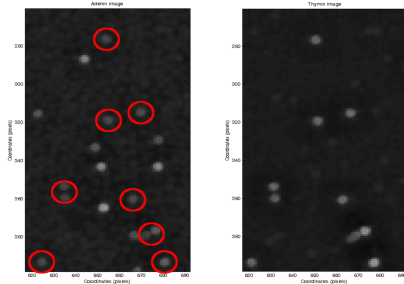




Fabian Knutti

Graduate Candidate	Fabian Knutti
Examiner	Prof. Dr. Guido Schuster
Co-Examiner	..
Subject Area	Sensor, Actuator and Communication Systems

Modeling of DNA images for the purpose of registration and detection

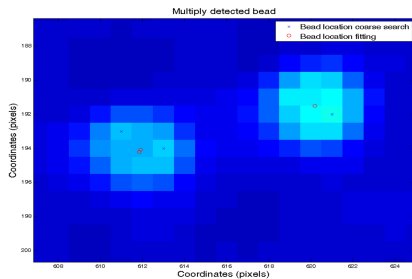


Crosstalk between beads of different bases

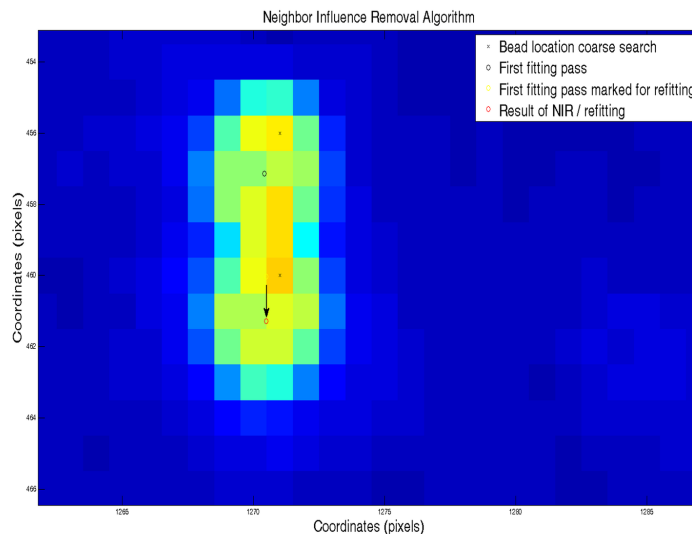
Introduction: Today DNA is analyzed with different methods including the Illumina method. This method involves taking high resolution images from the sample. The aim of this project is to investigate if the image content can be represented by parameters instead of pixels. This could lead to simplified methods for image registration and brightness determination.

Approach/Technologies: To determine a suitable model various different functional candidates were fitted to the image data. The different fit results were then compared in terms of their quality-of-fit parameters such as R^2 to find the most suitable model. An algorithm to remove the mutual influence of multiple closely spaced beads, based on modeled beads, was proposed.

Result: The results show that the modeling approach does provide certain advantages. For example can multiply found elements be detected and removed. The developed neighbor-influence-removal algorithm (NIR-algorithm) shows that multiple closely spaced beads can be resolved in general.



Example of a multiply detected bead



Results obtained with the neighbor influence removal algorithm