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FACULTY OF EGINEERING

Digital Image Processing
LECTURE-34

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OUTLINE

- Introduction to image segmentation
- MCQ
- References

Introduction to image segmentation

•The purpose of image segmentation is to partition an image into meaningful regions with respect to a particular application

•The segmentation is based on measurements taken from the image and might be greylevel, colour, texture, depth or motion

•Usually image segmentation is an initial and vital step in a series of processes aimed at overall image understanding

•Applications of image segmentation include

•Identifying objects in a scene for object-based measurements such as size and shape

•Identifying objects in a moving scene for object-based video compression (MPEG4)

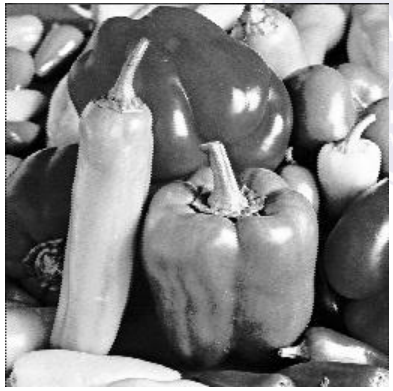
•Identifying objects which are at different distances from a sensor using depth measurements from a laser range finder enabling path planning for a mobile robots

Introduction to image segmentation

Example 1

Segmentation based on greyscale

Very simple ‘model’ of greyscale leads to inaccuracies in object labelling

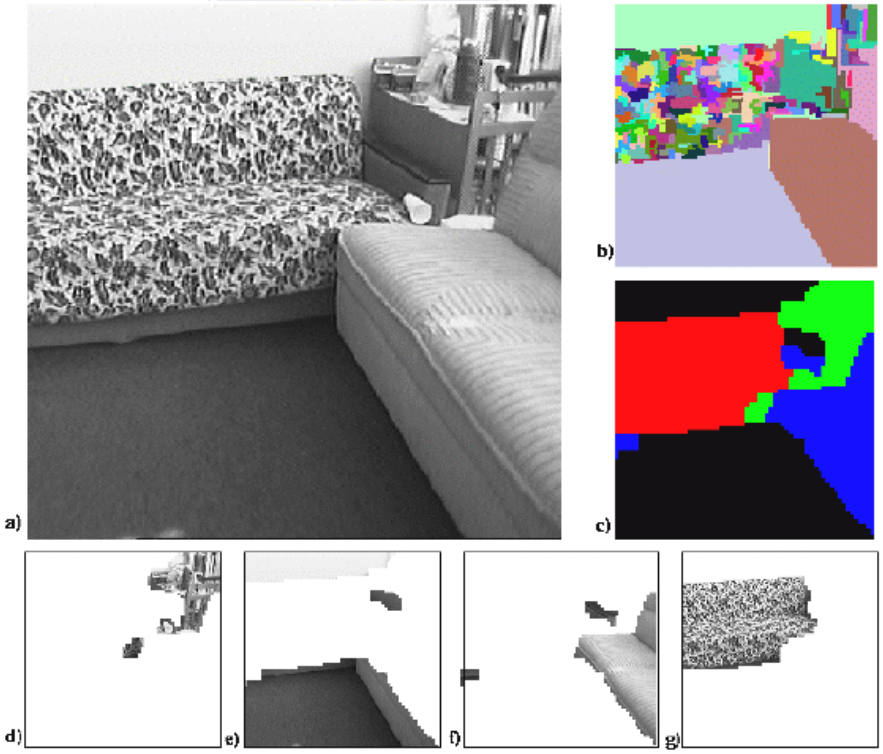


Introduction to image segmentation

Example 2

Segmentation based on texture

Enables object surfaces with varying patterns of grey to be segmented



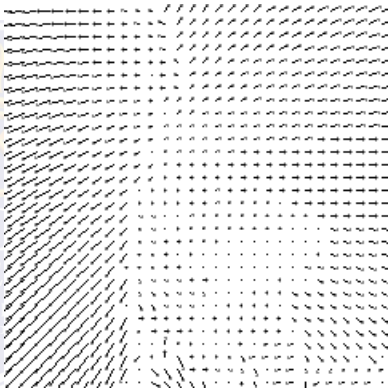
Introduction to image segmentation

Example 3

Segmentation based on motion

The main difficulty of motion segmentation is that an intermediate step is required to (either implicitly or explicitly) estimate an optical flow field

The segmentation must be based on this estimate and not, in general, the true flow



Introduction to image segmentation

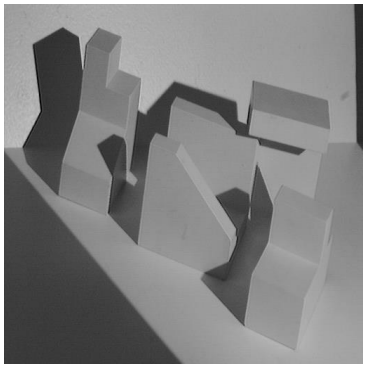
Example 4

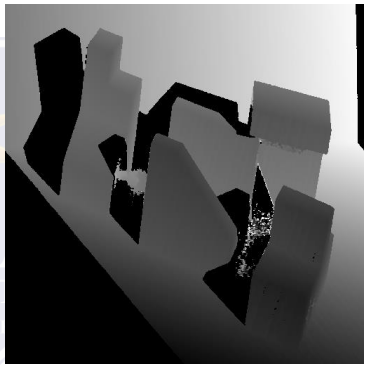
Segmentation based on motion

The main difficulty of motion segmentation is that an intermediate step is required to (either implicitly or explicitly) estimate an optical flow field

The segmentation must be based on this estimate and not, in general, the true flow

Original image





Range image

Segmented image

MCQ

1. What is the difference between Convolution and Correlation?
   a) Image is pre-rotated by 180 degree for Correlation
   b) Image is pre-rotated by 180 degree for Convolution
   c) Image is pre-rotated by 90 degree for Correlation
   d) Image is pre-rotated by 90 degree for Convolution

2. Convolution and Correlation are functions of _____
   a) Distance
   b) Time
   c) Intensity
   d) Displacement

3. The function that contains a single 1 with the rest being 0s is called _____
   a) Identity function
   b) Inverse function
   c) Discrete unit impulse
   d) None of the Mentioned

MCQ

4. Which of the following involves Correlation?

a) Matching

b) Key-points

c) Blobs

d) None of the Mentioned.

5. An example of a continuous function of two variables is _____

b) Intensity function

c) Contrast stretching

d) Gaussian function

References

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▪ Fundamentals of Digital Image Processing, A.K. Jain. Published by Prentice Hall,Upper Saddle River, NJ.