SRM Institute of Science and Technology
College of Engineering and Technology
School of Computing

SET A

DEPARTMENT OF COMPUTATIONAL INTELLIGENCE

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2023-2024 ODD

Test: CLAT-2
Course Code & Title: 18CSE390T Computer vision
Year & Sem: III & 5th sem

Date : 10 -10-2023
Duration: 2 periods
Max. Marks: 50 Marks

Part - A
(10 x 1 = 10 Marks)

Instructions: Answer all

Q. No	Question	Marks	BL	CO	PO	*PI Code
1	To address the issue using Hough transform, detecting two lines in instances where there is only one in a given image, which of the following actions is most likely to mitigate this problem? a.Increase the size of the bins in the Hough transform. b.Decrease the size of the bins in the Hough transform. c.Sharpen the image d.Make the image larger	1	2	CO-2	1	1.6.1
2	A second order derivative operator can be defined as ____. a. Laplacian b. Gaussian c. Histogram d. Sobel	1	1	CO-2	1	1.6.1
3	A set of connected pixels that lie on the boundary between two regions are called as ..... a. point b. edge c. color d. line	1	1	CO-2	1	2.2.4
4	Find out the measure which is not used to describe a region in an image. a.Mean and median of grey values b.Minimum and maximum of grey values c.Number of pixels alone d.Number of pixels above and below mean	1	2	CO-2	1	1.6.1
5	Sobel gradient is not good for detection of..... a. Horizontal lines b. Vertical lines c. Diagonal lines d. Edges	1	2	CO-2	2	1.6.1
6	Which of the following is the example for application of image subtraction? a..MRI scan b.CT scan c.Mask mode radiography d.MRI and CT Scan	1	2	CO-3	2	2.2.4

7	Stiffness in internal elasticity of active contours follows _____ a. First order derivatives b. Second order derivatives c. Third order derivatives d. Lines and points	**1**	**1**	CO-3	**2**	**1.6.1**
8	**_____**is a segmentation method that uses energy forces and constraints to separate the pixels of interest from the picture. a. Image restoration b. Active Contours c. Pixel d. On the boundary of the curve	**1**	**1**	CO-3	**2**	**1.6.1**
9	The_____ model is an advanced version of the snake model a. gradient vector flow b.Advance snake model c.Balloon model d.Geometric active contour	**1**	**2**	CO-3	**2**	**1.6.1**
10	For identifying and classifying the joints in the human body ..... are captured as a set of coordinates for each joint. a. Key Points b. Pairs c. Skeleton d. contour	**1**	**1**	CO-3	**4**	**1.6.1**

Part – B
(Answer any Four)
(4 x 5 = 20 Marks)

Instructions: Answer ALL

11	Discuss steps of Hough Transform for line detection.	**5**	**3**	CO-2	**1**	**1.2.1**
12	How can an edge of the image be detected? Discuss any edge detection algorithm for detecting an edge of the following image. 	**5**	**3**	CO-2	**1**	**1.2.1**
13	(a)What is an active contour model? How are contours represented using this model? (b)Differentiate Feature Detection and Feature Extraction.	**5**	**3**	CO-3	**1**	**1.2.1**
14	Consider the image given which is 7 X 7 in size.  Illustrate the steps involved in segmenting the flower from the input image using an intelligent scissor.	**5**	**3**	CO-3	**1**	**1.2.1**
15	Explain the basic operation of an active contour "Snakes" to approximate the perimeter of an object. Write only the expression	**5**	**3**	CO-3	**1**	**1.2.1**

	of its energy function. Also, briefly note the entire procedure of finding contours in any image.					
16	What is meant by Region Splitting and Region Merging? Explain in detail.	**5**	**3**	CO-3	**1**	**1.2.1**

Part – C
(Answer any One)
(2 x 10 = 20 Marks)

17	a) Consider the below images:  Different images of the Eifel Tower are taken from various perspectives, with varying foreground objects. In one image, the tower is rotated, while in another, it's zoomed in to display one half of it. Identify an appropriate feature matching algorithm and elucidate its operational principle to demonstrate that the object 'tower' is consistent across all the images. **(OR)** b) By illustrating the working principle of a suitable keypoint detection and a matching algorithm, explain all the images given below are taken from the same location. 	**10**	**3**	CO-2	**1**	**1.2.1**
178	a)For the given confusion matrix, calculate the following. (i)True Positive Rate (ii_False Positive Rate (iii)Positive Predictive Value (iv)Accuracy **(OR)** b)Elucidate the snake model for locating the active contours using a band technique with suitable diagrams. Also relate the external and internal energy level calculation formulas used for fitting the elastic band on the object boundaries sharply.	**10**	**3**	CO-3	**1**	**1.2.1**

	True matches	True non-matches	
Predicted matches	TP = 18	FP = 4	P' = 22
Predicted non-matches	FN = 2	TN = 76	N' = 78
	P = 20	N = 80	Total = 100

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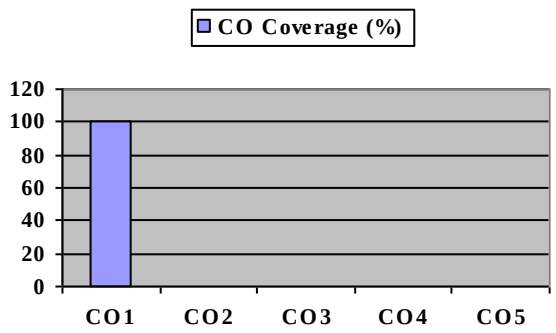
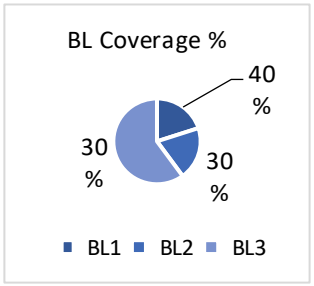
Course Outcome (CO) and Bloom's level (BL) Coverage in Questions





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SET B

DEPARTMENT OF COMPUTATIONAL INTELLIGENCE

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2023-2024 ODD

Test: CLAT-2 **Date:** 10-10-2023
Course Code & Title: 18CSE390T & Computer vision **Duration:** 100 Minutes
Year & Sem: III & 5th sem **Max. Marks:** 50 Marks

Part - A
(10 x 1 = 10 Marks)

Instructions: Answer all

Q. No	Question	Marks	BL	CO	PO	*PI Code
1	In _____ each region around detected keypoints is converted into a more compact and stable descriptor that can be matched against other descriptors. a) Feature detection b) Feature description c) Feature matching d) Feature tracking	1	L1	2	2	1.6.1
2	Patches with single orientation suffer from the _____ problem. a) aperture b) gradients c) patch d) location	1	L1	2	1	1.6.1
3	A _____ can be computed by creating a histogram of all the gradient orientations and then finding the significant peaks in this distribution. a) domain orientation estimate b) point orientation estimate c) dominate orientation estimate d) pixel orientation estimate	1	L1	2	1	1.6.1
4	The _____ tracker first compares patches in neighboring frames using a translational model. a) Kanada-Lucas-Tomasi b) Multi-scale Oriented Patches c) Dominate Orientation Estimate d) Scale Invariant Feature Transform	1	L1	2	1	2.2.4
5	An _____ can be defined as a set of connected pixels that forms a boundary between two disjoint regions. a) points b) surface c) patch d) edge	1	L1	2	1	2.2.4
6	_____ is the task of finding groups of pixels that "go together". a) Image prediction	1	L1	3	1	1.6.1

	b) Image identification c) Image selectin d) Image segmentation					
7	_____ are the boundaries that defines the region of interest in an image. a) Images b) Contours c) Domains d) Objects	1	L1	3	1	1.6.1
8	Finding the limitation of active contours is based on parametric curves of the form f(s), e.g., snakes, Bsnakes, and CONDENSATION. a) It is not challenging to change the topology of the curve as it evolves b) It is challenging to change the topology of the curve as it evolves c) It is challenging to change the size of the curve as it evolves d) b) It is not challenging to change the size of the curve as it evolves	1	L1	3	1	2.2.4
9	Which clustering algorithm does not require the assumption of equal-sized clusters? a) K-Means b) DBSCAN c) Agglomerative d) Mean-Shift	1	L1	3	1	1.6.1
10	___ is a way of identifying and classifying the joints in the human body. a) HPE b) PHE c) HBE d) BHE	1	L1	3	1	1.6.1
	Part – B **(Answer any Four)** **(4 x 5 = 20 Marks)**					
11	Identify how the edges are detected in an image. List out the two types of edge detection operators and the associated operators.	5	L3	2	4	1.2.1
12	Illustrate the response of the Sobell operator as it moves across a step edge from left to right in an image. How would you use this as an edgel detector?	5	L2	2	5	1.3.2
13	Explain the following terms with examples i. TP (True Positives) ii. FN (False Negatives) iii. FP (False Positives) iv. TN (True Negatives)	5	L1	2	4	1.3.2
14	With a neat sketch, outline the Intelligent Scissors to find image segmentation.	5	L2	3	4	1.3.2
15	Summarize the Level sets to avoid the limitation of active contours in image segmentation.	5	L2	3	4	1.2.1
16	Find and explain the pose estimation types with neat sketch.	5	L1	3	4	1.2.1

Part C
(Answer Two Questions)
(2 x 10 = 10 Marks)

17a	Find out the location of an object in an image by using Scale Invariant Feature Transform (SIFT). Identify the keypoints in the image and plot the keypoint matches.	10	L2	2	2	**1.3.1**
	(or)					
17b	Select a set of likely feature locations in a first image and to then search for its corresponding location in the subsequent images by using Feature tracking.	10	L3	2	4	**2.2.2**
18a	Identify and explain the Active contours used for image segmentation.	10	L3	3	2	**1.3.1**
	(or)					
18b	Explain with a neat sketch showing Mean Shift and mode used in image segmentation.	10	L2	3	4	**1.3.1**

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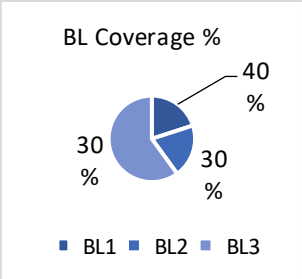
Course Outcome (CO) and Bloom's level (BL) Coverage in Questions



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SET C

DEPARTMENT OF COMPUTATIONAL INTELLIGENCE

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2023-2024 ODD

Test: CLAT-2 **Date:-10-2023**
Course Code & Title: 18CSE390T &Computer vision **Duration:** 100 Minutes
Year &Sem: III & 5th sem **Max. Marks:** 50 Marks

Part - A
(10 x 1 = 10 Marks)

Instructions: Answer all

Q. No	Question	Marks	BL	CO	PO	*PI Code
1	Forstner–Harris method is used for a) Feature detection b) Feature description c) Feature matching d) Feature tracking	1	L1	2	2	1.6.1
2	Scale invariance is used for _____ a) fine-scale features may not exist b) repeatability of gradients c) patch-scaling d)localization	1	L1	2	1	1.6.1
3	SIFT transformations are done for_____ a) domain orientation estimate b) point orientation estimate c) gradient estimate d) pixel orientation estimate	1	L1	2	1	1.6.1
4	The vertical and horizontal edge points are detected by _____. a)Preweitt operator b) Canny operator c) Lapalacian operator d) Scale Invariant Operator	1	L1	2	1	2.2.4
5	Successive approximation uses _____ method. a) polyline b) B-spline c) Smooth interpolating spline d) recursive finding points further away from current	1	L1	2	1	2.2.4
6	Contours are found based by _____ a) Image prediction b) Image identification c) Image selectin d) Energy functions	1	L1	3	1	1.6.1
7	_____ define the region of interest in an image. a) Images b) Contours c) Domains d) Objects	1	L1	3	1	1.6.1

8	Level set formulation can readily change _____ a) the topology of the curve as it evolves b the size of the region as it evolves c) the size of the curve as it evolves d) the size of the line as it evolves	1	L1	3	1	2.2.4
9	Ncut (A,B) means a) no.of edges crossing the cut b) total connections of A and B c) no.of edges not crossing the cut d) both similarity and dis-similarity between different A and B	1	L1	3	1	1.6.1
10	2D and 3 D feature based Alignment a) Estimates the motion between two or more sets of matched 2D or 3D points b) Restricts to global parametric transformations c) Curved surfaces with higher order transformation d) All the above	1	L1	3	1	1.6.1
	Part – B **(Answer any Four)** **(4 x 5 = 20 Marks)**					
11	Identify how to recognize objects in the cluttered scene?	5	L2	2	4	1.3.1
12	What are the problems faced by feature matching algorithms? How to perform efficient matching?	5	L2	2	5	1.2.1
13	Outline the basic methods to compare two images.	5	L2	2	4	1.2.1
14	Summarize the need of Scissors to get boundary of interest.	5	L2	3	4	2.2.2
15	Why active contour models are needed? Mention its application.	5	L2	3	4	1.2.1
16	Why clusters are formed in Mean shift and mode finding?	5	L2	3	4	1.2.1

Part C
(Answer Two Questions)
(2 x 10 = 10 Marks)

17a	Identify how to recognize objects in the cluttered scene.	10	L2	2	2	1.3.1
	(or)					
17b	Identify the matching strategy with the given values. Total dataset=100. Among that TP= 18, FP=4, TN=76, FN=2. Find TPR, FPR, PPV, ACC	10	L3	2	4	2.2.2
18a	Find the method and explain the pose estimation methods for complex 2D or 3D images.	10	L3	3	2	1.3.1
	(or)					
18b	Explain with neat sketch about cuts , Ncuts and graph oriented segmentation.	10	L2	3	4	1.3.1

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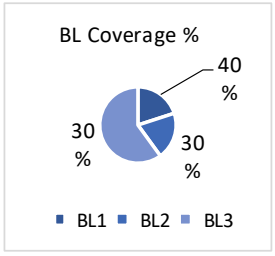
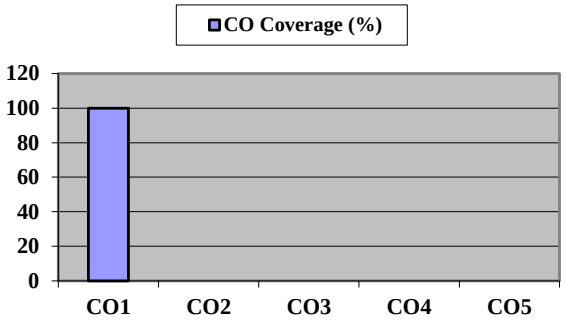
Course Outcome (CO) and Bloom's level (BL) Coverage in Questions





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SET D

DEPARTMENT OF COMPUTATIONAL INTELLIGENCE

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2023-2024 ODD

Test: CLAT-2
Course Code & Title: 18CSE390T & Computer vision
Year & Sem: III & V

Date: 10-10-2023
Duration: 100 Minutes
Max. Marks: 50

Part - A
(10 x 1 = 10 Marks)

Instructions: Answer all

Q. No	Question	Marks	BL	CO	PO	*PI Code
1	Which concept is used to represent the local features of an image that are invariant to scale and rotation? a) Hough transform b) Histogram of Oriented Gradients (HOG) c) Scale-invariant feature transform (SIFT) d) Eigenfaces	1	L1	2	2	**1.6.1**
2	Which technique is used to align two or more images to create a single panoramic image? a) Image segmentation b) Template matching c) Image stitching d) Image compression	1	L1	2	1	**1.6.1**
3	In order to locate good features to track, it makes sense to find maxima in the smaller eigenvalue because a) Larger uncertainty depends on the smaller eigen value b) Larger uncertainty depends on the higher eigen value c) Smaller uncertainty depends on the smaller eigen value d) Smaller uncertainty depends on the higher eigen value	1	L1	2	1	**2.2.4**
4	Which technique is used to generate a compact representation of an image by preserving its important features? a) Histogram equalization b) Principal Component Analysis (PCA) c) Fourier transform d) Median filtering	1	L1	2	1	**1.6.1**
5	Which of the following is the correct sequence of key point detection and matching process? a) Feature descriptor→ feature detection →feature matching→ feature tracking b) Feature detection→ feature descriptor→ feature matching→ feature tracking c) Feature detection→ feature matching→ feature tracking→ feature descriptor d) Feature matching→ feature tracking→ feature detection→ feature descriptor	1	L1	2	1	**1.6.1**
6	Which algorithm is commonly used for image segmentation?	1	L1	3	1	**2.2.4**

	a) K-means clustering b) Depth-first search c) Gaussian blur d) Fourier transform					
7	What is the maximum number of vanishing points that are possible for an arbitrary image? a) 1 b) 5 c) 10 d) No limit	1	L1	3	1	**1.6.1**
8	Which technique is used to detect and recognize objects based on their geometric shapes? a) Contour detection b) Texture analysis c) Blob detection d) Edge detection	1	L1	3	1	**1.6.1**
9	Which algorithm is commonly used for image registration, aligning two or more images? a) K-means clustering b) Optical flow c) SURF (Speeded-Up Robust Features) d) RANSAC (Random Sample Consensus)	1	L1	3	1	**1.6.1**
10	Which of the following detect multiple instances of a model in a single pass? a) FFT b) Fourier transform c) Hough transform d) DWT	1	L1	3	1	**1.6.1**
	Part – B **(Answer any Four)** **(4 x 5 = 20 Marks)**					
11	With respect to images, illustrate any two feature descriptors in detail.	5	L3	2	4	1.2.1
12	Explain in detail, the local processing approach for edge linking.	5	L2	2	5	1.2.1
13	Outline any one approach for detecting affine region.	5	L1	2	4	1.2.1
14	Differentiate top-down and bottom-up pose estimation.	5	L2	3	4	1.2.1
15	With an example, explain the mean shift segmentation algorithm in detail.	5	L2	3	4	1.2.1
16	Explain about the Global processing via the Hough Transform for edge linking	5	L1	3	4	1.2.1

Part C
(Answer Two Questions)
(2 x 10 = 20 Marks)

17 a	What is feature matching? What are components of feature matching? Explain the feature matching strategy with respect to Euclidean distance metric.	10	L2	2	2	1.3.1
	(Or)					
17 b	Explain Forstner–Harris and Adaptive non-maximal suppression (ANMS) feature detection algorithms	10	L3	2	4	2.2.2
18 a	Explain the different kinds of active contour models in terms of definition, working principle, energy function and advantages and disadvantages.	10	L3	3	2	1.3.1
	(Or)					
18 b	What is pose estimation? List the categories of pose estimation. Explain the techniques used for detecting pose estimation.	10	L2	3	4	1.3.1

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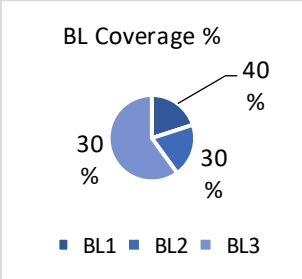
Course Outcome (CO) and Bloom's level (BL) Coverage in Questions



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