Faculty of Electrical Engineering & Computer Science
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Robust Image Processing Solutions for Industrial Application Using Optical Coherence Tomography (OCT)

ABSTRACT - Masterthesis

With the Optical Coherence Tomography (OCT) 2D and 3D tomographic images are obtained. To make use of the OCT in an industrial context, various image processing solutions are needed.

A particularly useful application for OCT in the field of industrial metrology is the layer thickness measurement. With multiple layers or heavy noise, the analysis is difficult. For this purpose, robust layer thickness detection algorithms are needed. An important part of the work will be the evaluation of the measurement uncertainty which can be achieved.

The opportunities for image enhancement should be investigated and implemented. In addition to the tomographic illustrations, the OCT is also suitable for absolute distance measurements. Thus, OCT offers a new way to shape and roughness measurements. To make use of the OCT for topography measurements, the surface must be detected as accurately as possible.

The following subtasks need to be solved:

- Basic training in OCT Systems
- Research and analysis of state of the art literature for layer thickness detection and image enhancement for OCT
- Development and implementation of three image processing solutions
    - Robust detection of the layer thicknesses in multiple layer systems
    - Possibilities for image enhancement / noise removal
    - Topography and roughness detection
- Analysis and evaluation of the uncertainty of the implemented algorithms
- Test the algorithms based on sample images
- Documentation of the work.