AutoNester-L
Optimized markers for leather hides

AutoNester-L is a software package for automatic placing of patterns on leather hides. It is widely used in the leather, upholstery, and car manufacturing industry. It is able to nest any set of pieces within a very short time in an optimal way, minimizing wasted material, while taking into account various types of constraints. The efficiency of the markers achieved by AutoNester-L is competitive to experienced human nesters.

The AutoNester-L software is organized as a Dynamic Link Library (DLL) to be used as a developer's tool kit. Developers of CAD-systems can integrate AutoNester-L into their software. We also offer the creation of custom-made standalone applications for the end user which can be used to create markers from special data formats.

AutoNester-L is constantly improved and more and more kinds of constraints are incorporated. Currently, the following constraints are supported:

- up to four different quality levels of the leather
- quality zones on the pieces and the surfaces
- holes in the surface
- free rotation of the pieces
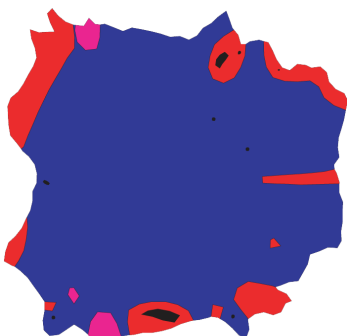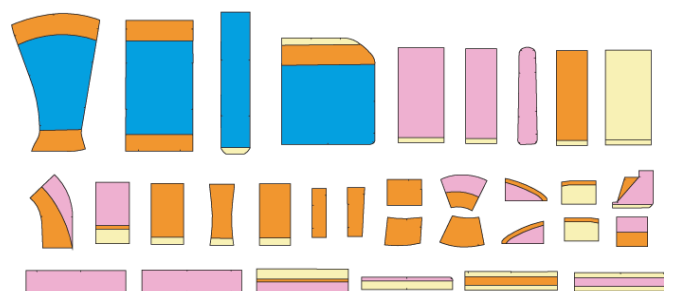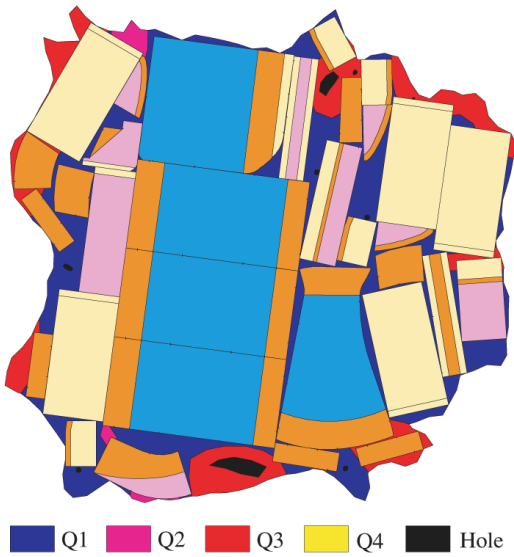- concurrently nesting on multiple skins

Methods

AutoNester-L combines many of the latest optimization techniques in order to achieve the best results in a very short time. We use local search algorithms based on new variants of Simulated Annealing, multiply iterated greedy strategies, paired with efficient heuristics, and fast high-quality pattern-recognition techniques. In the local search algorithms, we use fully dynamic statistical cooling schedules and dynamic parameter choice.
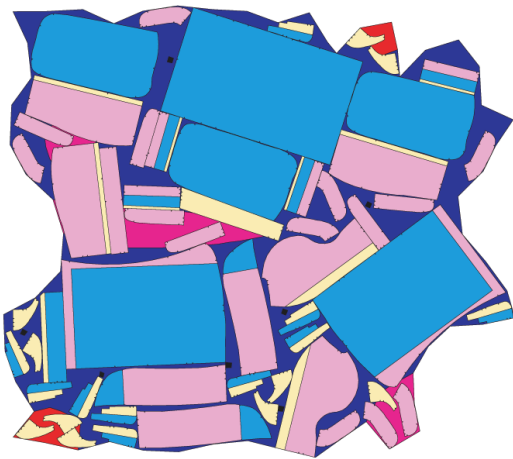
Examples

The following markers have been calculated by the AutoNester-L software package. All runtimes refer to a standard PC. The colors in the pieces and the leather hide mark different quality levels. Blue marks the best quality on a leather hide and the premium quality requirement on a piece, followed by pink, red, and yellow marks the lowest quality and quality requirement. Black marks holes. The pieces must be placed on the surface such that each part of a piece which has a certain quality requirement lies on a region of the surface which is of the same or higher quality.

Image of a leather hide

A data set of the furniture industry

| Q1 | Q2 | Q3 | Q4 | Hole |

Furniture, 30 pieces, efficiency 83%, half a minute

Furniture, 55 pieces, efficiency 84%, half a minute

Software

The AutoNester-L software package for automatic marker making on leather hides can be used via an application programming interface (API). The software package addresses developers of CAD-systems for the leather manufacturing industry and industries with compatible packing problems. CAD-system developers can easily integrate AutoNester-L into their own CAD-software. On request, we also build tailor-made standalone applications for our customers which are based on the AutoNester-L kernel.

AutoNester-L is available for all Microsoft-Windows-PC-Operation systems. More information and a detailed product description of AutoNester-L can be found on the Fraunhofer SCAI website.

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