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Digital Image Processing Fundamentals

Chapter 1

Introduction

Answers to the Chapter Questions

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Chapter 1:

Introduction

1.1 What is digital image processing

Questions/Answers

1. What is the difference between digital image processing and digital image analysis?

In digital image processing both input and output are images whereas in digital image analysis the system output is an image model.

2. What is the relationship between digital image analysis and robot vision?

Robot vision uses digital image analysis in order to model the input image and detect and recognize the image objects.

1.2 Topics of digital image processing and analysis

Questions/Answers

1. What is the difference between digital image analysis and computer graphics?

The input of a digital image analysis system is an image, whereas the output is a symbolic description. On the contrary, the input of a computer graphics system is a symbolic model and the output is an image (image synthesis).

2. What is the relationship between digital image processing and pattern recognition?

In object recognition applications image processing is usually considered as a preprocessing step before pattern recognition.

3. What is the most important problem in digital TV?

The biggest problem in digital TV is that digital video needs a lot of storage space. Therefore, high compression is needed for digital video storage and transmission.

4. What is the biggest problem in multimedia databases;

The biggest problem in multimedia databases is content-based search and retrieval of images as well as the storage/compression of multimedia data.

1.3 Digital image processing topics

Questions/Answers

1. What do we gain or lose when we digitize a text document as binary image instead of graylevel image?

We gain in storage space but we have poor quality.

2. What is the relationship between the physical texture and the image texture?

In general they are not related. However, the details in the physical texture of a material can be recorded as details in the image texture.

3. Which type images needs more storage space: the graylevel or the color ones?

Color images need the same storage space to equally sized grayscale images (1 byte/pixel) when they employ a 256 color map (1 byte/pixel) and 3 times more space when they are true color images (3 bytes/pixel).

4. What we gain or loose if we pack 8 binary pixels in one byte?

We gain storage space and we lose in access speed, since we have to perform bit shifts in order to retrieve a particular pixel.

5. What needs more storage space, a second of digital video or a digital film with 24 images?

A digital film needs storage space equal to the number of vertical pixels times the number of horizontal pixels (image size) times the number of images in the digital film. Video requires storage space equal to the size of the video frame (e.g. 720x576 pixels) times the number of frames per 1 second (e.g. 25 in the case of PAL).