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# B.M.S. College of Engineering, Bengaluru-560019

**Autonomous Institute Affiliated to VTU**

## June 2025 Semester End Main Examinations

**Programme: B.E.** **Semester: VI**

**Branch: Electronics and Communication Engineering** **Duration: 3 hrs.**

**Course Code: 19EC6CE1CV** **Max Marks: 100**

**Course: Computer Vision**

**Instructions**: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

| | | | UNIT - I | *CO* | *PO* | Marks |
|---|---|---|---|---|---|---|
| 1 | a) | | Analyze how clustering improves data organization and explore the core principles of the K-Means algorithm in efficiently segmenting datasets based on similarity patterns | *1* | *1* | **10** |
| | b) | | Analyze how clustering aids in structuring data and explore the principles of the K-Means algorithm in efficiently segmenting datasets, using the data points (8,9), (9,10), (16,18), (17,19) | *2* | *2* | **10** |
| | | | **OR** | | | |
| 2 | a) | | Evaluate how K-Means clustering determines similarity among data points, and assess its effectiveness in handling complex datasets with varying distributions. | *1* | *1* | **10** |
| | c) | | Given the dataset points **(4,5), (5,6), (12,14), (13,15)**, apply K-Means clustering with **K=2** by determining initial centroid positions and performing the first iteration of cluster assignments based on distance calculations. | *2* | *2* | **10** |
| | | | **UNIT - II** | | | |
| 3 | a) | | Apply the Hough Transform for detecting lines and structural features in various image processing applications, improving accuracy in edge detection and object recognition. | *1* | *1* | **10** |
| | b) | | Analyze the strengths and weaknesses of LOG and DOG edge detection techniques in image processing, focusing on their effectiveness in detecting fine details and handling noise across various applications. | *2* | *2* | **10** |
| | | | **OR** | | | |
| 4 | a) | | How does the Hough Transform enable efficient line detection in image processing, and what factors influence its accuracy in various applications? | *1* | *1* | **10** |

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|---|---|---|---|---|---|---|
| | | b) | Analyze the differences in computational efficiency between SIFT and SURF for real-time object recognition, considering factors such as processing speed, memory usage, and robustness in dynamic environments. | *2* | *2* | **10** |
| | | | **UNIT - III** | | | |
| | 5 | a) | Utilize wavelet descriptors to improve texture segmentation in satellite imagery. | *1* | *1* | **10** |
| | | b) | Analyze the effectiveness of deformable models in tracking non-rigid objects in motion. | *2* | *2* | **10** |
| | | | **OR** | | | |
| | 6 | a) | Apply **snakes and active contours** for image segmentation to accurately detect object boundaries, improving precision in feature extraction and classification across various applications | *1* | *1* | **10** |
| | | b) | Assess the impact of different parameter settings on the convergence speed of level set methods in shape segmentation. | *2* | *2* | **10** |
| | | | **UNIT - IV** | | | |
| | 7 | a) | Demonstrate the role of arbitrary section planes in analyzing structural details in engineering models. | *1* | *1* | **10** |
| | | b) | Examine how 3D image processing techniques enhance precision in scientific measurements. | *2* | *2* | **10** |
| | | | **OR** | | | |
| | 8 | a) | Implement ray tracing to achieve realistic rendering in 3D graphics applications. | *1* | *1* | **10** |
| | | b) | Compare the effectiveness of different 3D dataset sources in various imaging applications, assessing their accuracy, resolution, and adaptability across industries | *2* | *2* | **10** |
| | | | **UNIT - V** | | | |
| | 9 | a) | How can iris recognition improve security in access control systems? | *1* | *1* | **10** |
| | | b) | How does digital signature verification ensure cybersecurity in electronic transactions? | *2* | *2* | **10** |
| | | | **OR** | | | |
| | 10 | a) | How does super resolution help in satellite image analysis? | *1* | *1* | **10** |
| | | b) | Analyze the impact of facial recognition on privacy and security concerns. | *2* | *2* | **10** |



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