CS560 Digital Image Processing 3-0-0-6

Pre-requisites : Nil

Introduction - Elements of digital image processing systems, Elements of visual perception, brightness, contrast,hue, saturation, mach band effect, Color image fundamentals -RGB, HSI models, Image sampling, Quantization,dither, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT, KLT, SVD. Image Enhancement - Histogram equalization and specification techniques, Noise distributions, Spatial averaging,Directional Smoothing, Median, Geometric mean, Harmonic mean, Contraharmonic mean filters, Homomorphic filtering, Color image enhancement. Image restoration - Degradation model, Unconstrained restorationLagrange multiplier and Constrained restoration, Inverse filtering-removal of blur caused by uniform linear motion, Wiener filtering, Geometric transformations-spatial transformations. Image segmentation – Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing –Region splitting and Merging – Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm. Compression - Need for data compression, Huffman, RunLength Encoding, Shift codes, Arithmetic coding, Vector Quantization, Transform coding, JPEG standard, MPEG. Image. Morphology - Preliminaries, dilation, erosion, open and closing, hit or miss transformation,basic morphologic algorithms.

Texts

1. Digital Image Processing, Rafael C.Gonzalez, Richard E.Woods, Second Edition, Pearson Education/PHI,2000.

2. . W.K.Pratt, Digital Image Processing ,3/e Edn., John Wiley & sons, Inc. 2006.

3. K. R. Castleman, Digital Image Processing, Pearson, 2006.

4. Anil K. Jain, Fundamental of image processing, Pearson, 2002.

References

1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning, 2008.

2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson CourseTechnology,2001.

3. Computer Vision and Image Processing, Adrian Low, Second Edition, B.S. Publications, 2005.

4. Digital Image Processing using Matlab, Rafael C.Gonzalez, Richard E.Woods, Steven L. Eddins, PearsonEducation, 2007.