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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Computer Science & Engineering) (Artificial Intelligence & Machine Learning) (Sem.-7)

COMPUTER VISION

Subject Code : BTAIML-701-20

M.Code : 94006

Date of Examination: 21-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A

1. Write briefly :

- (a) Differentiate between sampling and quantization.
- (b) Discuss the effect of log transformation on an image.
- (c) Define Homography. What role does it play in image restoration?
- (d) What is the difference between low-pass filtering and high-pass filtering in frequency domain?
- (e) Differentiate between colour image smoothing and sharpening.
- (f) What is multiresolution expansion?
- (g) What is optical flow and how is it used to track the motion of objects in a scene?
- (h) What is the difference between fundamental and essential matrices?
- (i) Write applications of object recognition.
- (j) What are the different types of pattern classes?

SECTION-B

2. Explain the concept of power law transformation and discuss its applications in digital image processing.
3. What are noise models? Discuss additive and multiplicative noise models and explain how frequency domain filtering can be used to restore images degraded by them.
4. Describe various colour models and discuss their advantages and disadvantages for image processing tasks.
5. What is a loss function? Discuss different types of loss functions along with their advantages and disadvantages.
6. Discuss the importance of feature extraction and representation in object recognition. What are some common feature extraction and representation techniques?

SECTION-C

7. What is spatial filtering? Discuss different types of spatial filters explaining how they can be used to reduce noise and enhance image quality.
8. Explain the Discrete Fourier Transform (DFT) of two variables and its properties. How can the 2-D DFT be used to implement the Fast Fourier Transform (FFT)?
9. Explain the wavelet transform in one dimension and show how it can be used to decompose an image into different frequency subbands? Discuss the advantages of using wavelets over traditional Fourier transforms for image processing.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.