Aliah University

AUTUMN SEMESTER EXAMINATION 2024

FOR BTECH 4TH YEAR / 7TH SEM ONLY

Paper Name: Professional Elective III (Computer Vision) Full Marks: 80

Paper Code: CSEUGPE15 Time: 3:00 Hrs

Section A

(Answer all questions) 5 × 2

1. (a) What is the size of a monochromatic image of dimension 1024x256 pixels? **[CO1, Applying]**
   (b) If red, green and blue intensities are represented with 1 byte each, what is the total number of colors? **[CO2, Applying]**
   (c) Write names of five applications of computer vision. **[CO3, Understanding]**
   (d) Mention a possible means for night vision. **[CO3, Analyzing]**
   (e) Define window and viewport. **[CO4, Understanding]**

Section B

(Answer any 6 questions) 6 × 5

2. Write the difference between spatial resolution and intensity resolution. **[CO1, Understanding + Remembering]** 5
3. How do illumination and reflectance contribute in formation of an image? **[CO2, Remembering]** 5
4. How does human vision work? Give a comparative view of cones and rods cells. **[CO1, Analyzing]** 3+2
5. Briefly mention the present-day challenges in computer vision. **[CO3, Understanding]** 5
6. Define image subtraction. Briefly outline how it is useful in X-ray videography. **[CO2, Understanding + Remembering]** 2+3
7. What is salt and pepper noise in images? Which filter is recommended for eliminating this type of noise? **[CO4, Understanding + Analyzing]** 3+2
8. How is a hyperplane represented? In object recognition, how are they useful? **[CO5, Understanding + Analyzing]** 2+3
9. What is the training and prediction time complexity of Nearest Neighbor classifier? **[CO5, Analyzing]** 5

Section C

(Answer any 4 questions) 4 × 10

10. With suitable diagrams, explain different image acquisition techniques. **[CO1, Understanding + Remembering]** 10

11. (a) Define image segmentation. **[CO2, Understanding + Remembering]**
    (b) With mathematical expressions, derive how image averaging removes noises. **[CO3, Understanding + Applying]** 3+7

12. (a) Briefly explain spatial correlation and spatial convolution. **[CO4, Understanding]**
    (b) What is histogram equalization? How is it useful? **[CO2, Understanding]** 6+4

13. (a) With a diagram, explain the 3D viewing process. **[CO2, Understanding]**
    (b) Give a comparative view of parallel projection and perspective projection. **[CO2, Analyzing]** 6+4

14. (a) Briefly mention the steps in video processing of a vision application. **[CO3, Understanding + Remembering]**
    (b) What is cross-validation in a classification problem? **[CO5, Applying]** 6+4

15. Write short notes. 5+5
    (a) Edge detection **[CO2, Remembering]**
    (b) Convolution and feature map **[CO4, Understanding]**