenges. [5]

- 15 Explain the concept of Bundle Adjustment in Structure From Motion (SFM) and its significance in the reconstruction of 3D scenes. [10]
- OR
- 16 Describe the concept of Layered Motion in Dense Motion Estimation and discuss its advantages and limitations in modeling complex motion patterns. [10]
- 17 Which technique in Computational Photography aims to enhance the resolution and clarity of an image by combining multiple low-resolution images of the same scene? [10]
- OR
- 18 A. Describe the key steps involved in the process of Image Stitching and explain the challenges faced in creating seamless panoramas. [5]
B. Explain the concept of Super-resolution and Blur Removal in Computational Photography, and discuss their applications and challenges in enhancing image quality. [5]
- 19 A. Explain the process of Bundle Adjustment in 3D reconstruction, its significance, and the challenges involved in optimizing camera parameters and 3D structure simultaneously. [5]
B. Discuss the challenges and advancements in Face Recognition, and explain its significance in various applications such as security systems, personal devices, and social media platforms. [5]
- OR
- 20 Explain the process of 3D reconstruction, including the different techniques and representations used, and discuss the challenges faced in accurately reconstructing the shape, texture, and geometry of objects or scenes. [10]