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18BM62

Sixth Semester B.E. Degree Examination, Feb./Mar.2022

Medical Image Processing

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the image sensing and acquisition in detail. (10 Marks)
- b. Illustrate the components of a general purpose image processing system. (10 Marks)

OR

- 2 a. Discuss the fundamental steps in digital image processing. (10 Marks)
- b. Explain the following:
 - (i) Relationship between pixels
 - (ii) M-adjacency (10 Marks)

Module-2

- 3 a. Explain the following terms:
 - (i) Two dimensional convolutions.
 - (ii) Arithmetic/logical operations on image. (10 Marks)
- b. Explain the sharpening spatial filters in detail. (10 Marks)

OR

- 4 a. Explain contrast stretching and bit plane slicing. (10 Marks)
- b. Explain the following terms:
 - (i) Image negative transformation.
 - (ii) Log transformation.
 - (iii) Power law. (10 Marks)

Module-3

- 5 a. Illustrate the Butterworth lowpass filter in frequency domain. (10 Marks)
- b. Explain the properties of 2D DFT:
 - (i) Translation and Rotation property.
 - (ii) Symmetry property.
 - (iii) Linearity property. (10 Marks)

OR

- 6 a. Illustrate the ideal low pass filter in frequency domain. (10 Marks)
- b. Explain the homomorphic filtering with neat diagram. (10 Marks)

Module-4

- 7 a. Explain the model of the image degradation/restoration process with relevant diagram. (10 Marks)
- b. Explain the following:
 - (i) Gaussian noise.
 - (ii) Rayleigh noise.
 - (iii) Exponential noise.
 - (iv) Uniform noise. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 8 a. Illustrate the coding redundancy spatial and temporal redundancy. (10 Marks)
b. Explain the functional block diagram of a general image compression system in detail. (10 Marks)

Module-5

- 9 a. Explain the following gradient operators :
(i) Roberts operator.
(ii) Prewitt operator.
(iii) Sobel operator. (10 Marks)
b. Illustrate the canny edge detector with relevant equations. (10 Marks)

OR

- 10 a. Illustrate the steps for Otsu's global thresholding algorithm in detail. (08 Marks)
b. Explain the following terms:
(i) Region growing in an image.
(ii) Region splitting and merging in an image. (12 Marks)

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