

Project title: SchauML - Development of user-centered, optical fabric inspection systems for complex products using machine learning by and for SMEs

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Mission Statement

Particularly in the case of high-priced products, such as those produced in Germany, quality control, known as fabric inspection in the textile industry, is of great importance. As a significant cost factor, quality control is therefore subject to continuous optimization with the aim of increasing its efficiency.



Abbildung 1: Gewebe mit Fehler / woven fabric with defect [Quelle: ITA]

Classically, fabric inspection is carried out by operators at inspection machines, where they spend hours looking for faults on or in the fabric, which is illuminated as it passes by on the table. To support operators in this task, digital fabric inspection systems can already be used under certain conditions. However, the existing rule-based fabric inspection systems have disadvantages. On the one hand, they tend to be less user-centric. Due to their high complexity, they can often only be operated by the user after special training by the manufacturer. Furthermore, the systems have to be configured and tested for each product in a time-consuming process. As a consequence, rule-based fabric inspection systems are only profitable for large companies with large batch sizes. Systems based on artificial intelligence, on the other hand, have the advantage of being easier to configure. These systems are not yet commercially available. Since they require a comprehensive database to reach their full potential, the systems are only operated

in parallel with manual inspection and therefore also only profitable for large batch sizes. This is where the SchauML research project comes in.

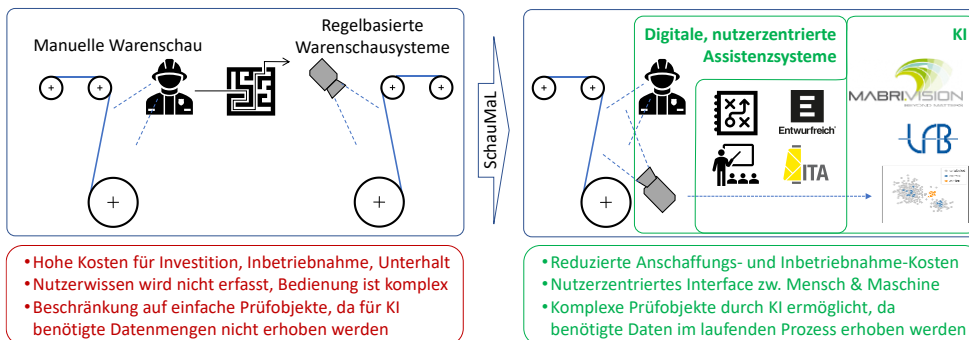


Abbildung 2: Konzeptbild / illustration of the concept [Quelle: ITA]

Approach

A fabric inspection system is being developed that requires less adaptation to new materials than the state of the art, so that SMEs also benefit from the technology. Mabri.Vision is designing the hardware and, together with the LfB, an algorithm for defect detection. Associated partners are needed to test the hardware and generate a sufficient database. The company WKS is well-suited for this as it is a pure fabric inspection company, so that the hardware will be installed there. In order to enable the operators to work ergonomically, Entwurfreich is developing user interfaces with the necessary expertise. At the ITA, meanwhile, research is being conducted on parameter prediction. With the help of a light table, which has similar characteristics as a fabric inspection machine, an algorithm is developed, which offers the possibility of a self-adjustment of parameters. The two developed algorithms will be combined with the user interface. This should allow an easy operation and at the same time a fast learning of the algorithm. In this way, more defects are detected at an early stage, so that no productivity is lost in further steps to intermediate products that are already defective.

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