Flower Factory: A Component-based Approach for Rapid Flower Modeling

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INTRODUCTION

The rapid 3D objects modeling provides an effective way to enrich digital content, which is one of the essential tasks in VR/AR research. In this paper, we propose a component-based framework for rapid flower modeling, called Flower Factory. The flowers are assembled by different components, e.g., petals, stamens, receptacles and leaves. The shapes of the components are created using geometric primitives such as points, splines. After the shapes are determined, the textures are synthesized automatically based on a predefine mask. The whole modeling process can be controlled by several parameters, which describe the physical attributes of the flowers. Our technique is capable of producing a variety of flowers rapidly.
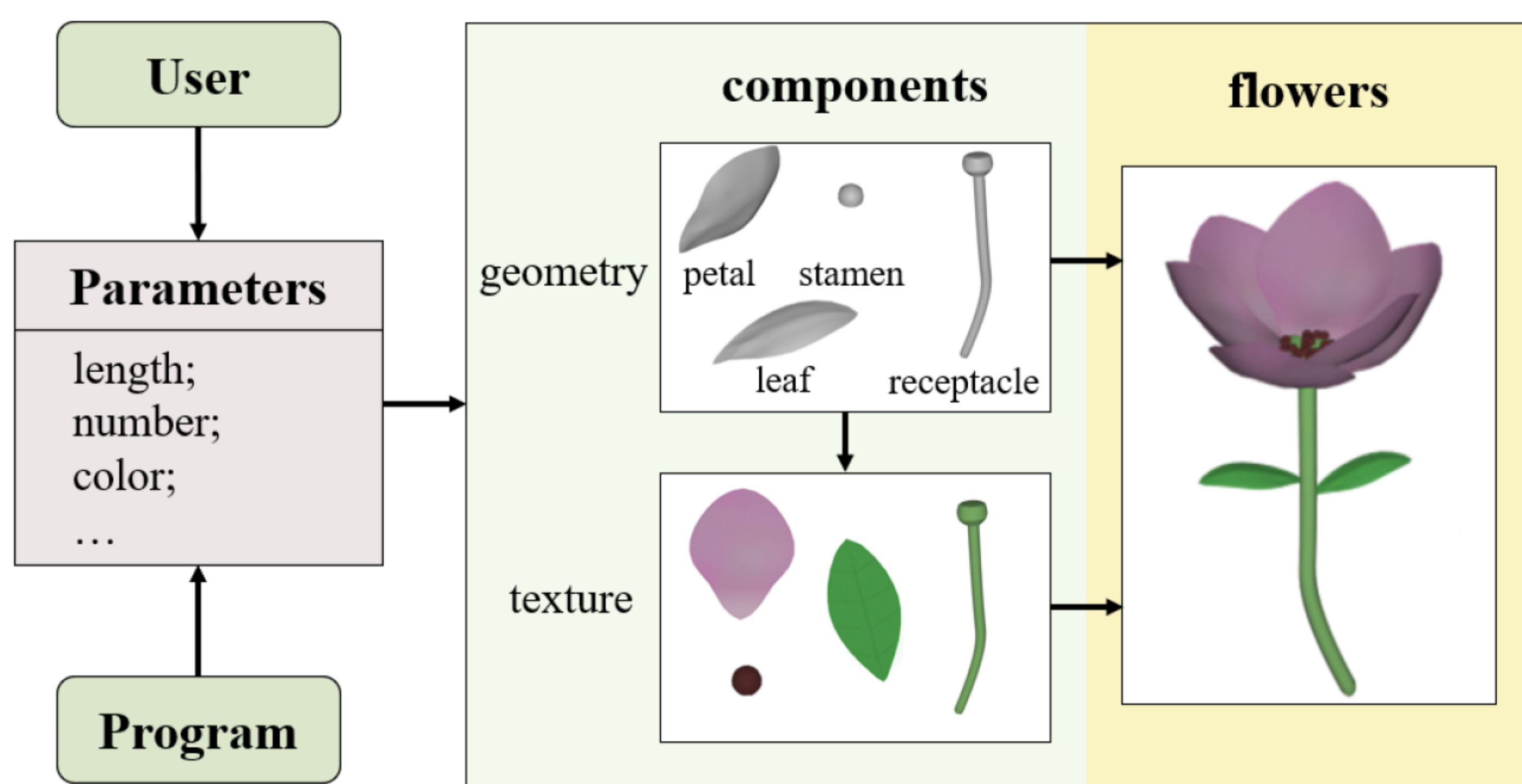
GEMOTRY GENERATION

The geometric model of flowers can be separated into four components: petals, stamens, receptacles and leaves. We first generate each component respectively, then we combine these components to assemble a complete flower model. The generation process is fully controlled by parameters, which describe the physical attributes of the flowers. We provide a simple but intuitive interface for users to adjust parameters. After the model generation, users can still edit the 3D flowers manually according to their needs. After generating the flower model, we also generated the blooming animation.

TEXTURES GENERATION

Users can define the colors for each component, then our system automatically produce the corresponding texture based on the geometry. Considering the natural characteristics of the textures of real petals, we design a number of rules and provide a predefine mask to adjust the color distribution on the petal surface. The textures of petals can be controlled and synthesized with different attributes automatically.
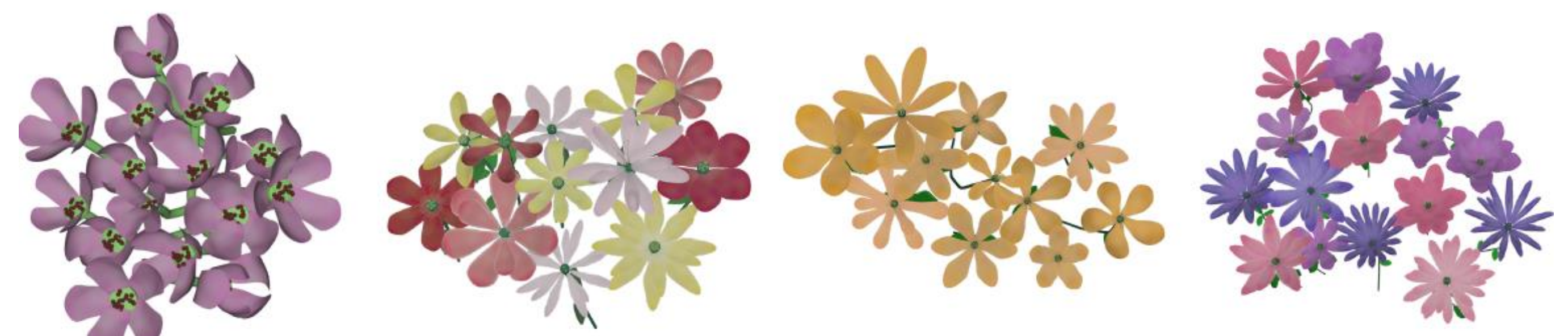

EXPERIMENTS

A. Generation of different flower models.

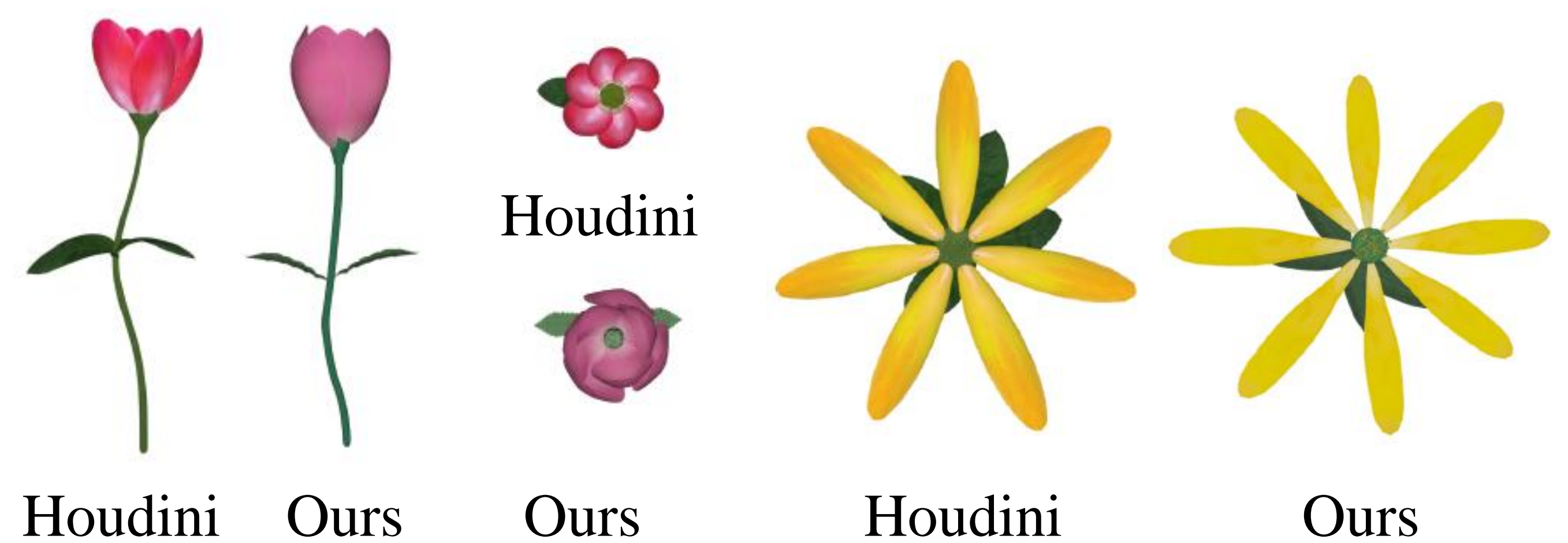### B. The scene with blossom clusters.

C. The comparison of results between different approaches.

Zheng et al. 2017   Ours

D. The comparison between 3D designers' flowers and ours.

Houdini   Ours   Ours   Houdini   Ours

CONCLUSION

We propose a framework for rapid modeling of flowers. It is able to generate 3D components for flowers and assemble them in various ways. With an intuitive and easy-to-use interface, even novices without any modeling experience can create 3D flowers rapidly. Due to the low computational cost, our system can be integrated into a mobile application.

ACKNOWLEDGMENTS