# Scene Segmentation and Interpretation

Image Characterisation using Texture

## Introduction

Texture is an important image feature used in many computer vision systems. In this coursework, we will analyse and implement one of the most common statistical methods in order to extract texture descriptors: co-occurrence matrices. They are fast and easy to implement, and provide good results that could be used in a posterior step to perform image segmentation and object recognition / classification.

Regarding the final objective, texture can be computed globally or locally. By globally, it is understood that all pixels in the image are used to compute a final vector of features. In contrast, locally means that texture is computed at each pixel by using just its neighbourhood. Hence, each pixel will have its own vector of features. In this coursework we will develop both approaches.

Firstly, the goal is to be able to create output images corresponding to different texture descriptors. Therefore, we will apply the co-occurrence matrices at local level producing descriptors for each pixel. We will then use these descriptors to enhance the Region Growing segmentation algorithm developed in the first coursework.

Matlab guidelines:

- graycomatrix: compute co-occurrence matrices.
- graycoprops: compute some statistics from the matrices (Contrast, Energy, Homogeneity and Entropy). You can also compute some of the others.

Secondly, the goal is to produce a vector of features for an image, and use this information to classify the images in different classes. We have the script *scr_classify* that uses the weka library to classify the images of the dataset with one classifier called “Random Forests”. This script calls the function *computeFeatureVector*, which is the function that extracts the features from the images.

## Objectives

**A)** To understand the texture descriptors and its different use (local, global). To design, analyse, and implement the algorithms in matlab.

**B)** To test the Region Growing algorithm using the texture features with the provided images.

**C)** To classify the dataset Textures using texture features.

**Coursework: 2 sessions (4 hours)**

**A)** Coursework documentation 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 analysis (speed, quality, etc).
5) Organization and development of the coursework (tasks, time estimations and real dedication).
6) Conclusions.

**B)** Matlab code with comments.

**Coursework Evaluation:**

**A)** During the labs.
**B)** After the coursework.

**DEADLINE:** March 19 (Wednesday group*)* and March 20 (Thursday group). Late submission will be penalised.