Bachelor-/Masterthesis/FP/IP

Technische Universität München

EI MST

Fakultät für
Elektro- und Informationstechnik
Lehrstuhl für
Messsystem- und Sensortechnik

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Digital Production Optimization of optical systems in terms of smart factories and industry IoT 4.0.

The Smart Factory is at the center of the so-called Industry 4.0. It provides a production environment that ideally organizes itself without human intervention and it is based on so-called cyber-physical systems and the intelligent networking of machines and products. On the basis of this information, the individual production steps are controlled until the desired end result is achieved. Thanks to the intelligent networking of production facilities and their ability to organize themselves, production processes can be modelled individually and flexibly. This makes it possible to produce individual products and small batches with intelligent automation within a cost framework that can only be achieved in conventional production plants for mass production. This is also referred to as mass customization. Scalability of production, increasing the yield, while maintaining the customization of fiber optic goods, as measurement devices and sensors are currently main challenge for sensing applications in the wind market, using fiber optic devices. The production of the key component of an optical-electrical measurement device can be optimized by image recognition and auto alignment systems in combination with artificial intelligence to find best suitable positioning in regards to optical tolerances of the aligned components. After digitalization the current production processes, collecting big data and analyzing the processes using neuronal networks, the objective is it to find hidden coherences and exploit new potentials in the production processes.

fos4X, a former spin-off of the TUM MST, is developing fiber optic sensors and measurement devices for the wind and test & measurement industry. The digitalization of production processes are main the lever for scaling.

The proposed scientific work is involving characterization and evaluation of the production processes of fiber optic components. In the next step production activities needs to be digitalized and optimized by applying image recognition and artificial intelligence on alignment processes. The activities will take place at the company fos4X, Munich. The work also offers a good balance between theory and practical development.