



B.E DEGREE EXAMINATIONS: APRIL / MAY 2023

(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)

- | | | |
|--|-----|-------------------|
| 1. Give two examples of image defects that can be compensated by image processing. | CO1 | [K ₂] |
| 2. State the non-uniformity property of light. | CO1 | [K ₂] |
| 3. Outline the Machine Learning pipeline for image classification. | CO2 | [K ₂] |
| 4. List the pros and cons of Alexnet. | CO2 | [K ₂] |
| 5. Write the use of single shot detector. | CO3 | [K ₂] |
| 6. Define sliding window in image processing. | CO3 | [K ₂] |
| 7. List the challenges in developing visual tracking methods. | CO4 | [K ₂] |
| 8. State temporal sliding window. | CO4 | [K ₂] |
| 9. Define Unsupervised segmentation. | CO5 | [K ₂] |
| 10. Write the training objectives of GANs. | CO5 | [K ₂] |

Answer any FIVE Questions:-

PART B (5 x 4 = 20 Marks)

(Answer not more than 80 words)

- | | | |
|--|-----|-------------------|
| 11. What is gamma correction and why is it needed in digital image system. | CO1 | [K ₂] |
| 12. Define Similarity Gap. Compare visual and semantic similarity. | CO2 | [K ₃] |
| 13. Differentiate between Fast R-CNN and Faster R-CNN. | CO3 | [K ₃] |

- | | | |
|---|-----|-------------------|
| 14. How to evaluate object tracking system? | CO4 | [K ₂] |
| 15. Explain the POS-CNN pipeline. | CO4 | [K ₂] |
| 16. What are GANs? How do they work? | CO5 | [K ₂] |

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

- | | | | |
|--|------|-----|-------------------|
| 17. a) Explain the structure of Human Eye. | (6) | CO1 | [K ₂] |
| b) How are image gradients calculated? Discuss the effects of varying sigma value in gradient computation. | (6) | CO1 | [K ₃] |
| 18. a) Briefly explain the Deep Learning face verification pipeline. | (6) | CO2 | [K ₂] |
| b) With appropriate examples, discuss the various interpretations of image similarities. | (6) | CO2 | [K ₃] |
| 19. a) Illustrate the working of Histogram of Oriented Gradients based image detector. | (8) | CO3 | [K ₃] |
| b) List the benefits and disadvantages of Viola-Jones Face detector. | (4) | CO3 | [K ₂] |
| 20. a) Write about the training of R-CNN network. | (6) | CO3 | [K ₂] |
| b) List different types of spatial pooling layer and write purpose of the pooling layer.. | (6) | CO3 | [K ₂] |
| 21. a) How to apply neural networks to visual tracking problem? | (6) | CO4 | [K ₂] |
| b) Briefly explain how action classification is done with Convolutional Neural Networks. | (6) | CO4 | [K ₂] |
| 22. Illustrate how encoder-decoder architectures are more suitable for pixel-to-pixel prediction in the segmentation problems. | (12) | CO5 | [K ₂] |
