EUROPEAN UNION

European Regional Development Fund

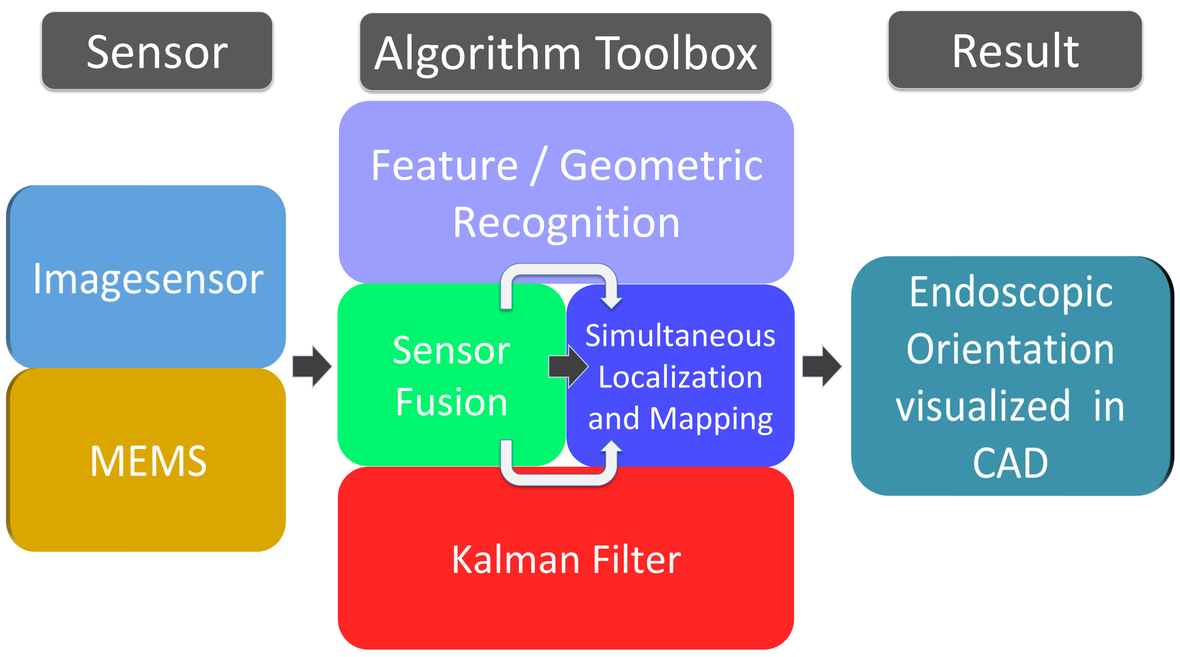
Technische Hochschule Wildau
Technical University of Applied Sciences

Research Project - Endokma
Endoscopic Orientation In Complex Machines

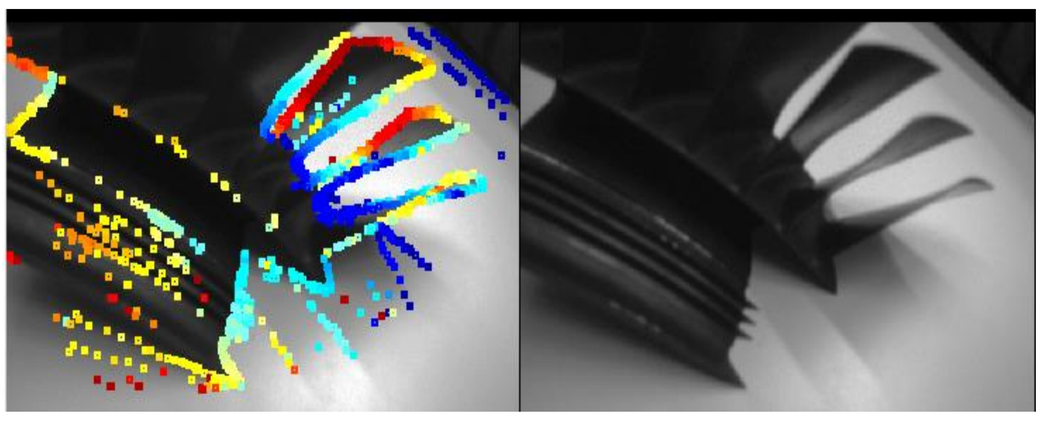
goal of the project

The user of the endoscope will get permanent information about the position, orientation and viewing angle. This will lead to an automated process that simplifies and optimizes the inspection or manufacturing process.

project content

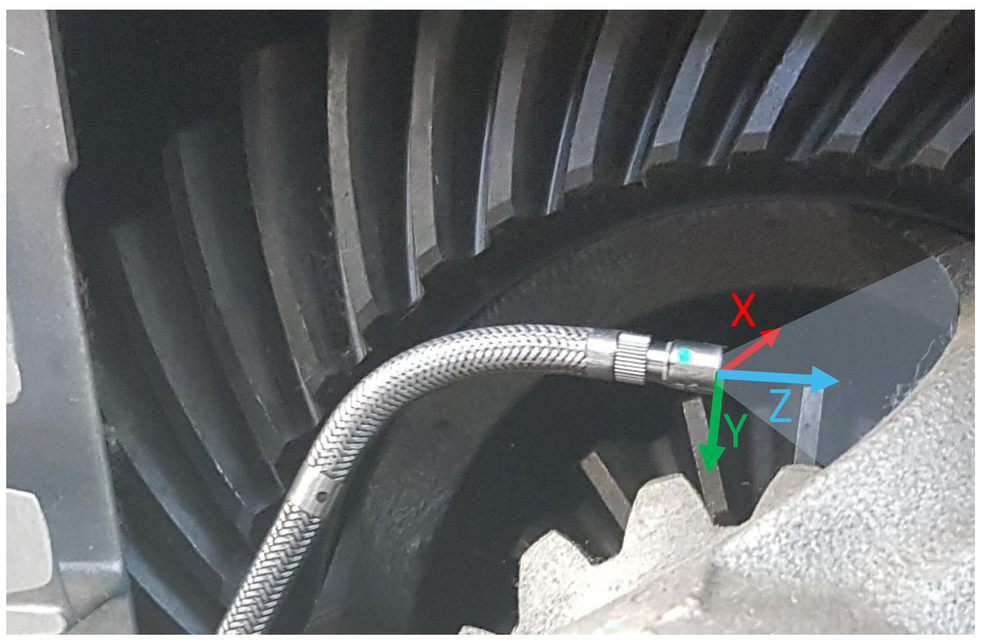


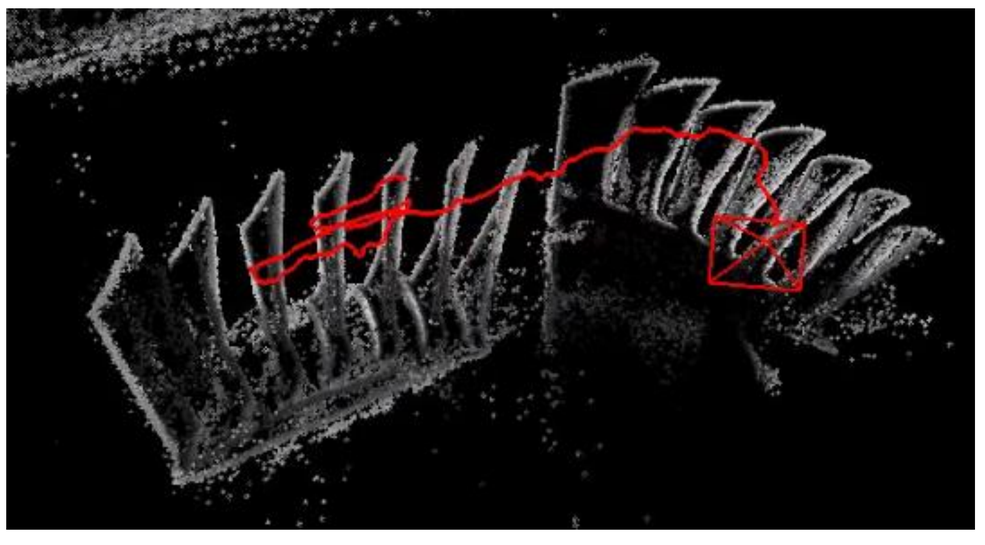
The technology is based on an technical endoscope with a camera and various MEMS (Micro Electro-Mechanical Systems) and multi-sensor data fusion.
The software contains algorithms like feature and geometric structure recognition. To minimize the error function and noise, it is necessary to implement mathematical compensation algorithm and make use of Kalman-Filter.
Based on the calculated results, a visualization of the position and location of the endoscope inside a CAD model of the inspected machine will be displayed.



first results

Test objects (turbine blisk and transmission) were used for tracking the distal end of the endoscope. With these data we could generate a 3D point cloud in real time. Therefore we registered the optical and photometrical characteristics of the system and recalculated the movement of the endoscope by feature detection and tracking.





outlook

- Additional studies on further real samples and geometries
- Implementation of the IMU (Inertial Measure Unit) on the distal tip of the endoscope
- Data fusion
- Optimization of the algorithm
- Visualisation of all information in the CAD model
- Evaluation of the system

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