RoVi1 Vision-Mini-Project 1 – Image restoration

In the real world images are sometimes affected by noise in a way that makes working with them (or looking at them) difficult. In this project we will therefore look at image restoration. You will find a set of images that are affected by different kinds of defects. The overall task is to minimize the impact of the noise and thereby to improve the quality of the image. For images 1-4 we expect you to come up with an analysis and a way to remove (or weaken) the defect. You can decide if you want to address image 4_1 or 4_2 (or both). Image 5 is optional and you can decide if you want to work on it. The original image (with a watermark) is also provided for you. *Do not use the original image in any of your computations.*

For each image:
- Investigate the image and identify the defect. You can for example use the histogram and/or the frequency spectrum of the image for this purpose.
- Design a solution that removes or weakens the impact of the defect and investigate the properties of the solution. It might make sense to investigate different solution possibilities.
- Implement and apply the solution(s).

You must at least once make use of:
- Defect analysis based on a histogram.
- Defect analysis based on the frequency spectrum.
- Filter design in the frequency domain.
- An order-statistic filter.
- An adaptive filter (we talked about two), an inverse filter or both.

Reporting
- Please have a look at the ReportStructure.pdf document on Blackboard to see what we expect. If anything is unclear there or in this document please contact us as soon as possible.
- Write a group report (max. 4000 words).
- For each image you are supposed to show the analysis process and the conclusion you derived. Further you need to motivate and describe the implemented solution and the results.
- The project should be delivered through the SDU Assignment feature on Black Board.
- Please provide a pdf version of your report, your properly organized program code (in compileable form, please provide one source file per image (that solves the problem in that specific image)) and your output images (if not clearly visible in the report). Please name the pdf "RoVi1-Vision-Mini-Project-1_hand_in_<FullName1>_<FullName2>.pdf" (replace <FullName1> and <FullName2> with the full name of the members of your group). Please put the Code (and potentially images) in a zip archive named "RoVi1-Vision-Mini-Project-1_hand_in_<FullName1>_<FullName2>.zip". Upload both files to SDU Assign. It is good enough if one of the group members uploads it.
- Hand it in latest on 28.10.2018 – 11:59pm.
- If you feel that you need an extension please contact us as soon as possible (giving a very good reason) and definitely long before the deadline.
- Approval of this report is a prerequisite for taking the exam. In the exam this report might be used as a starting point for questions.