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Question Paper Code: U7B02

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Seventh Semester

Biomedical Engineering

21UBM702-MEDICAL IMAGE PROCESSING

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

PART A - (10 x 2 = 20 Marks)

1. Define image sampling and explain its role in digital image processing. CO1-U
2. List the significance of image acquisition in biomedical image processing in two sentences. CO1-U
3. Define contrast stretching in the context of image processing. CO1-U
4. Spatial filters are also called averaging filters. Provide a reason for this nomenclature in two sentences. CO3-Ana
5. Write down the mathematical formula for Salt and Pepper noise. CO1-U
6. State the significance of the signal-to-noise ratio (SNR) in the Wiener filter. CO1-U
7. Classify the types of discontinuity in digital image. CO2-App
8. Define region growing. CO1-U
9. Illustrate the need for Compression. CO3-Ana
10. Define run length coding. CO1-U

PART – B (5 x 16= 80 Marks)

11. (a) Illustrate the conversion of RGB color model to HSI model and vice versa in detail. CO3 -Ana (16)
- Or
- (b) Analyze the elements of visual perception in the context of human vision and describe the process of image formation in the eye. CO3 -Ana (16)
12. (a) Analyze the basic intensity transformation functions along with diagram. CO3 -Ana (16)

Or

- (b) Calculate the Logarithmic and Power Law Transformation for an CO3 -Ana (16)
given image with 7 bits where $c=1$ and $\gamma=0.2$

110	120	90
91	94	98
90	91	99

13. (a) Design wiener filtering approach for segmentation in detail. CO3 -Ana (16)

Or

- (b) Classify the different types of order statistics filtering in detail. CO3 -Ana (16)

14. (a) Illustrate the techniques used for region representation in detail. CO3 -Ana (16)

Or

- (b) Demonstrate how edge detection is performed? Explain hough transform and discuss how the edge points are linked. CO3 -Ana (16)

15. (a) Explain in detail on segmentation of ROI in blood vessels, lesions, tumour, lung nodules CO1 -U (16)

Or

- (b) Explain the need of image compression. How is run length encoding approach used for compression?it is lossy? Justify. CO1 -U (16)