

TNM087 – Image Processing and Analysis

Lab 4

TASK 3 – Segmentation, object features and classification

In this task you are given images containing grains of rice and macaronis in two different sizes. The rice and macaronis can be considered as objects of three different classes, i.e. *rice*, *small macaronis* and *large macaronis*. Your task is to modify the code in *CountObjects.m* to segment the grains of rice and the macaronis from the background, and classify each objects into the different classes based on object features. After classification, you should return the number of objects belonging to each class, as well as an image displaying the objects in different colors.

Since the methods required to perform this task had been introduced in the preparations (and/or other previous tasks), we keep these instructions short. If you have finished (and understood) the previous tasks, you should have no problem solving this task using a similar methodology.

We recommend you to follow the following steps:

1. Segment the input image RGB color image into a binary image. Choose an appropriate color channel.
2. Remove noise and make sure that your segmented image contains only the relevant objects. Remember that also single foreground pixels will be labelled as objects.
3. Label the objects.
4. Compute relevant object features that can be used for classification.
5. Classify the objects based on object features and count the number of objects for each class.
6. Create an RGB-image displaying the different classes of objects in different colors.

Your code should be general enough to return the correct number of objects for the three test images:

Image	Rice	Small macs	Large macs
<i>MacnRice1.tif</i>	48	12	6
<i>MacnRice2.tif</i>	60	14	6
<i>MacnRice3.tif</i>	42	11	5