Scene Segmentation and Interpretation

Image Segmentation
(Region Growing)

Introduction

The segmentation is an essential part of many computer vision systems. The goal is the partition of an image into a set of non-overlapped regions whose union is the entire image. For instance, the Region Growing algorithm is a well-known solution, fast, easy to implement and provides good results even for complex images.

In this coursework the main goal is to develop a Region Growing algorithm for segmenting an image. The implemented algorithm should work for grey level images and colour images. The results have to be compared with the result of the Fuzzy C-Means (FCM) clustering algorithm (mostly provided in Matlab) on the same images.

Matlab guidelines:

- Recursive implementation is going to be a problem due to the maximum number of recursive calls allowed. Therefore, sequential implementation is preferable.
- The segmentation labelling can be done in grey level or colour.

Objectives

A) Information search. Team work.

B) To understand segmentation algorithms. To design, analyse and implement the Region Growing algorithm in Matlab.

C) To test the algorithm at least with the provided images. To study the problems and possible improvements.

D) To compare the results obtained with both segmentation algorithms.

E) Documentation.

Coursework:

A) A report of the practice with the following sections:

1) Introduction and problem definition.
2) Algorithm analysis.
3) Design and implementation of the proposed solution.
4) Experimental section and results (speed, quality ...).
5) A brief discussion regarding the algorithms (parameters, algorithms comparison …)
6) Organization and development of the coursework (tasks, time estimations and real dedication).
7) Conclusions.

B) Matlab code with comments.

Coursework Evaluation:

A) During the labs.

B) After the coursework.

DEADLINE: 4th *March*. Late submission will be penalised.