

Basavarajeswari Group of Institutions

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT
 (Autonomous Institute under Visvesvaraya Technological University, Belagavi)

2022 SCHEME

USN

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Course Code

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Sixth Semester B.E. Degree Examinations, May/June 2026

COMPUTER VISION ALGORITHMS & APPLICATIONS

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBT:CO: PI)</u>																
<u>Module-1</u>																			
1.	a. List the approaches used to understand depth of computer vision.	06	(1:1: 1.2.1)																
	b. Brief about the historical developments in the field of computer vision.	06	(2:1: 1.2.1)																
	c. Why padding is needed. Discuss all the padding techniques.	08	(3:1: 1.2.1)																
(OR)																			
2.	a. How do we classify images, list all the types of images.	06	(2:1: 1.2.1)																
	b. Draw the neat diagram of image sensing pipeline; mention the types of image sensor & factors affecting the sensor performance.	06	(3:1: 1.2.1)																
	c. Let's take 2D point P = (100, 50) apply the 2D transformations (i) Translation (using Tx=50 and Ty=30) (ii) Euclidean (using $\theta=30^\circ$) (iii) similarity transformation (using s=1.2) (iv) Affine transformation.	08	(3:1: 1.2.1)																
<u>Module-2</u>																			
3.	a. Write the main goal of image segmentation and discuss its types.	06	(1:2: 1.2.1)																
	b. Apply the region growing on following image data with seed point as (2,2) and threshold value as 2. (Use 4 neighbouring connectivity)	06	(3:2: 1.2.1)																
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0	1	2	0																
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0	2	5	1																
	c. Write an algorithm for Otsu's threshold detection method.	08	(2:2: 1.2.1)																
(OR)																			
4.	a. Discuss all the neighbourhoods in the image processing.	06	(3:2: 1.2.1)																
	b. Discuss any three edge detection operators with necessary matrix representing horizontal, vertical and diagonal edges.	06	(3:2: 1.2.1)																
	c. Describe in general Nilsson's A-algorithm as an application of graph search to edge detection.	08	(2:2: 1.2.1)																
<u>Module-3</u>																			
5.	a. Define Class, and Pattern in Object recognition.	06	(2:3: 1.2.1)																
	b. Discuss the XOR problem as linearly separable problem.	06	(3:3: 1.2.1)																

Note: (RBT - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator)

- c. Discuss any four knowledge representation techniques in computer vision. **08 (3:3: 1.2.1)**

(OR)

6. a. What is knowledge, how it helps in an object recognition system. **06 (2:3: 1.2.1)**
- b. A certain disease affects 1 % of a population. A diagnostic test for this disease has a 90 % probability of correctly identifying someone with the disease (sensitivity) and an 80 % probability of correctly identifying someone without the disease (specificity). If a person tests positive, what is the probability that they actually have the disease? **06 (3:3: 1.2.1)**
- c. Apply Support Vector Machine (SVM) for two class classification problem. **08 (3:3: 1.2.1)**

Module-4

7. a. List any four real world applications of regression. **06 (2:4: 1.2.1)**
- b. Discuss any three examples of matrix completion in handling of missing data. **06 (3:4: 1.2.1)**
- c. Discuss in detail the types of machine learning. **08 (3:4: 1.2.1)**

(OR)

8. a. With the example illustrate simple two classification problem. **06 (3:4: 1.2.1)**
- b. What are parametric and non-parametric machine learning model. **06 (2:4: 1.2.1)**
- c. Discuss in brief with necessary equations about,
(i) Linear regression (ii) Logistic regression. **08 (3:4: 1.2.1)**

Module-5

9. a. Discuss about Recurrent Neural Network (RNN) and Long Short – Term Memory (LSTM) with neat diagram. **10 (3:5: 1.2.1)**
- b. Differentiate the gradient and stochastic gradient descent optimization methods used in ANN. **10 (3:5: 1.2.1)**

(OR)

10. a. Describe the Convolutional Neural Network (CNN) structure and also explain the concept of kernel and maxpooling. **10 (3:5: 1.2.1)**
- b. Discuss any one training algorithm and two optimizations' techniques used in ANN. **10 (3:5: 1.2.1)**

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