Code: 20A30702b

R20

B.Tech IV Year I Semester (R20) Regular Examinations December/January 2024

AI FOR IMAGE ANALYSIS

(Common to AI&DS, CSE (AI) and CSE (AI&ML))

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) What is the relation between object and image coordinates for a pinhole camera? 2M

(b) Estimate how well the human vision system can estimate depth. Assume the focal length of the eye to be 17 mm and the stereo basis to be 65 mm. At which distance is the parallax equal to the spatial resolution of the eye? Assume that the eye is a diffraction-limited optical system with an aperture of 3 mm. 2M

(c) Name the two parameters on which the resolution of an image is dependent. 2M

(d) List the applications of Image Processing. 2M

(e) List the Variables and Data Types of Python. 2M

(f) Write Sci-kit image library's functions to read an image and displat it. 2M

(g) How Blending of Two Images is done using Open CV? 2M

(h) What is the use of Gradient in image processing? 2M

(i) What is the difference between supervised learning and unsupervised learning? 2M

(j) What is meant by Image Registration? 2M

PART – B

(Answer all the questions: 05 X 10 = 50 Marks)

2 What is Image formation model? Explain Sampling and Quantization. 10M

OR

3 In practical applications it is often required to carry out a tomography with as few as possible projections. Imagine that the angle intervals become larger and larger. Discuss what happens by using a point object with Gaussian shape and the standard deviation σ:
(i) When do artifacts commence and how do they look like?
(ii) Where do these artifacts occur first? 10M

4 Explain RGB color model. 10M

OR

5 Explain the steps involved in digital image processing. 10M

6 List and explain Python Conditional Statements with example. 10M

OR

7 What is Structural Similarity Index? 10M

8 Write notes on the following:
(i) Median Filter, (ii) Gaussian Filter. 10M

OR

9 Explain Histogram Equalization with an example. 10M

10 Discuss Image Registration using the RANSAC Algorithm. 10M

OR

11 Write about Real-Time Use Case of Detecting Faces. 10M

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