



GENERATING FREEHAND STYLE DRAWINGS WITH SVG

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Introduction

Vector graphics are often known for their clean edges, flat colors, and even sterility. In this project we attempt to add nuance-rich and personal looks to them using freehand style drawings generated as SVG (Scalable Vector Graphics) by Python programming language. The algorithms are developed based on the findings of studying the hand drawing process in art creation. Methods of defining line stroke segments as drawing characteristics using formal grammar are explored, and stochastic turtle graphic interpretation is implemented.

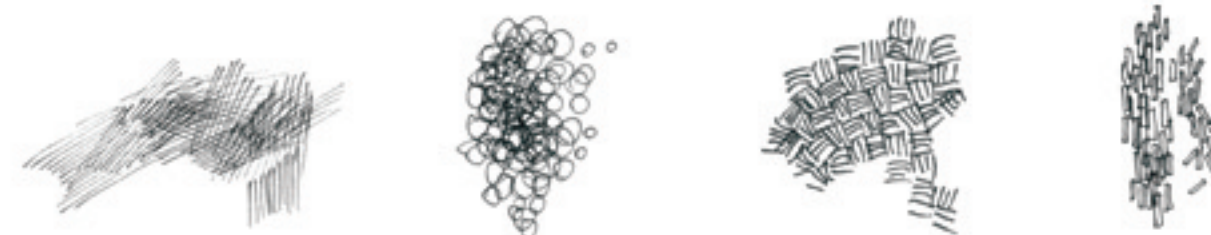


Typical vector graphics

Drawing Generation

To generate freehand style drawings, our approach includes the following steps:

1. define hand drawing characteristics;



Hand drawing strokes

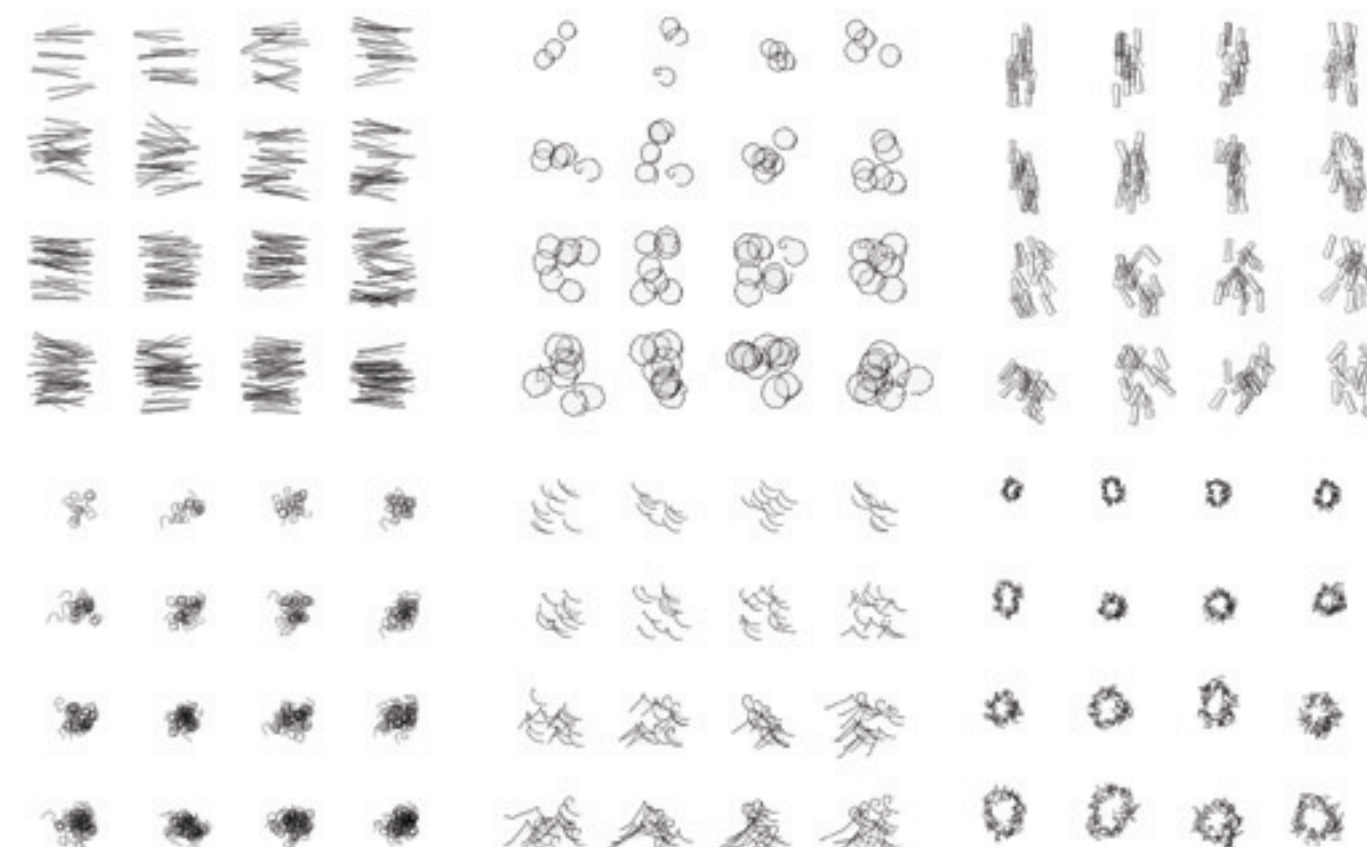
This project is derived from our study on experimental drawings in which drawings are broken down into lines, then stroke segments for the purpose of analyzing and collecting the characteristics of drawings. These characteristics can be described using formal grammar strings. The length of strings determines the amount of characteristics certain stroke carries, the longer the strings are, the more defined the stroke shape will be. Too long of the strings, however, cause rigidity, and too short make the stroke undistinguishable.

L-string examples:

'F+F+F+F+F+F+F+F+F+', 'F+F+F+F+F+F+F-F-FF',
'F+F+F-F-FF+F+F+F+F', 'F+F+F-F-FF+F+F+F+F',
'F+F+F-F-FF+F+F+F+F'

2. create a library of drawing line strokes;

Next, these strings are organized to form a library of arrays in which the Manhattan distance indicates the degree of similarity among line strokes. This library is subsequently used to apply line strokes to form patterns, such as the commonly used patterns created by hatching or crosshatching in hand drawings.



Sample stroke unit library

3. apply line strokes and render SVG.

We then add the stochastic factors into the turtle graphics interpretation process to enhance the feel of human touch. A Python module adapted by the authors based on SVGdraw is used along with Batik SVG Rasterizer and Adobe Illustrator to render SVG as the final output.



Two different strokes applied to a same path (top)

Conclusion

Lines are the fundamental building blocks in free hand drawing. The analogy between the SVG rendering model and the hand drawing process makes it feasible for us to develop the algorithms utilizing lines to construct patterns and tones, which is comparable with what an artist does in hand drawings.

This approach adds fine tones and delicate details to vector graphics, makes them reflect the versatile style of freehand drawings. This way the artwork becomes more personal and can be used in situations where a feeling of closeness or commitment should be generated. Exploration in this direction brings out further potentials of SVG as a tool for art expression.

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