

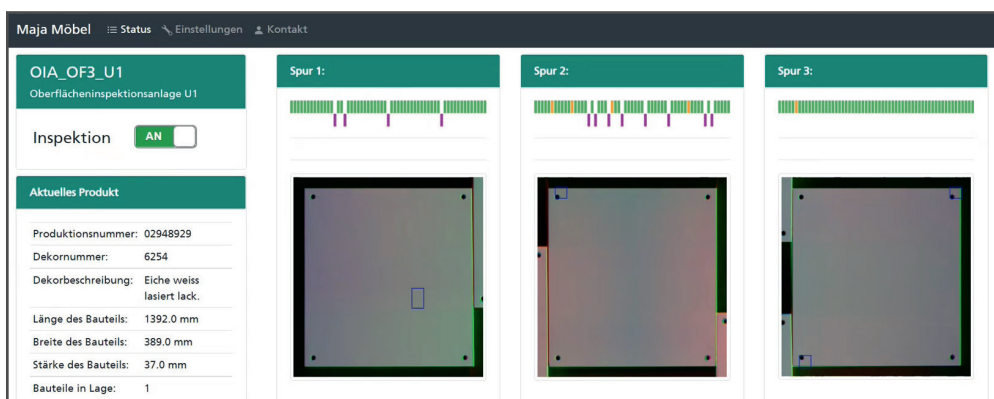
Inspection of Wood and Furniture Panels

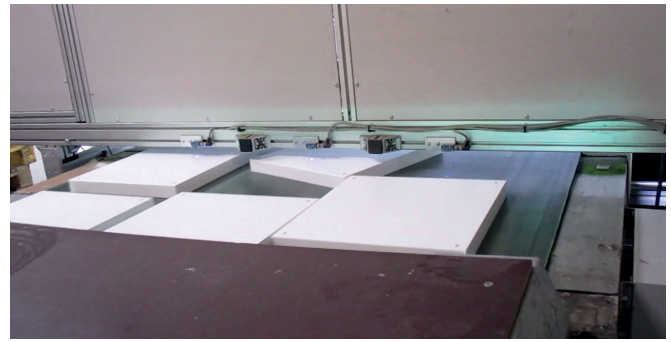
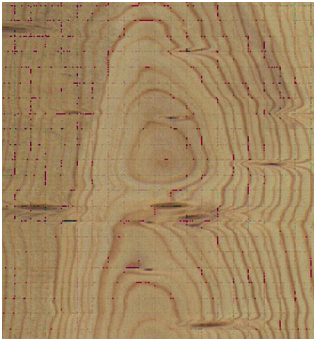
Wood is a very versatile material. However, wood as a natural material is also a very complicated and not easy to inspect in terms of quality. Because of its fiber structure, properties can vary greatly – depending on the type of wood, processing and environmental influences.

This applies to solid wood as well as to fiberboard and wood composites. High-quality products for the furniture industry must not only meet many functionally relevant material requirements, but also need to have excellent optical properties. Therefore, a wide variety of quality assurance applications are necessary here.

Above: Removing texture from wood – original image and its texture

Below: The web-based user interface of a furniture panel inspection system





*Extracting the grain pattern of a wood panel;
left: original image, right: the grain pattern*

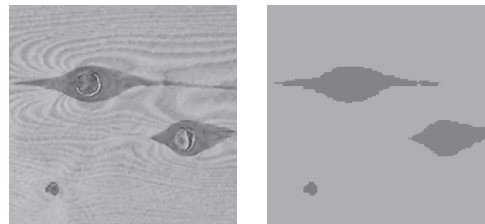
Inline furniture panel inspection

The Fraunhofer Institute for Industrial Mathematics ITWM has developed some solutions for quality assurance in recent years:

Surface Inspection for Furniture Panels

We use Artificial Intelligence for image analysis and adapt our solutions to our customers' production. The system is capable of:

- Detecting defects on all six surfaces of furniture panels like scratches and dents
- Finding texture deviations on textured panels
- Detecting color deviations on textured panels
- Inline Inspection
- Low false positive rate by separating of texture and defects
- Classification of defects and calculating quality grades
- Web based user interface with online statistics



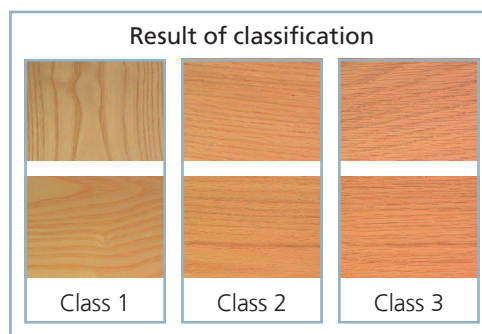
*Detecting defects but ignoring the wood texture,
left: original image, right: extracted defects*

Color Classification of Wood

As a natural product, wood has variations in color and texture. However, for many products, e. g. in the furniture industry, several pieces of wood with as similar in appearance as possible are needed. The Fraunhofer ITWM has developed an AI based system that carries out this sorting automatically:

- Sorting by color and/or texture
- Inline sorting
- Separating of texture and color for sorting e. g. sort only by color and ignore texture
- Web based user interface with online statistics

*Sorting by color, top: random inputs,
bottom: sorting results with separate classes
for every color grading*



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