Digital Image Processing

Lecture 1: Introduction to Digital Image Processing

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1.Introduction

1.1. **Course goals**

1.2. The basic concepts of **Image and Video Processing System**

1.3. **Applications** of Digital Image and Video Processing

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1.1. **Course goals**

Provides basic and advanced methods of **Processing, Transforming, Analyzing and Compressing** digital images and digital videos to exploit the two basic properties of digital images, digital videos : **visual cues and semantic cues**.

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1.1. **Course goals**

Processing: color, geometry, local preprocessing.

Transform: Fourier transform, Karhunen Loève transformation.

Analysis: image and video segmentation.

Compression: lossless and lossy image compression.

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1.2. The basic components of **Image Processing System**

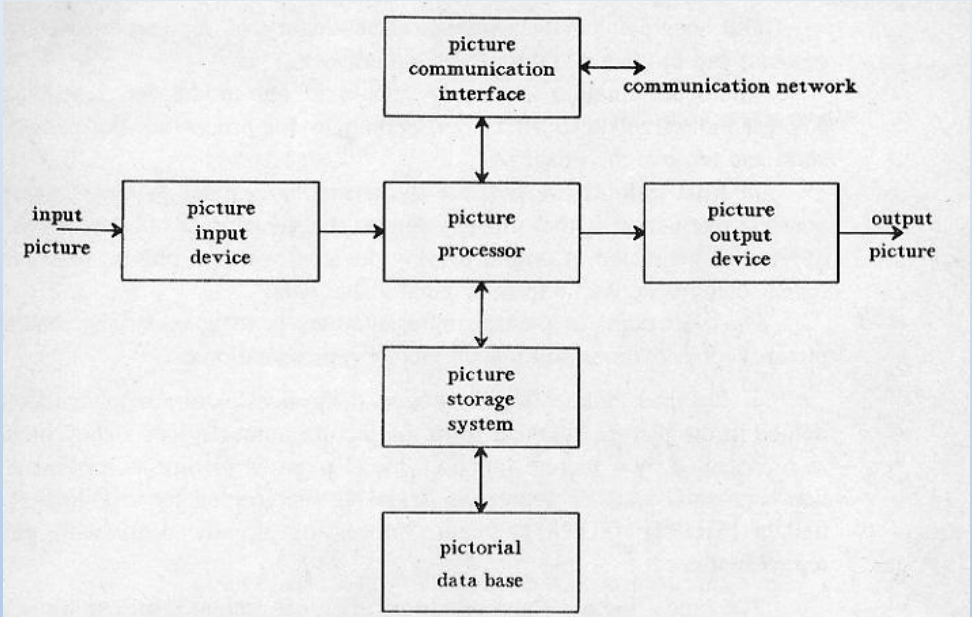

Fig1.1 Pictorial information system.

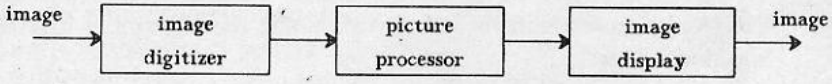

Fig1.2 A picture processing system.

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1.3. **Applications** of Digital Image and Video Processing

Image Enhancement, Image Segmentation, Image Transformation, Image Restoration, Image Compression, Watermarking and Steganography, Forensics,etc.

- **Super Video Resolution**
- Stitching Video 360
- **Automatic Image Segmentation and Annotation**
- Seamless Cloning
- **Video Denoise-Deblur-Stabilization**
- Watermarking-Steganography
- **Forensics** (Image Forgeries Detection)
- Inpainting (Fast Marching)
- **Real-time Video Manipulation**

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1.3. **Applications** of Digital Image and Video Processing

- **Pattern recognition**

  Face recognition, Human actions recognition, Human gestures recognition, Optical character recognition,…

- **Visual Information Retrieval**

Objects Retrieval, Scene Retrieval, Event Retrieval,…

- Remote sensing, Technical diagnostics,
- **Autonomous vehicle guidance**
- **Automatic surveillance**
- **Biomedical Imaging**