

PSI2651 – Processamento, Análise e Síntese de Imagens

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Course Content

- Introduction
- Digital Image Fundamentals
- Image Transforms
- Image Enhancement
- Image Restoration
- Image Compression
- Image Segmentation
- Image Reconstruction from Projections *
- Representation and Description
- Recognition and Interpretation

Recommended Text

- R. C. Gonzalez and R.E. Woods, “Digital Image Processing”, Reading, MA, 1992 (reprinted 1993).
- N. D. A. Mascarenhas and F. R. D. Velasco, “Processamento Digital de Imagens”, IV Escola de Computação, IME-USP, 1984.
- E. L. Hall, “Computer Image Processing and Recognition”, Academic Press, New York, 1979.
- A. Rosenfeld and A. C. Kak, “Digital Picture Processing” 2nd. Ed., v. 1 and 2, Academic Press, New York, 1982.
- K. R. Castleman, “Digital Image Processing”, Prentice-Hall, Englewood Cliffs, NJ, 1982.
- P. M. Embree and B. Kimble, “C Language Algorithms for Digital Signal Processing”, Prentice Hall, NJ, 1991.

Introduction

- It has been estimated that 75% of the information received by a human is VISUAL !!!!
- Computer Processing of Visual Information - the Digital Image Processing Revolution - was triggered by processing needs in developments such as lunar and other space missions, remote sensing, medical imaging, picture phone & digital television, and entertainment.

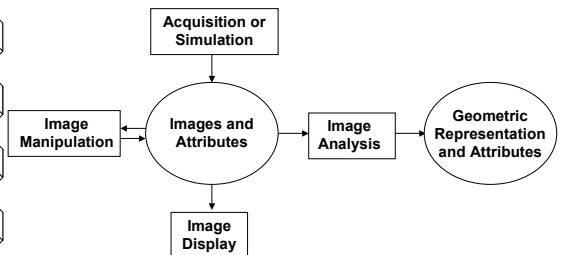
Introduction

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Image Processing
Computer Graphics
Computer Vision
Pattern Recognition
Scientific Visualization
Volume Visualization
Visual Computing
.....

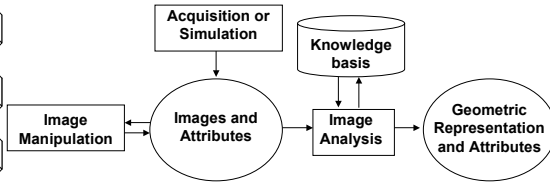
Introduction

- Image Processing



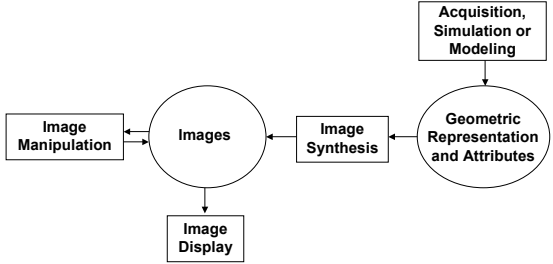
Introduction

• Pattern Recognition



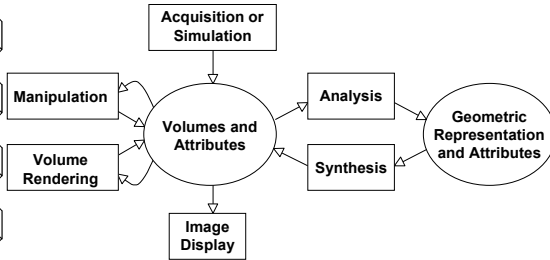
Introduction

• Computer Graphics



Introduction

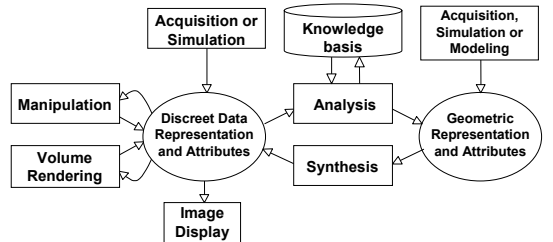
• Volume Visualization



Introduction

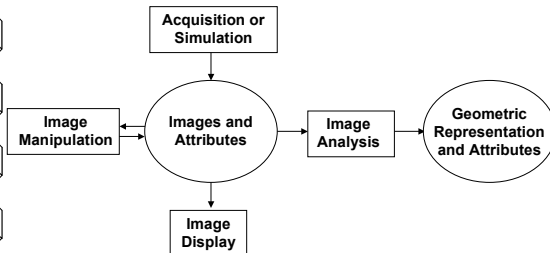
• Visual Computing = IP + PR + CG + VV

- faster, bigger storage & cheaper computers ⇨ Viability
- engineering, medical imaging, geosciences, physics modeling, archeology ⇨ Applicability



Introduction

• This course will concentrate on Digital Image Processing



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Introduction

- Applications
 - Medical
 - Chromosome classification
 - blood cell analysis
 - chest radiograph analysis
 - computed tomography
 - digital radiography
 - Remote Sensing
 - land use & resource study
 - detection of forest fires
 - iceberg movements
 - weather prediction

Introduction

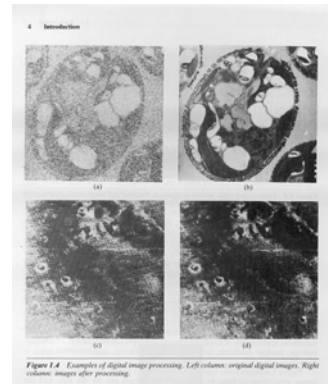
- Applications
 - Geology
 - Oil & Mineral Exploration
 - Seismic Imaging
 - Oceanography
 - Ocean bed analysis
 - Plate Tectonics
 - Astronomy
 - Study of atmosphere
 - Brightness Patterns of Stars

Introduction

- Applications
 - Consumer Electronics
 - Optical Character Recognition
 - Picture Phone
 - Automation
 - Robot vision
 - Inspection & control quality systems
 - Entertainment

Introduction

- Examples



Introduction

- Examples

