

Dear Reviewers,
thank you for your thorough reviews, we would like to clarify some aspects of our work.

NOVELTY AND CONTRIBUTION

Our system defines a general framework that brings user interaction to a task that is currently either fully automated (Wong et al. [WZS98]) or fully manual (Illustrator). The only interaction [WZS98]'s pioneering work provides is for an artist to define the frame for the pattern. All other design choices, even the placement of the first element, are programmed for each pattern individually. Our main contribution is procedural decoration that puts global design constraints such as symmetry (Figures 4,5) explicitly under artist control, interrelated with visually specified input (such as densities, (Figure 6), strokes (Figure 7), vector fields (Figure 8), automatic pathfinding (Figure 9), down to control at the individual element level (Figure 10)).

Wong's system is not practical. It had sound fundamentals, but it lacked the controls to make it a usable tool for artists. We added those controls, and we did it by creating a unified method rather than as a set of specific fixes.

RELATED WORK

We have focused the discussion of related work on procedural methods such as ours. Lu et al.'s DecoBrush (review 12645), for example, pieces exemplars intelligently together with a data-driven approach, which is fundamentally different; we would be happy to extend our discussion, though, if so desired (review 12793 analogously).

EVALUATION

Reviews 12645 and 12793 suggest to have the experts assess the differences of [WZS98] and our method regarding use. We do not agree that this is in fairness possible. We want to empower artists to use procedural tools expressively, without requiring the programming skills [WZS98]'s needs to modify the rules file ("looks very much like a block of C++ code", [WZS98], Section 4). Our experts, having no programming skills, would not be able to use [WZS98]'s system artistically. Therefore, we focus the evaluation against [WZS98] on a comparison of the quality of results instead, and compare the use of the system against Illustrator, which is arguably a preferred tool for designers practicing the art.

Review 12645 questions the robustness of the study. We would like to clarify that 6 out of the 8 experts did neither know the authors nor the developed method in advance. Also, we did conduct the comparison of the result quality of [WZS98] and ours before giving any information about our system (see the questionnaire in the supplemental materials; the introduction was about ornaments, only the workshop part introduced the tool).

FUTURE WORK

Review 12645 suggests that element positions should adapt to changes in the environment. After thorough testing and a preliminary run-through with a designer, we deliberately chose the 'what you see is what you get' principle, as changes, which were not directly triggered by the artist are hard to anticipate and the system would lose controllability. We consider exploring this trade-off further as future work, the discussion of which we offer to add to the Future Work section.

Review 12441 asks about limitations of the greedy approach. Our method of placing the next element based on the placement function does not consider connections when computing the next space to fill. Here indeed a global optimization or distribution strategies, taking the connections of the elements also into consideration, might be an alternative at the cost of the interactive performance we aim for. Further research on this is called for, but beyond the scope of our paper. We could extend the Future Work section in this direction – the related work review 12793 points to will be of great value for this.

The scaling of individual elements would be straight forward to implement and a valuable addition (review 12645).

TECHNICAL DETAILS

* Selection of elements, their appearance and connections (review 12793 and 12441): as in [WZS98], artists use artist-defined glyphs (Figure 7 right: two strawberry types, one white, one gray flower, one connection path template with two leaves attached, in green and gray). Out of these, largest elements that fit are greedily placed at the current global maximum of the placement function and connections to existing elements made. Then the placement function is updated. As we support more complex functions than the mere distance ([WZS98]), smaller elements can be placed before larger elements (review 12441). For our placement function this happens rarely and symmetric placement of elements of the same type is possible (Figure 7 center, the red and blue flowers are different types, review 12441). For the strawberry model connections are made according to proximity, avoiding intersections with the existing pattern by testing against proxy geometry (e.g. lines against circles). The rules for connections are implemented in the Deco framework [MM12], which we use as render backend.

* Placement functions for the results (reviews 12441, 12793): all results, if not otherwise already stated, are created with a four-way-symmetry in combination with a dense filling. We will indicate this in the final paper and add the full placement functions to the supplementals.

* Individual, local edits (review 12793): edits require detection of violated connection rules and reconfigurations beyond re-running the procedural system (e.g. detecting orphaned elements).

* Artist-defined order (review 12441): artists specify design constraints (select placement functions, place start elements, optionally define weights in the functions); the order the elements are placed in is algorithmically defined thereafter.

* Achievable design variety (review 12358): our designs are technically only restricted by the iterative creation logic of 'find space, place elements within and (optionally) connect'. For aesthetic coherency, all our models were designed by the same artist and thus share visual traits specific for the artist's individual style, hence proving the goal of supporting artistic intent.

PRESENTATION

We will improve the presentation regarding novelty and contribution (e.g. review 12358) and technical details as discussed here. Detailed comments on phrasing, typos (reviews 12793 and 12441) and figure placement (review 12645) will go into a final version (thanks!).

We believe these points as well as the others raised by the reviewers can be reasonably addressed for a camera-ready version and we will be happy to do so.