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Faculty of EBIT
Department of Computer Science

COS791: Image Analysis and Understanding
Assignment D

1 Instructions

1. This assignment must be completed individually
2. No plagiarism is allowed. Please refer to the University's policy on plagiarism.
3. You are allowed to make use of any programming language.
4. You are not allowed to use a library where the image processing operations are already implemented. You have to implement these processing operations yourself. If you make use of a library for some other functionality, you must reference it in your code and mention it during the demo

2 Task

This assignment will introduce you to the implementation of the Hough transform that are required for image analysis. For the assignment you need to implement the following:

1. The basic Hough transform for lines and circles. For each of these, you need to implement both the explicit approach and the polar coordinate approach.
2. Decompose at least one of these Hough transforms mentioned in the point above.

For each transform, you should also implement the inverse transform so that the effect can be viewed on the image.

For the demonstration of these transforms, make use of the following images:

- lena.png
- microphone
- screw.png
- film.png
- drawing.png

These images are available in the zip file, `images.zip`, that is included with this specification file under the `Assignments` folder on the course website.

3 Demonstration of Assignment

Once you have implemented the transforms, you need to demonstrate your assignment during a designated timeslot in class. During the demonstration you need to:

- Illustrate both transforms.
- Describe the difference between the transforms w.r.t. the way they work and the results that were obtained.
- Discuss why you chose the specific second transform.

You should use the images listed below to demonstrate these transforms and their inverses. The demonstration time is only approximately 5 minutes. Once the booking for these demonstrations are available, you need to book for one of the slot on the course website.

4 Submission of Assignment

The assignment files should be compressed into a single file and submitted via the course website before the deadline.

The deadline for the assignment is 20 October 2019 at 23:00.

For any further information contact Mardé Helbig (mhelbig@cs.up.ac.za)