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Question Paper Code: U4301

B.E. / B.Tech. DEGREE EXAMINATION, APRIL/MAY 2025

Professional Elective

Electronics and Communication Engineering

21ECV107- MACHINE VISION

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. _____ mimic the human visual system. CO1-U
(a) Computer vision (b) Computer Graphics (c) Image processing (d) Image
2. A grey level image pixel is represented by -----bit CO1-U
(a) One (b) Two (c) Four (d) Eight
3. For the given 3*3 image 123 456789 the texture of the image from CO3-App
statistical information will be,
(a) Smooth texture (b) Coarse texture
(c) Regular texture (d) None of the these
4. The dynamic matching technique used for speech recognition is ----- CO1-U
(a) Dynamic time warping (b) End point constraint
(c) Time alignment and normalization (d) Hausdorff distance
5. The different modalities to acquire medical images are ----- CO1-U
(a) X-ray (b) computed tomography
(c) magnetic resonance imaging (d) All of the above

PART – B (5 x 3= 15 Marks)

6. List the Functions of the machine vision system. CO1-U
7. Suppose two images of the same scene taken from different angles. Apply CO2-App
SIFT to detect key points. How key points are matched between the two
images using Euclidean distance between descriptors.

8. How do you know the image is over segmented? CO1-U
9. What is mean by supervised learning? CO1-U
10. In a smart surveillance system, action recognition is used to detect suspicious activities in real time. Given a scenario where a person is running in a shopping mall, how can the system differentiate between normal running and potentially suspicious behavior CO2-App

PART – C (5 x 16= 80 Marks)

11. (a) Compare the intrinsic and extrinsic parameters of camera with suitable examples. CO1-U (16)

Or

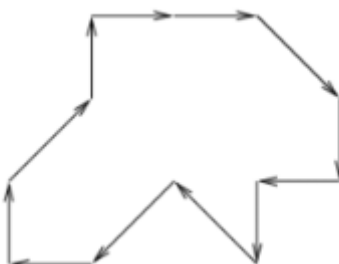
- (b) Illustrate the coordinate transformation between film coordinates and pixel array. CO1-U (16)

12. (a) There are two images of the same object taken from slightly different viewpoints. The goal is to use SIFT to identify matching key points between the two images. If two images have 200 and 250 key points respectively, how are the key points matched? What technique is used to ensure robust matching? CO5-Ana (16)

Or

- (b) A process involves identifying specific points in an image that are distinctive and can be reliably detected across various transformations, such as rotation, scaling, and changes in illumination. Identify the process how it is better than other methods give the reason with examples. CO5-Ana (16)

13. (a) How image is segmented using chain codes and explain it types. Find the 8-directional chain code and shape the numbers for the figure given below: CO3-App (16)



Or

- (b) For the above image perform K – means Clustering and mean shift clustering and justify the answer. CO3-App (16)



14. (a) A detection methodology is a key task in machine vision that involves identifying and locating objects within an image or video. Describe that methodology and explain its types and applications. CO1-U (16)
- Or
- (b) Illustrate the Popular algorithms used to perform object detection and explain in detail with suitable examples. CO1-U (16)
15. (a) The algorithm is one of the classifications of data based on knowledge already gained or on statistical information extracted from patterns and/or their representation. Identify which algorithm is used and analyze all the types and conclude which is suitable. CO3-App (16)
- Or
- (b) The raw data is processed and converted into a form that is amenable for a machine to use and this technique involves the classification and cluster of patterns. Identify which technique is used and analyze all the types and conclude which is suitable. CO3-App (16)

