

KoMuTex – Based Quality Assurance for Complexly Patterned Textiles in the Woven Goods Sector

Problem / Motivation

- Manual fabric inspection of complex-patterned textiles yields a detection rate of only $\approx 70\%$, is subjective, and labor-intensive
- Existing automated inspection systems generate high error rates (false positives) for colored, complex-patterned fabrics and small batch sizes
- The shortage of skilled workers in German textile SMEs increases costs and jeopardizes international competitiveness
- Increasing quality requirements (low defect tolerance, high export market pressure) necessitate digital, objective inspection procedures



Solution

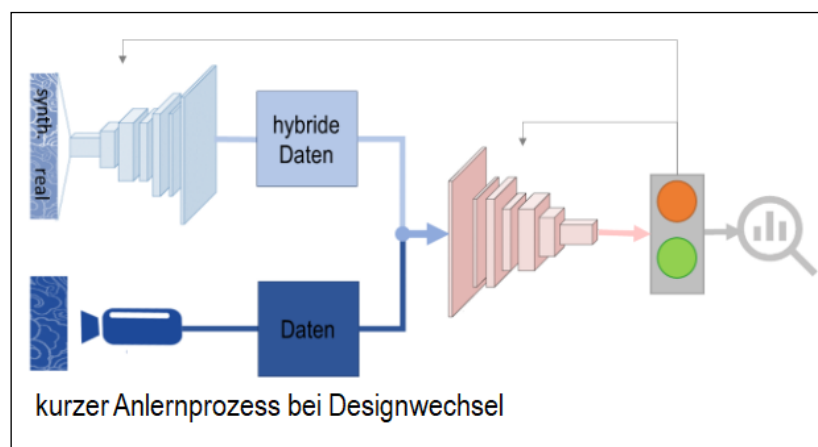
- Development of a two-stage machine learning framework: 1) PatchCore anomaly detection on simulation data + 2) CNN classification (transfer learning) for real image data
- Creation of a hybrid dataset comprising CAD simulations, real-world images, and GAN-generated synthetic images to reduce training effort
- Construction of a modular imaging demonstrator (area-/line-scan camera, controlled illumination) for production speeds up to 40 m/min
- Integration of image processing into existing fabric inspection and ERP systems; provision of a SaaS option for straightforward adaption by SMEs

Project Launch

11/2025

Project Partner

Gesellschaft zur Förderung angewandter Informatik e.V.



Description of the Project Approach

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