

DECO : A Designing Editor for Line Stone Decoration

Yuki Igarashi*

University of Tsukuba, Japan / JSPS Research Fellow

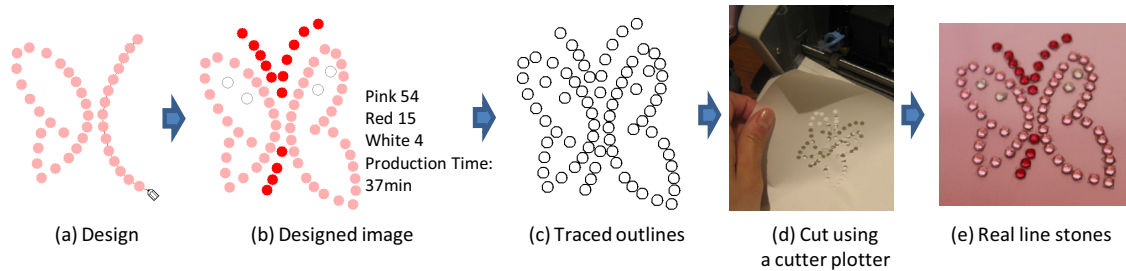


Figure 1: Overview of our system. A user draws free-form strokes on the canvas. The system automatically generates a virtual line stone image. The user constructs a physical pattern, using a cutting plotter. Finally, the user employs the pattern to place the stones.

1 Introduction

Line stone decoration is popular with young people. They enjoy applying line stone decorations to personal goods, such as notebook PCs, mobile phones and digital cameras. However, novices often find line stone decorations difficult to design, as the user must consider stroke length, stone width, and stone spacing. Hence, many people employ off-the-shelf design sheets or have their items decorated by an in-store professional. We have developed an interactive designing editor for line stone decoration. The user interactively draws freeform strokes on the canvas, as shown in Figure 1. The system then automatically generates a virtual line stone image (Fig. 1(b)), in which none of the stones overlap. Various off-line methods have been proposed for designing such decorations (e.g., tile mosaics [Hausner 2001]). Using our system, the user can create the designs interactively at the computer. Our system also creates a physical pattern to help novice users to construct real line stone (Fig. 1 (c), (d)).

2 User Interface

Figure 2 shows our prototype system. The system is implemented as a Java™ program with internal vector representations. When the user draws a stroke, the system automatically places stones on the stroke without overlap. Strokes are represented as polylines, so that the user can easily modify a stroke to move, erase, change the colors of the stones, or change the scale. Existing strokes are modified using a pull tool [Igarashi et al. 2005], as shown in Figure 3(a). During a pull operation, the system interactively updates the positions of the stones and the number of stones on a stroke. The user can load a preexisting image and place stones to trace the image in the shape of the image (Fig. 3(b)). Flood-fill operations are also available.

Once the design has been completed, the system supports the production process. The user is shown the required number of stones and the total production time, and the resulting line stone image is exported in vector format (Figure 1(c)). The DXF dataset is supported. The user can then cut out a pattern using a cutter plotter [Graphtec]. The holes in this pattern facilitate the placement of the line stones on the design, as shown in Figure 1(d). In this way, even a novice user can easily create real line stones.

3 Results

We used our system to create some line stone designs and actual line stone decorations, as shown in Figure 4. A design session typically

*e-mail:yukim@acm.org

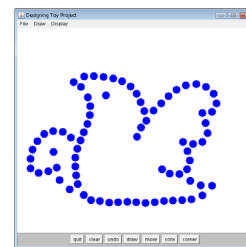
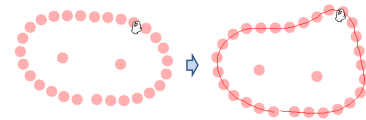


Figure 2: Screenshot of the DECO system.



(a) The user can pull an existing stroke.



(b) The user loads an image and places stones to trace the image.

Figure 3: Operations.

took 10-20 min, and production of the decoration required 30-60 min.

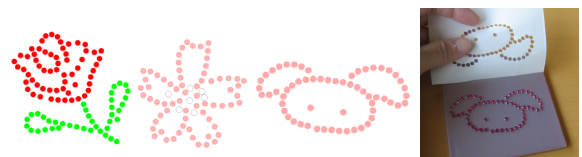


Figure 4: Results using our system and real line stones.

References

- GRAPHTEC. Craft ROBO.
- HAUSNER, A. 2001. Simulating decorative mosaics. In *Proceedings of the 28th annual conference on Computer graphics and interactive techniques*, 573–580.
- IGARASHI, T., MOSCOVICH, T., AND HUGHES, J. F. 2005. As-rigid-as-possible shape manipulation. *ACM Transactions on Computer Graphics* 24, 3, 1134–1141.