21CSE14	IMAGE AND VIDEO PROCESSING	L	T	P	C
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Course Objectives

- Understand Sampling and quantization and Image Transforms
- Able to know various filters and frequency domain methods
- Learn Compression techniques available
- Learn steps of video processing
- Learn Motion Estimation methods

UNIT I	FUNDAMENTALS OF IMAGE PROCESSING AND IMAGE TRANSFORMS	9 Hours

Fundamentals of Image processing and Image Transforms: Basic steps of Image processing system sampling and quantization of an Image – Basic relationship between pixels Image Transforms: 2 – D Discrete Fourier Transform, Discrete Cosine Transform (DCT), Discrete Wavelet transforms

UNIT II	IMAGE PROCESSING TECHNIQUES	9 Hours

Image Enhancement: Spatial Domain methods: Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial filters, Sharpening Spatial filters Frequency Domain methods: Basics of filtering in frequency domain, image smoothing, image sharpening, selective filtering Image Segmentation: Segmentation concepts, point, line and Edge detection, Thresholding, region based segmentation

UNIT III	IMAGE COMPRESSION	9 Hours

Image compression fundamentals – coding Redundancy, spatial and temporal redundancy. Compression models : Lossy and Lossless, Huffmann coding, Arithmetic coding, LZW coding, run length coding, Bit Plane coding, transform coding, predictive coding , wavelet coding, JPEG standards

UNIT IV	BASIC STEPS OF VIDEO PROCESSING	9 Hours

Analog video, Digital Video, Time varying Image Formation models : 3D motion models, Geometric Image formation , Photometric Image formation, sampling of video signals, filtering operations

UNIT V	2-D MOTION ESTIMATION	9 Hours

Optical flow, general methodologies, pixel based motion estimation, Block matching algorithm, Mesh based motion Estimation, Global Motion Estimation, Region based motion estimation, multi resolution motion estimation. Waveform based coding, Block based transform coding, predictive coding, Application of motion estimation in video coding.

UNIT VI	CASE STUDY	

Case Study on Video Coding

TOTAL PERIODS: 45

Course Outcomes:

At the end of the course, Students can able to

- Understand Image processing and Image Transforms
- Understand Image processing techniques
- Know about Image compression, Video Processing and Motion Estimation

Text books:

1. Gonzaleze and Woods ,"Digital Image Processing ", 3rd edition , Pearson
2. Yao wang, Joem Ostarmann and Ya – quin Zhang, "Video processing and communication ",1st edition , PHI

Reference Books:

1. M. Tekalp ,"Digital video Processing", Prentice Hall International