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Project Titel:	Development of a system for the generation of adjustment suggestions for cross winding machines on basis of a simulation
Partner:	Fraunhofer ITWM, Kaiserslautern
	GFaI, Berlin
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Mission Statement

There are 200 finishing companies in the textile and clothing industry in Germany. 90 of the 200 finishing companies are operating dyeing plants. Almost all of the dyeing plants are classified as SMEs.

A total of approx. 361,000 tonnes of fibres were processed in the clothing and home textiles sector in Germany in 2012. It can be assumed that approx. 30 % of these fibres are bobbin-dyed in Germany. This results in a total of 110,000 tonnes of bobbin-dyed yarn per year. When dyeing the bobbins, the uniformity of the through-dyeing of the yarn package is of particular importance. According to industry figures, the reject rate for poorly dyed bobbins is 2 % and thus around 2,200 tonnes per year in Germany. The dyer suffers sales losses due to complaints and rejects amounting to approx. 4 €/kg yarn. Every year, German finishers incur costs of approx. 8.8 million € due to dyeing errors. According to internal calculations of a spinning mill with bobbin dyeing attached and an annual capacity of 4,500 t of dyed yarn, rejects amounting to around 400,000 € per year arise due to bobbin defects.

The aim of the interdisciplinary DensiSpul project is to generate setting proposals for standard and future winding machines in order to reduce the reject rate of poorly dyed bobbins by at least 15 % and to shorten set-up times. A reduction of 15 % of the winding errors means an annual saving of approx. 1.3 million € in Germany.

Solution

The solution is based on the approach of automatically generating setting parameters specifically for different winding machines in such a way that the density distribution in the bobbin becomes homogeneous. A homogeneous

density distribution in the bobbin is the decisive factor for uniform through-colouring of the bobbin. The setting suggestions are generated by an optimization algorithm based on simulations of the density distribution in the winding body. The development of the material models and the validation of the virtual density distributions is carried out via microcomputer tomography (µCT). The achievement of the objectives is ensured trough cooperation of different competences from the fields of textile technology, 3D data processing and simulation.

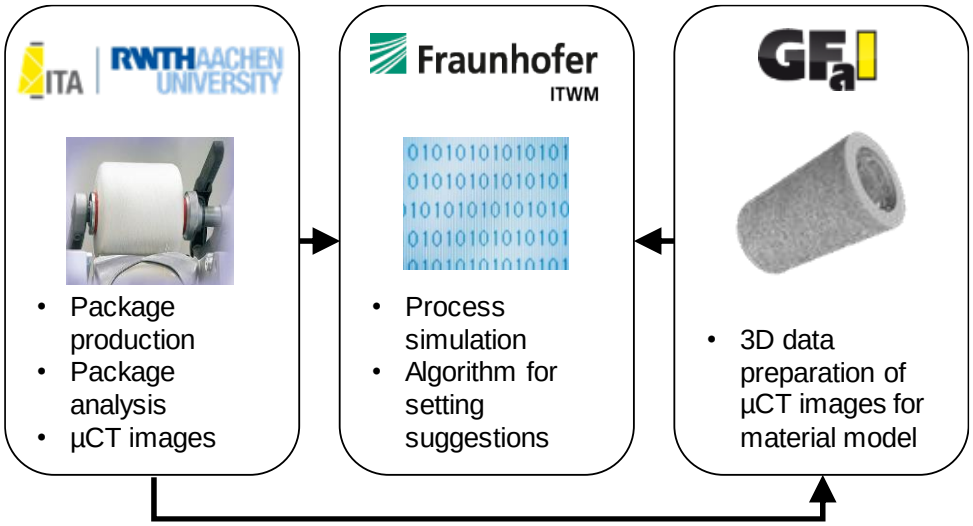

Figure 1: Interdisciplinary approach of the project DensiSpul

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