

Sewing car mats precisely:

## Smart cameras automatize linking



*Figure 1: With the help of industrial image processing a new linking machine replaces 16 standard machines.*

**While during the production of e.g. car mats a separate standard linking machine is required for every mesh size, a new concept based on industrial image processing replaces 16 machines. Currently the company Erb  in France is using a prototype of such a new linking machine.**

Originally, the term linking referred to the making of chains and chain mails, today it is the trade for joining of two knitted goods like a collar with a sweater torso as well as edging of fabrics. The advantage of linking is the elasticated and non-bunch seam. Given that this trade is time-consuming, it was soon tried to automatize the work by implementing linking machines. However, the standard linking machine has several significant disadvantages. There are sixteen different mesh sizes, which the textile industry uses. Since one linking machine supports in each case only one technique, companies need altogether 16 machines to satisfy all customer requirements. In addition, the operation of the single machines is not easy and requires on the one hand a long teaching phase and on the other hand technical skills. Additionally the operation of the machine demands a higher attention and preciseness, which can be very tiring and it holds the risk that a little inattention produces second quality products.

**New machine concept**

The mentioned disadvantages, the upcoming problem to find qualified employees as well as the high cost of production through long manual work prompt the manufacturer of sewing machines Erb  in cooperation with system integrator Acyrus to develop a new linking

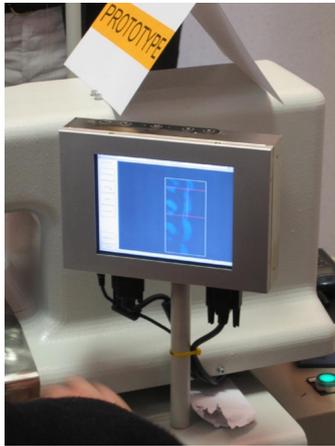


Figure 2: The available meshes are detected and displayed on a touchscreen.



Figure 3: The prototype of the new linking machine works with an integrated mvBlueLYNX camera instead of the eyes of the operator.



Figure 4: The standard linking machine demands skills and flair by the operator.

machine concept that should make linking easier, faster and more reliable. The new concept is based on a traditional sewing-machine with integrated image processing, which controls the needle and for this reason makes sure, that the right mesh is met along the existing seam of the edge as well as the entry of the needle takes place in the middle exactly (Figure 2). The image processing part of the machine takes up the central role of the concept: first, it has to guarantee a sufficient speed during the image capturing, second it has to keep apart the meshes to meet the entry exactly and third it has to control several motors, to align the needle precisely. Traditional solutions would have its focus on a camera, frame grabber and a digital I/O board. In contrast, Acyrus decided to use an all-in-one solution and chose the intelligent camera

mvBlueLYNX with a 640 x 480 pixels image sensor from MATRIX VISION. Because of the available computing power, a multitude of interfaces and an open Embedded Linux operating system it is possible to complete all image processing and control tasks in the camera directly. More precisely the mvBlueLYNX controls the three different motors of the needle as well as the ultraviolet LED ring illumination and it handles the input signals of the two pedals. Additionally the machine can be controlled via touch screen, whose display and control is handled by camera, too.

### Less rejections

The new linking machine offers several advantages. The linking process is 50% faster and through the machine support more reliable. Furthermore, the acquisition of one machine is enough to cover the whole range of

Different mesh sizes.

### Combination with tradition

For the textile industry the combination of traditional technology and modern industrial image processing represents a great assistance. However, an operator of the linking machine is still necessary, but the machine takes over the important part of the work. Furthermore, the merging of 16 machines saves costs, the knowledge about the different linking techniques remains at the manufacturer and the quality of the products does not depend on the human employees.

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