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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Sixth Semester, B.E. - Electronics and Communication Engineering

Semester End Examination; June/July - 2015

Image Processing and Pattern Recognition

Time: 3 hrs

Max. Marks: 100

Note: Answer any FIVE full questions, selecting at least TWO full questions from each part.

PART - A

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|------|---|---|
| 1 a. | Explain different components of an image processing system with respective diagram. | 7 |
| | b. Explain any two applications of image processing. | 7 |
| | c. Describe the process of image acquisition using sensor strips. | 6 |
| 2 a. | Describe the procedures carried out for zooming and shrinking digital images. | 6 |
| | b. Describe the types of adjacency. Explain its role in defining a boundary. | 7 |
| | c. Explain various image operations with examples. | 7 |
| 3 a. | Explain any two piecewise-linear transformation functions. | 7 |
| | b. Explain the significance of power – law transformation with an example. | 7 |
| | c. Describe the applicability of logic operations in image enhancement. | 6 |
| 4 a. | Describe the basic steps involved in frequency domain filtering with a diagram. | 7 |
| | b. Explain the modification in the formula, that convert an Ideal low pass filter to Butterworth low pass filter of frequency domain. | 7 |
| | c. Explain the applications of Laplacian filters in image processing. | 6 |

PART - B

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| 5 a. | Explain various mean filters used in restoring an image. | 7 |
| | b. Explain the ways of estimating the parameters of periodic noise. | 6 |
| | c. What are order statistics filters? Explain how alpha trimmed filter performs better than other order statistics filter. | 7 |
| 6 a. | Explain the role of inverse filtering in restoration. | 6 |
| | b. Describe the RGB color model with the schematic of RGB color cube. | 7 |
| | c. Describe the processing techniques applicable to full color images. | 7 |
| 7 a. | Define features with respect to pattern recognition. Explain any two applications of pattern recognition. | 7 |
| | b. Define random variables. Explain, how the outcomes can be modelled by
i) Binomial distribution and ii) Poisson distribution. | 7 |
| | c. Describe any one method for estimating the parameters of density. | 6 |
| 8 a. | Explain the role of multiple features with necessary modifications in the formulae. | 6 |
| | b. Explain model – based estimation method for evaluating the error rate of a classifier. | 7 |
| | c. Explain the significance of Receiver Operating Characteristic (ROC) curve. | 7 |