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/EVEN)

Test: CLAT-3
Course Code & Title: 18CSE390T & Computer vision
Year & Sem: III & V

Date: 2-11-2023
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 of the following is not intrinsic camera parameters? a) Focal length b) skew c) position d) distortion	1	L1	4	1	1.6.1
2	The process of finding the position of 3D point from image location and camera position is called as a) Factorization b) Bundle adjustment c) Triangulation d) Calibration	1	L1	4	1	2.2.4
3	Which of the following makes it hard to simultaneously estimate the 3D depth of a scene and the amount of camera motion? a) Bas-relief ambiguity b) Gauge ambiguity c) Local uncertainty d) Global uncertainty	1	L1	4	1	2.2.4
4	What comes after the two-view reconstruction in the pipeline implementation of global structure from motion? a) Global rotation estimation b) Feature matching c) Feature point extraction d) Estimation of camera centers	1	L1	4	1	1.6.1
5	Which of the following is used to determine the extrinsic and intrinsic calibration parameters of a camera when it is looking at a long rectangular patterns? a) Essential matrix	1	L1	4	1	2.2.4

	b) Hessian matrix c) Ambiguity d) Vanishing point					
6	For image alignment, the simplest motion model used is a) Translate and scale the images in 2D b) Rotate and scale the images in 2D c) Translate, rotate and scale the images in 2D d) Translate and rotate the images in 2D	1	L1	5	1	1.6.1
7	The process of combining multiple images with overlapping fields of view to produce a segmented panorama or high resolution images is called a) Image stitching b) Image warping c) Image alignment d) Image matching	1	L1	5	1	1.6.1
8	Gap closing fix the gap between two ends of the panorama by a) Compressing the alignment of images b) Stretching the alignment of images c) Shrinking the alignment if images d) Shortening the alignment of images	1	L1	5	1	2.2.4
9	The process of simultaneously adjusting pose parameters for a large collection of overlapping images is called a) Bundle adjustment b) Gap closing c) Parallax removal d) Blending	1	L1	5	1	1.6.1
10	Finding the camera position relative to a known 3D object or scene is a) Pose estimation b) Structure from motion c) Factorization d) Self calibration	1	L1	5	1	1.6.1
	Part – B **(Answer any Four)** **(4 x 5 = 20 Marks)**					
11	Explain briefly about the process of finding the 3D point from 2D feature locations.	5	L3	4	4	2.2.4
12	State the reason for the existence of high uncertainity in the estimation of struction from motion. How will you reconstruct 3D objects from photos taken from Internet?	5	L2	4	5	2.2.4
13	Explain the method of recovering the unknown calibration matrices of images.	5	L3	4	4	1.6.1
14	State and explain the technique for creating large panoramas by chaining number of rotation matrices and focal length.	5	L2	5	4	1.6.1
15	Explain briefly about rotational panoramas.	5	L3	5	4	2.2.4

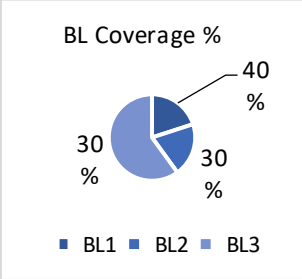
16	Discuss the technique for reducing the double images and blurring due to local misregistrations.	5	L2	5	4	1.6.1

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

17 a	Discuss in detail about Tomasi and Kanade algorithm for finding structure and motion from feature tracks using orthographic approximations.	10	L2	4	2	3.5.6
	(Or)					
17 b	Explain any one error metric which involved in the process of finding the image motion and explain the image alignment technique that gives high accuracy.	10	L3	4	4	3.5.6
18 a	Discuss elaborately the steps involved in producing an image compositing.	10	L2	5	2	3.5.6
	(Or)					
18 b	Explain the following feature based image alignment approaches. i. Robust least square and ii. RANSAC approaches	10	L3	5	4	3.5.6

***Performance Indicators are available separately for Computer Science and Engineering in AICTE examination reforms policy.**

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



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SRM Institute of Science and Technology
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SET B

DEPARTMENT OF COMPUTATIONAL INTELLIGENCE
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Test: CLAT-3 Date: 2 /11/2023
Course Code & Title: 18CSE390T & COMPUTER VISION Duration: 2 periods
Year & Sem: III YR & 5th Sem. Max. Marks: 50

Part - A
(10 x 1 = 10 Marks)

Instructions: Answer all

Q. No	Question	Marks	BL	CO	PO	PI Code
1	The process of simultaneously adjusting pose parameters and 3D point locations for a large collection of overlapping images is called A) Photogrammetry B) bundle adjustment C) gap closing D) misregistratiom	1	1	4	2	1.6.1
2	While performing the median filtering, suppose a 3*3 neighborhoods have values (3, 7, 2, 1, 0, 0, 9, 5, 8), then what is the median value to be given to the pixel under the filter? A) 0 B) 2 C) 3 D) 5	1	2	4	1	1.6.1
3	The Fast Fourier transform algorithm can compute the transform of an N X M image in an …….. operations A) O(NM) B) O(N2M2) C) O(NlogM) D) O(NM log NM)	1	2	4	4	2.2.4
4	Which of the following measures are not used to describe a region? 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	1	4	3	1.6.1
5	_____is set of connected pixel that lies on the boundary between two regions. A) Point B) Edge C) Colour D) Line	1	1	4	2	1.6.1
6	---------- is a kind of technique favoured by David Hockney to create the collages that he calls joiners. A) Perspective model B) Planar perspective motion C) Projective factorisation D) Factorisation	1	1	5	2	2.2.4
7	--------- can be used to estimate a series of rotation matrices and focal lengths. A) Parallax removal B) Gap Closing C) Rotational panorama	1	1	5	1	1.6.1

	D) Perspective model					
8	Which algorithm is most commonly used when the camera is known to be level and only rotating around its vertical axis? A) Image stitching B) Parallax removal C) Cylindrical Image stitching D) Gap closing	1	1	5	2	2.2.4
9	The process of simultaneously adjusting pose parameters for a large collection of overlapping images is called A) bundle adjustment B) Perspective model C) Image stitching D) Projective reconstruction	1	1	5	3	1.6.1
10	Kang estimated dense optical flow between each input image and a/an ---------- A) Output image B) Reference image C) Central Reference image D) Centrifugal image	1	1	5	2	1.6.1

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

Instructions: Answer any 4

11	How the Hierarchical motion estimation is applied to accelerate the search process?	5	3	CO-4	4	2.2.4
12	Explain the process of bundle adjustment with appropriate equations.	5	3	CO-4	2	1.6.1
13	Discuss in detail about gap closing in image stitching.	5	3	CO-5	1	2.2.4
14	Explain the rotational panoramas with a neat example.	5	3	CO-5	3	2.2.4
15	People prefer that the final stitched image is “upright” rather than twisted or tilted. Justify.	5	3	CO-5	1	2.2.4
16	Explain briefly about the process of finding the 3D point from 2D feature locations.	5	3	CO-4	2	1.6.1

Part – C (Answer any One) (2 x 10 = 20 Marks)						
17	a)How does hierarchical motion estimation is applied to accelerate the search process? Compare this method with fourier-based alignment. (OR) b) Illustrate a technique that have been developed to convert a projective reconstruction into a metric one	10	3	CO-4	4	3.5.6
18	a) Organize two-dimensional motion models in image stitching. (OR) b) Show the calculation of reconstruction of projective depth in an image by applying parallax?	10	3	CO-5	4	3.5.6

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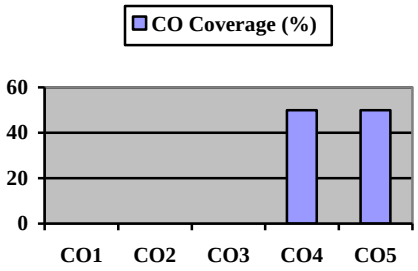
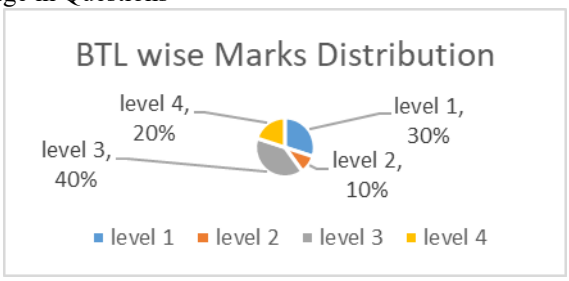
Course Outcome (CO) and Bloom's level (BL) Coverage in Questions





Approved by the Audit Professor/Course Coordinator: Yes

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SET C

DEPARTMENT OF COMPUTATIONAL INTELLIGENCE
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2023-2024 (ODD/EVEN)

Test: CLAT- 3 **Date:** 02-11-2023
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	Which one of the following refers the problem of triangulation? a) A problem of estimating a point's 2D location when it is seen from multiple cameras b) A problem of estimating a point's 3D location when it is seen from multiple cameras c) A problem of estimating a point's 3D location when it is seen from single camera d) A problem of estimating a point's 2D location when it is seen from single camera	1	L2	4	2	1.6.1
2	_____ refers to the process of estimating intrinsic and extrinsic parameters. a) Image calibration b) Point calibration c) Camera calibration d) Digital calibration	1	L1	4	1	1.6.1
3	When we process video sequences, we frequently obtain extended feature tracks from which we can reconstruct structure and motion using _____ technique. a) triangulation b) calibration c) factorization d) sparsity	1	L1	4	2	1.6.1
4	Which one of the following enhances the accuracy and reliability of 3D scene reconstructions from multiple images and camera views? a) triangulation b) Bundle adjustment c) sparsity d) calibration	1	L1	4	2	2.2.4
5	When lines are visible in three or more views, the _____can be used to transfer lines from one pair of image to another. a) trifocal tensor b) ground truth c) exploiting sparsity d) projective factorization	1	L1	4	2	1.6.1
6	_____ is the simplest possible motion model to use	1	L1	5	2	2.2.4

	when aligning images is to simply translate and rotate them in 2D. a) Image perspective motion b) projective factorization motion c) Planar perspective motion d) Planar intrinsic motion					
7	Which one is the most typical case for panoramic image stitching? a) when the camera undergoes a pure rotation b) when the camera undergoes a pure translation c) when the camera undergoes a pure scaling d) when the camera undergoes a pure reflection	1	L2	5	2	1.6.1
8	Images can also be projected onto a _____ which is useful if the final panorama includes a full sphere or hemisphere of views, instead of just a cylindrical strip. a) spatial surface b) spherical surface c) cylinder surface d) view surface	1	L1	5	2	1.6.1
9	RANSAC is used to find a set of _____ matches. a) non linear b) linear c) inlier d) non inlier	1	L1	5	1	2.2.4
10	Weighted averaging with a distance map is often called _____. a) feathering b) pointing c) computing d) normalizing	1	L1	5	2	1.6.1
	Part – B **(Answer any Four)** **(4 x 5 = 20 Marks)**					
11	Identify and explain the triangulation problem with relevant diagram.	5	L1	4	4	2.2.4
12	Explain how the bundle adjustment used in recovering the structure from motion.	5	L2	4	2	1.6.1
13	Explain the concept of Fourier-Based Alignment in Computational photography.	5	L2	4	4	2.2.4
14	Describe how the Planar perspective motion used in aligning images.	5	L1	5	2	2.2.4
15	Identify and explain why the Parallax removal required in image stretching.	5	L2	5	4	1.6.1
16	Summarize how the Recognizing panoramas used in image stitching.	5	L2	5	3	2.2.4

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

17a	Illustrate how the Projective Reconstruction used in recovering the structure from motion.	10	L3	4	4	**3.5.6**
	(or)					
17b	Explain how the Constrained Structure and Motion used in	10	L2	4	2	**3.5.6**

	recovering the structure from motion.					
18a	With neat sketch explain how the Cylindrical and spherical coordinates used in align images.	10	L3	5	4	**3.5.6**
	(or)					
18b	Discover the concept of Feathering and center-weighting with diagram.	10	L2	5	2	**3.5.6**

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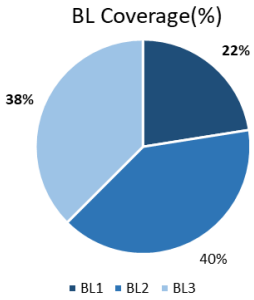
Course Outcome (CO) and Bloom's level (BL) Coverage in Questions



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SET D

DEPARTMENT OF COMPUTATIONAL INTELLIGENCE

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2023-2024 **(ODD/EVEN)**

Test: CLAT-3 **Date:- 02.11.2023**
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	Structure from Motion steps are a) 2D feature tracking->3D estimation->optimization-> geometry filtering b) geometry filtering ->2D feature tracking->3D estimation -> optimization c) both a and b d) None of these	1	L1	4	1	1.3.1
2	Epipolar lines a) are fine-scale features b) come in corresponding pairs c) are patch-scaling d)used in localization	1	L1	4	2	1.3.1
3	Projective reconstruction of the scene can be computed using a) domain orientation estimate b) point orientation estimate c) triangulation. d) pixel orientation estimate	1	L1	4	2	2.2.3
4	The most accurate way to recover structure and motion is _____. a) Triangularization b) Bundle adjustment c) Projection d) Time Invariant Operator	1	L1	4	2	2.2.3
5	Frame-rate image alignment is widely used in _____ a) speed up the computation. b) digital cameras to implement their image stabilization c) Smooth interpolating spline d) recursive finding points further away from current	1	L1	4	1	1.3.1
6	Simplest motion model uses a) translation b) rotation c) both a and b d) None of these	1	L1	5	1	1.3.1
7	Whiteboard and document scanning is the application of a) homography	1	L1	5	1	1.3.1

	b) rotation c) Planar perspective motion d) Objects					
8	The feature-based matching stage first extracts _____ a) topology of the curve as it evolves b) scale invariant feature transform (SIFT) c) Hough transform d) size of the line as it evolves	1	L1	5	1	1.3.1
9	Compositing gives a) combining features b) final compositing surface c)both a and b d)None of these	1	L1	5	2	2.2.3
10	Computer vision algorithms are used in a) retail industries b) surveillance and security c) healthcare d) Al of these	1	L1	5	2	2.2.3
	Part – B **(Answer any Four)** **(4 x 5 = 20 Marks)**					
11	What is the problem of triangularization. Explain the stages of triangularization.	5	L2	4	2	2.2.3
12	Write the algorithm of Perspective factorization.	5	L2	4	2	2.2.3
13	Summarize Line based Techniques in constraint structure and motion.	5	L2	4	2	2.2.3
14	Write the algorithm of Fourier based alignment.	5	L2	4	2	2.2.3
15	Identify the methods available for gap closing.	5	L2	5	2	2.2.3
16	Summarize the basic idea of Planar perspective motion. Explain with an example.	5	L2	5	2	2.2.3

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

17a	What is Structure from Motion? Explain the methods to do this.	10	L2	4	2	2.2.3
	(or)					
17b	Explain Hierarchical Motion Estimation in detail.	10	L3	4	2	2.2.3
18a	What is Parallax removal? Explain the methods to remove it.	10	L3	5	2	2.2.3
	(or)					
18b	Ilustrate the concepts of computer vision algorithms in autonomous vehicles and transportation .	10	L3	5	3	2.2.3

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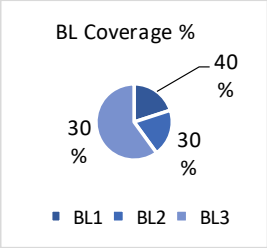
Course Outcome (CO) and Bloom's level (BL) Coverage in Questions



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