



B.E DEGREE EXAMINATIONS: APRIL/MAY 2024

(Regulation 2018)

Sixth Semester

INFORMATION SCIENCE AND ENGINEERING

U18ISE0001: Image and Video Analytics

COURSE OUTCOMES

- CO1:** Understand the purpose of computer vision and operations that can be applied to them.
CO2: Build key point detector using CNN.
CO3: Detect an object like face using Deep CNN.
CO4: Design computer vision architectures for video analysis.
CO5: Predict entire image using image segmentation and synthesis.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions: -

PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

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|---|-----|-------------------|
| 1. State the significance of digital images in the field of computer vision. How do they differ from analog images? | CO1 | [K ₁] |
| 2. How do contrast and brightness correction contribute to enhancing image quality? | CO1 | [K ₁] |
| 3. What is the difference between CNN and other models? | CO2 | [K ₁] |
| 4. Identify the role of ResNet in fine-grained image recognition. | CO2 | [K ₂] |
| 5. Mention the benefits of Single Shot detector (SSD) in real-time object detection tasks. | CO3 | [K ₁] |
| 6. Recall the process of training detectors in object detection systems and its importance. | CO3 | [K ₁] |
| 7. Distinguish single-object tracking and multiple-object tracking. | CO4 | [K ₂] |
| 8. Summarize the importance of optical flow and its role in video analysis | CO4 | [K ₂] |
| 9. List the benefits of Image synthesis. | CO5 | [K ₁] |
| 10. Define Image segmentation. | CO5 | [K ₁] |

Answer any FIVE Questions: -

PART B (5 x 4 = 20 Marks)
(Answer not more than 80 words)

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|--|-----|-------------------|
| 11. Compare and contrast the characteristics of the RGB and CMYK color models. | CO1 | [K ₂] |
| 12. Discuss the applications of image convolution in feature extraction and its limitations in | CO1 | [K ₃] |

handling complex image structures.

- | | | | |
|-----|---|-----|-------------------|
| 13. | Describe the process of working with pooling layers in convolutional neural networks. | CO2 | [K ₂] |
| 14. | Compare the HOG-based detector with the Viola-Jones face detector in terms of accuracy and efficiency. | CO3 | [K ₂] |
| 15. | Identify the role of action recognition and action classification to understand the human behavior in videos? | CO4 | [K ₃] |
| 16. | Explain the concept of human pose estimation in image segmentation. | CO5 | [K ₂] |

**Answer any FIVE Questions: -
PART C (5 x 12 = 60 Marks)
(Answer not more than 300 words)**

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|-----|---|------|-----|-------------------|
| 17. | a) Illustrate the structure of digital image and explain how the human eye perceives digital images? | (8) | CO1 | [K ₂] |
| | b) Explain the concept of edge detection and its significance in image analysis. | (4) | CO1 | [K ₂] |
| 18. | a) Assess the ethical implications of using facial recognition technology in various applications, such as surveillance and authentication systems. | (6) | CO2 | [K ₃] |
| | b) Discuss the significance of implementing CNNs using TensorFlow. How does it contribute to image classification tasks? | (6) | CO2 | [K ₃] |
| 19. | Elaborate the evolution of object detection algorithms from R-CNN to Faster R-CNN. Highlight the key advancements in each iteration. | (12) | CO3 | [K ₃] |
| 20. | a) Evaluate the strengths and limitations of single-shot detectors in comparison to region-based approaches. | (6) | CO3 | [K ₄] |
| | b) Explain the concept of sliding windows in object detection algorithms. How does it contribute to accurate detection? | (6) | CO3 | [K ₂] |
| 21. | a) Discuss the challenges associated with visual object tracking in real-world scenarios. Provide examples to illustrate these challenges. | (8) | CO4 | [K ₂] |
| | b) Describe any one deep learning technique used for optical flow estimation. | (4) | CO4 | [K ₂] |
| 22. | Analyze the principles behind style transfer using Generative Adversarial Networks (GAN). Provide examples to illustrate its applications. | (12) | CO5 | [K ₄] |
