Project Title: Automatic real-time defect detection in textiles with complex patterning structures

Partner: STFI Sächsisches Textilforschungsinstitut, Chemnitz
LfB Institute of Imaging and Computer Vision, Aachen

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Mission Statement

With around 1200 companies, the German textile and clothing industry is one of the largest branches of industry in Germany. One of the main characteristics of this branch of industry is the high number of small and medium-sized enterprises. The textile sector in particular is strongly characterised by SME companies with a share of 75%. In the first half of 2014, German weaving mills alone achieved sales of € 945 million. There are 61 weaving companies in Germany with a total of approx. 8600 employees.

The aim of the project is to develop an algorithm that realises image capture on the weaving machine and comparison with the simulation of the
expected fabric failure in real time and online, thus enabling automatic fault detection.

The developed solution focuses primarily on the field of Jacquard weaving. Automated error detection on the one hand reduces the cost-intensive fabric inspection and on the other hand enables a quick reaction to errors. Defects can be detected and eliminated directly in the development phase and not only identified in a subsequent process. The potential in Germany is enormous.

Research has shown that in the Saxony / Thuringia area alone, approx. 50,000 linear metres of jacquard fabric ("African Damask") are produced every day. The amount of work required for manual quality control of this quantity (assumption 10 m/min average inspection speed) is approx. 83 employee hours per day per weaving mill. Through the automatic fault detection, this effort (approx. 18,000 working hours per year) can be reduced by approx. 30 % (= 120,000 € per weaving mill per year).

**Solution:**

In this project, a system for the automatic error detection of complex structures during the manufacturing process is to be developed. The solution is based on a three-step approach. First, a virtual preview of the fabric produced on the machine is generated by means of simulation. Image data is then captured on the machine using image acquisition. A comparison between the simulation and the captured image data is then made using robust calculation algorithms. With the help of this comparison, any errors can be identified and classified.

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