Homework 3 OpenCV

Computer Vision 2021/22

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April 25th 2022

This homework report purpose is to provide the experimental results of some application of OpenCV library. In this case we're going to see some application of segmentation algorithms. Comments on problems encountered and conclusions are also provided at the end of the document.

We're using as input the images from previous labs and three more images representing cracks on the asphalt.

Task 1

Task 1 requires to perform segmentation of the cracks on the asphalt from 3 different photo with different noise, brightness and color condition. Three different approaches are used (there was another one which used watershed algorithm but didn't work well).

1. simple Region Growing algorithm after blur threshold and erosion.
2. a reference using threshold only
3. a more elaborated region growing algorithm with seed points picked manually for better accuracy

Here are the seed picked for each image

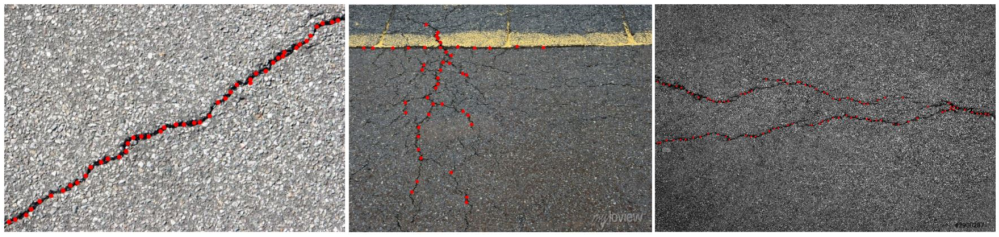

Image 1: Seeds

Here are the final results, the rows are the different images and each column is one different approach.

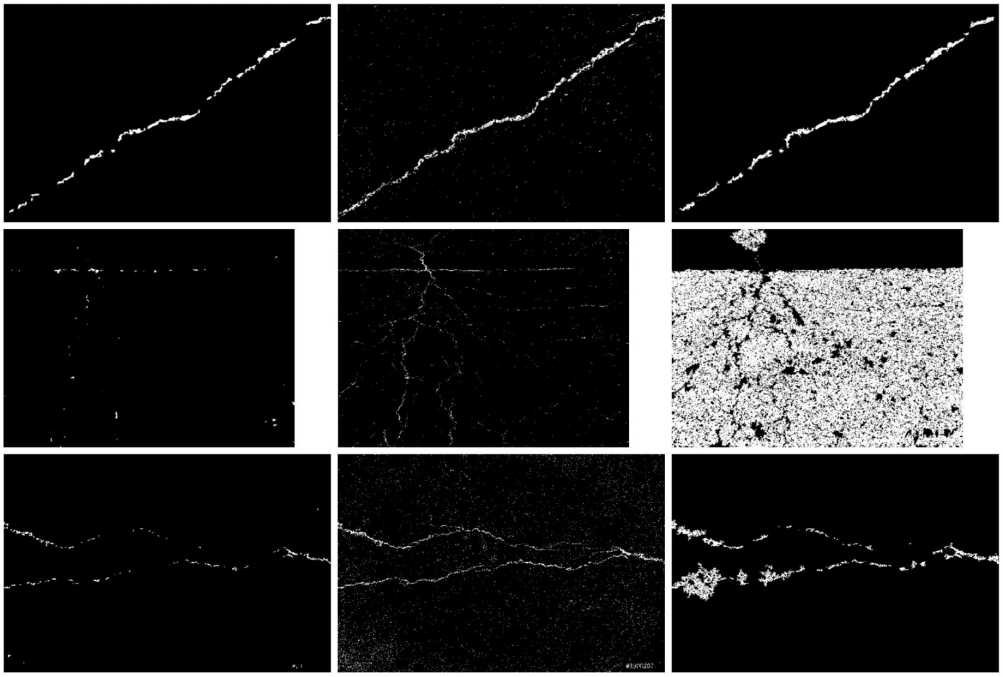

Image 1: Crack segmentation

Task 2

Task 2 requires to segment the image from Lab 4 to separate the sky, the road and anything else. We use a cluster oriented approach using k-means:

Image 2: Clustering

Task 3

In this task we need to segment the robots' yellow shirts. Following the previous task we use again clustering and we filter out what we don't need using using inRange in HSV color space.

Conclusions

The main problems encountered in this homework mainly concerned the elaboration of the regionGrowing algorithm from scratch. It was also really difficult to tune the parameters adequately to obtain a good result, for example region growing 2 not worked as expected even giving input seeds manually. Unfortunately segmentation is a pretty difficult task.

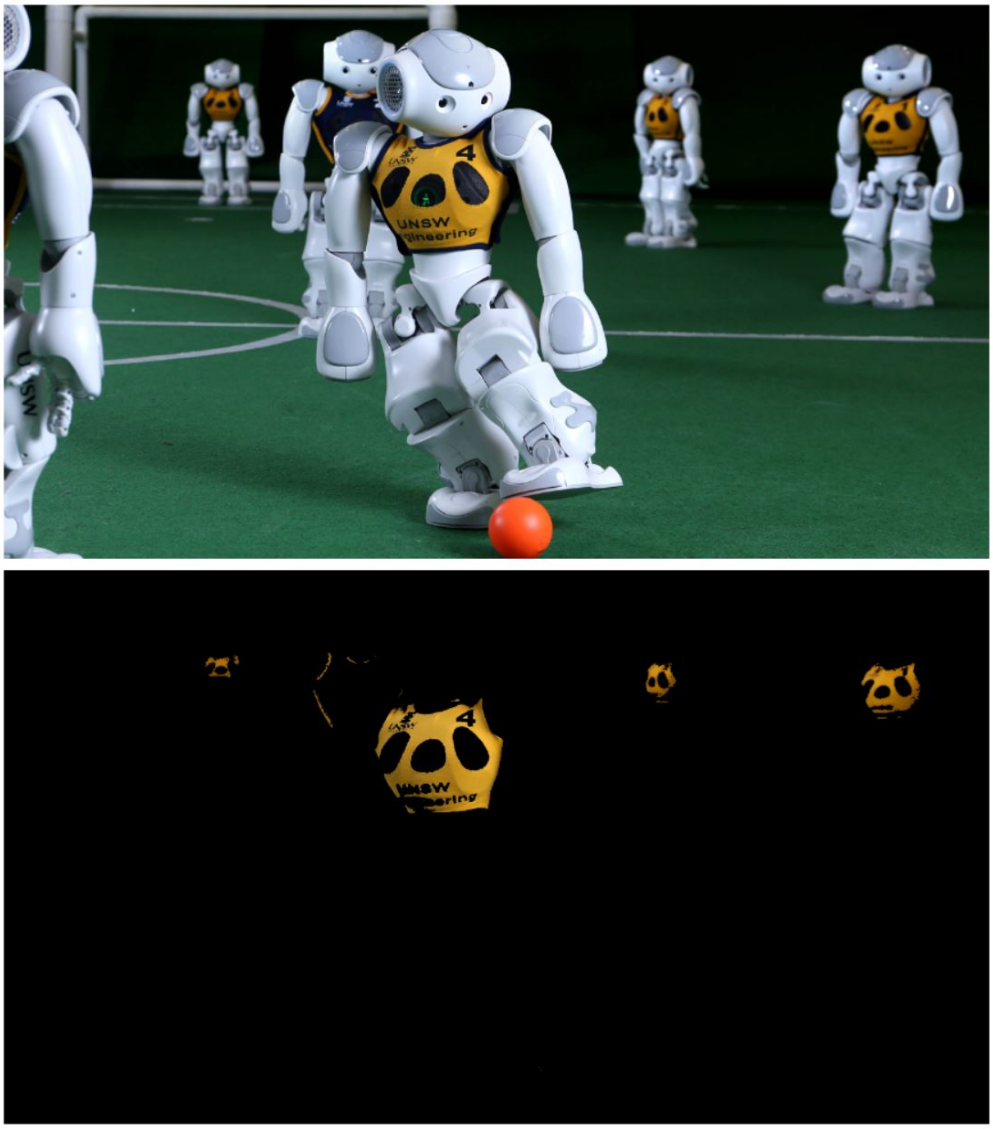

Image 3: Clustering2