Diploma, Anna University-UG, PG., HSC & SSLC

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CP5071 IMAGE PROCESSING AND ANALYSIS

DETAILED SYLLABUS

OBJECTIVES

- To understand the image processing concepts and analysis
- To understand the image processing techniques
- To familiarize the image processing environment and their applications,
- To appreciate the use of image processing in various applications

UNIT I IMAGE PROCESSING FUNDAMENTALS

Introduction – Elements of visual perception, Steps in Image Processing Systems – Digital Imaging System - Image Acquisition – Sampling and Quantization – Pixel Relationships – File Formats – colour images and models - Image Operations – Arithmetic, logical, statistical and spatial operations.

UNIT II IMAGE ENHANCEMENT AND RESTORATION

Image Transforms -Discrete and Fast Fourier Transform and Discrete Cosine Transform, Spatial Domain - Gray level Transformations Histogram Processing Spatial Filtering – Smoothing and Sharpening. Frequency Domain: Filtering in Frequency Domain – Smoothing and Sharpening filters – Homomorphic Filtering., Noise models, Constrained and Unconstrained restoration models.

UNIT III IMAGE SEGMENTATION AND MORPHOLOGY

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Motion Segmentation, Image Morphology: Binary and Gray level morphology operations - Erosion, Dilation, Opening and Closing Operations Distance Transforms- Basic morphological Algorithms. Features – Textures - Boundary representations and Descriptions- Component Labeling – Regional descriptors and Feature Selection Techniques.

UNIT IV IMAGE ANALYSIS AND CLASSIFICATION

Image segmentation- pixel based, edge based, region based segmentation. Active contour models and Level sets for medical image segmentation, Image representation and analysis, Feature extraction and representation, Statistical, Shape, Texture, feature and statistical image classification.

UNIT V IMAGE REGISTRATION AND VISUALIZATION

Rigid body visualization, Principal axis registration, Interactive principal axis registration, Feature based registration, Elastic deformation based registration, Image visualization – 2D display methods, 3D display methods, virtual reality based interactive visualization.

REFERENCES

1. Alasdair McAndrew, ―Introduction to Digital Image Processing with Matlab‖, Cengage Learning 2011,India

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4. Rafael C.Gonzalez and Richard E.Woods, ―Digital Image Processing‖, Third Edition, Pearson Education, 2008, New Delhi

5. S.Sridhar, ―Digital Image Processing‖, Oxford University Press, 2011