Code No: 138BH

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year II Semester Examinations, September - 2020
COMPUTER VISION
(Electronics and Communication Engineering)

Time: 2 Hours   **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks
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1.   Discuss in detail the following morphological operations:
        a) Erosion   b) Dilation   [7+8]

2.a)   List various approaches used in Image enhancement and then discuss any one method
        of it.
  b)   List and explain the fundamental steps in digital image processing.   [7+8]

3.   Name different types of boundary tracking procedures, explain the square tracing
        algorithm.   [15]

4.   Write a short note on followings:
        a) Fourier descriptors   b) Region descriptors.   [7+8]

5.a)   Distinguish Hough Transform and generalized Hough transform.
  b)   Discuss about the RANSAC for straight line detection.   [7+8]

6.a)   What is line detection, Explain the line detection by using HT?
  b)   Discuss about accurate center location by using Hough transform.   [7+8]

7.a)   How to evaluate extracted shape descriptors in 3D vision? Discuss.
  b)   Explain about photometric stereo.   [7+8]

8.a)   Discuss about combining views from multiple cameras.
  b)   Explain the identifying road signs in vehicle vision system.   [7+8]

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SIXTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018
Course Code: CS362
Course Name: COMPUTER VISION

Max. Marks: 100   Duration: 3 Hours

PART A
Answer all questions, each carries 3 marks.   Marks

1	Explain "foreshortening" with a neat illustration.	(3)
2	What is meant by an "Epipolar Constraint"? How is it represented algebraically?	(3)
3	How is radiance different from irradiance? Explain.	(3)
4	What is Stereopsis? What are the two processes involved in it?	(3)

PART B
Answer any two full questions, each carries 9 marks.

5	a)	What is BRDF? State its properties.	(4)
	b)	State and explain the Marr-Poggio-Grimson multi-scale algorithm for establishing stereo correspondences.	(5)
6	a)	What is SVD? State the Tomasi's and Kanade's factorization algorithm for affine shape from motion.	(6)
	b)	Write a short note on shadows.	(3)
7	a)	Explain the Affine Structure from motion theorem, with a neat illustration.	(6)
	b)	State the binocular fusion problem.	(3)

PART C
Answer all questions, each carries 3 marks.

8	How is supervised learning different from unsupervised learning. Explain with an example.	(3)
9	What is classification? How is it different from clustering? Explain with an example.	(3)
10	Explain the algorithm for geometric hashing.	(3)
11	Why is the role of feature extraction in pattern recognition considered highly important? Explain with an example.	(3)

PART D
Answer any two full questions, each carries 9 marks.

12	a)	Explain the design cycle of a pattern recognition system.	(5)
	b)	Write a note on Bayesian Decision Theory.	(4)
13	a)	What is meant by a pose? How can you hypothesize a correspondence between a collection of image features and a collection of object features, using pose	(6)

consistency?

b) What could cause uncorrelated estimates of pose? How can this issue be handled? (3)

14 a) How is prior probability related to posterior probability? What role do they play in decision making? Explain with an example. (5)

b) Write short notes on univariate and multivariate densitiy. (4)

PART E

Answer any four full questions, each carries 10 marks.

15 a) Explain the various steps in developing a clustering task, with a proper example. (5)

b) What are proximity measures? State two properties of a dissimilarity measure. Mention any two examples for dissimilarity measures, with equations. (5)

16 a) What are the different types of features that could be used for clustering? (2)

b) How are genetic algorithms used for pattern classification? State the recent advances in the field. (4)

c) Mention the ways in which neural network structures can be used for pattern recognition. (4)

17 a) What are decision trees? Explain the ID3 algorithm for classification. (5)

b) Write a short note on Classification And Regression Trees (CART). Explain with an example. (5)

18 a) State the K-Means algorithm for clustering. Apply K-Means algorithm on the following data set to obtain two clusters: (1, 1), (1.5, 2), (3, 4), (5, 7), (3.5, 5), (4.5, 5) and (3.5, 4.5). (7)

b) What are similarity measures? State any 3 examples for distance functions that can be used as similarity measures. (3)

19 What are Support Vector Machines? Explain with examples and neat illustrations. (10)

20 a) What are linear discriminant based classifiers? Explain the Perceptron algorithm for classification. (6)

b) How is the Minimum Mean Squared Error (MME) method used for classification? Explain with an example. (4)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: CS362

Course Name: COMPUTER VISION

Max. Marks: 100 Duration: 3 Hours

PART A
Answer all questions, each carries 3 marks.

Marks

1	State different limitations of a pinhole camera and how to overcome these limitations. Write a short note on thin lenses.	(3)
2	What is BRDF? How are areas sources different from line sources?	(3)
3	Explain trifocal geometry with neat sketch.	(3)
4	What is meant by image rectification?	(3)

PART B
Answer any two full questions, each carries 9 marks.

5	a)	Explain the different components of a vision system.	(3)
	b)	How is conversion from affine to euclidean images performed?	(3)
	c)	What are shadows? Differentiate umbra from penumbra.	(3)
6	a)	Explain Tomasi's and Kanade's factorization algorithm for affine shape from motion.	(5)
	b)	Compare weak perspective projection and orthographic projection in affine projection models.	(4)
7	a)	State any four limitations of thick lens.	(3)
	b)	Explain the different methods for solving the binocular fusion problem.	(6)

PART C
Answer all questions, each carries 3 marks.

8	Explain the design cycle of a pattern recognition system.	(3)
9	How is supervised learning different from unsupervised learning. Explain with an example.	(3)
10	What is meant by a pose?	(3)
11	Explain the process of obtaining hypothesis using invariants.	(3)

PART D
Answer any two full questions, each carries 9 marks.

12	a)	Write a short note on "Bayesian decision theory discrete feature" and "Bayesian	(6)

decision theory continuous feature".   .

	b)	What could cause uncorrelated estimates of pose? How can this issue be handled?	(3)
13	a)	Define the following terms 1) state of nature 2) feature space 3) class conditional probability density function 4) prior probability.	(4)
	b)	What is meant by pattern? Write a short note on pattern recognition system.	(5)
14	a)	Explain the algorithm for geometric hashing.	(6)
	b)	Differentiate pose consistency and pose clustering.	(3)

PART E

Answer any four full questions, each carries10 marks.

15	a)	What are decision trees? Explain any algorithm to build a decision tree.	(7)
	b)	Define Entropy and Gini-index with an example.	(3)
16	a)	What are linear discriminant based classifiers? Explain the Perceptron algorithm for classification.	(6)
	b)	Explain Minimum Squared Error Method (MSE) for Classification.	(4)
17	a)	State the K-Means algorithm for clustering.	(3)
	b)	Apply K-Means algorithm on the following data set to obtain three clusters: (1, 1), (1.5, 2), (3, 4), (5, 7), (3.5, 5), (4.5, 5) and (3.5, 4.5).	(7)
18	a)	What are distance measures? State any two properties of a similarity measure. Mention any two examples for dissimilarity measures, with equations.	(4)
	b)	What is the importance of genetic algorithm in pattern classification? Explain with an example.	(6)
19	a)	Explain the use of neural network structures for pattern recognition with an example.	(7)
	b)	Explain linear discriminant functions for single category and multi category.	(3)
20	a)	What are Support Vector Machines? Explain with an examples and neat illustrations and list out the advantages and disadvantages of SVM.	(10)

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