Karlsruhe Institute of Technology

**Earliest start:
01.05.2021**

**Institute for Automation and
Applied Informatics**

IAI

Master's Thesis

Analysis of background subtraction algorithms evaluated with images captured by a plenoptic camera

Object recognition is a crucial and essential task in computer vision and many of the approaches for 2D object detection utilize gray value information to extract desired objects from images. Nevertheless, gray values of the background influence the performance of those approaches strongly. To reduce this negative impact, background subtraction is regarded as a vital step. A typical background subtraction algorithm contains normally the following three steps: background initialization, foreground detection, and background maintenance.

In recent years, numerous algorithms to segment foreground from background have been developed. Each algorithm owns certain pros and cons. Thus, an evaluation of the approaches using real images is an important issue. In our project, we use images captured by a high-speed plenoptic camera for the evaluation.
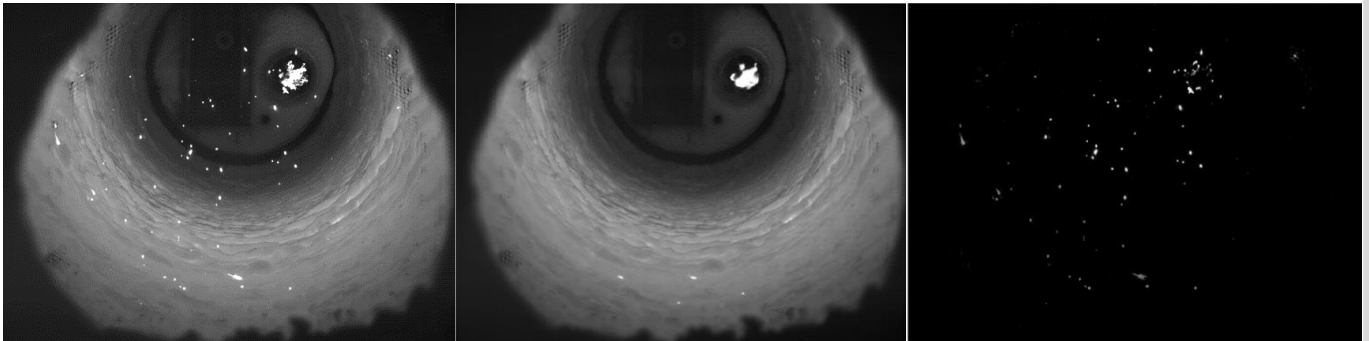
Tasks:
- Literature review focusing on background subtraction (BS) algorithms
- Implementation of various BS approaches and evaluation of the results from different algorithms based on real images
- Investigation of the performances of each in terms of different criteria, such as computation time, accuracy, etc. and choosing appropriate approaches for the project
- Modifying and optimization of the approaches to obtain a better result
- Documentation of all the outcomes in either English or German

Requirements:
- We are looking for a highly self-motivated student in the field of mechanical engineering or related. Knowledge and experiences in MATLAB is a requirement.

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