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CP5079

DIGITAL IMAGE AND VIDEO PROCESSING

L T P C
3 0 2 4

OBJECTIVES:

- To understand broad range of image processing techniques and their applications.
- To learn about video processing techniques and understand the video content.
- To appreciate various techniques used for acquisition, preprocessing, enhancement and analysis of image and video data.
- To appreciate the use of image& video processing in current technologies.
- To expose the students to real-world applications and case studies of the image& video processing.

UNIT I FUNDAMENTALS OF IMAGE PROCESSING

9+6

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

UNIT II IMAGE ENHANCEMENT AND RESTORATION

9+6

Image Transforms – Enhancement in the Spatial Domain – Enhancement in the Frequency Domain – Image restoration.

UNIT III IMAGE SEGMENTATION AND MORPHOLOGY

9+6

Detection of Discontinuities – Edge operators- Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Motion Segmentation- 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 BASICS OF VIDEO PROCESSING

9+6

Introduction – Video Sampling and Interpolation- Motion Detection and Estimation – Video Enhancement and Restoration

UNIT V VIDEO SEGMENTATION, TRACKING & APPLICATIONS

9+6

Video Segmentation- Motion Segmentation- Motion Tracking in Video-Video Quality Assessment- Case Studies – Image processing in Biometrics, Image Security, Steganography and Watermarking, Stereo vision, Object Segmentation and Tracking in the Presence of Complex Background in video, Forensic video analysis.

TOTAL: 45+30 :75PERIODS

OUTCOMES:

Upon completion of the course, the student will be able to

- Have a clear impression of the breadth and practical scope of digital image processing and have arrived at a level of understanding that is the foundation for most of the work currently underway in this field.
- Critically analyze the role of video in modern technologies.
- Implement basic image and video processing algorithms.
- Design and develop various applications that incorporates different techniques of Image and Video processing.
- Apply and explore new techniques in the areas of image and video Processing.

REFERENCES:

1. Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing", Third Edition, Pearson Education, New Delhi, 2008,.
2. S.Sridhar, "Digital Image Processing", Oxford University Press, New Delhi, 2011.
3. Al Bovik (Alan C Bovik, "The Essential Guide to Video Processing", Academic Press, Second Edition, 2009.
4. A. Murat Tekalp, "Digital Video Processing", Prentice Hall, 1995.
5. Oges Marques, "Practical Image and Video Processing Using MATLAB", Wiley-IEEE Press, 2011.

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CP5085**PRINCIPLES OF CRYPTOGRAPHY****L T P C****3 0 2 4****OBJECTIVES:**

- To understand the mathematical foundations of security principles.
- To appreciate the different aspects of encryption techniques.
- To understand various attacks present over encryption and authentications techniques.
- To understand the role played by authentication in security.
- To appreciate the current trends of security practices.

UNIT I CLASSICAL ENCRYPTION AND BLOCKCIPHERS**9+6**

Classical Encryption – Substitution Cipher – One-time-pad Encryption – Block Ciphers – DES – Key Recovery Attacks on Block Ciphers – Iterated-DES and DESX – AES – Limitations of Key-recovery based Security.