"Walk-through-Raster" – a Generative Aesthetics from 1966

A short description without mathematics

Frieder Nake, May 2021

"Walk-through-Raster" was a rather powerful program to generate algorithmic pictures, "computer art", if you like. In this short note, I want to describe its characteristic features in as simple terms as possible. I will avoid all mathematics that would be needed to better understand the program's function. I hope, nevertheless, the reader will understand well enough. It is true that the secrets behind algorithmic art can really be fathomed only when we allow for mathematical descriptions.

Should I, in parentheses, mention here that algorithmic art always exists as a double. It has a surface and a subface. The surface is for us to see, the subface is for the computer-with-program to manipulate. This particular ontology makes algorithmic art a bit difficult to describe. I'll try.

Assume we are given the following ingredients:

1. a *repertoire of signs* (a set of visible things, here called "signs")
2. a *picture plane* of a given size, and covered by a *grid* whose rectangular elements we call "cells"
3. a function that selects one sign from the given repertoire as the "first", *first selection function*
4. a function that, given a sign (called the predecessor), selects a next sign according to probability distribution (the *transition probability*).

We use these givens to now generate a chain of signs all of which are chosen from the repertoire. We use the first selection function to select the first sign of the chain. This done, we use the transition probability distribution select the second sign, depending on the first, and continue this procedure: the third sign is selected, depending on the second sign, by using the transition probability distribution, etc.

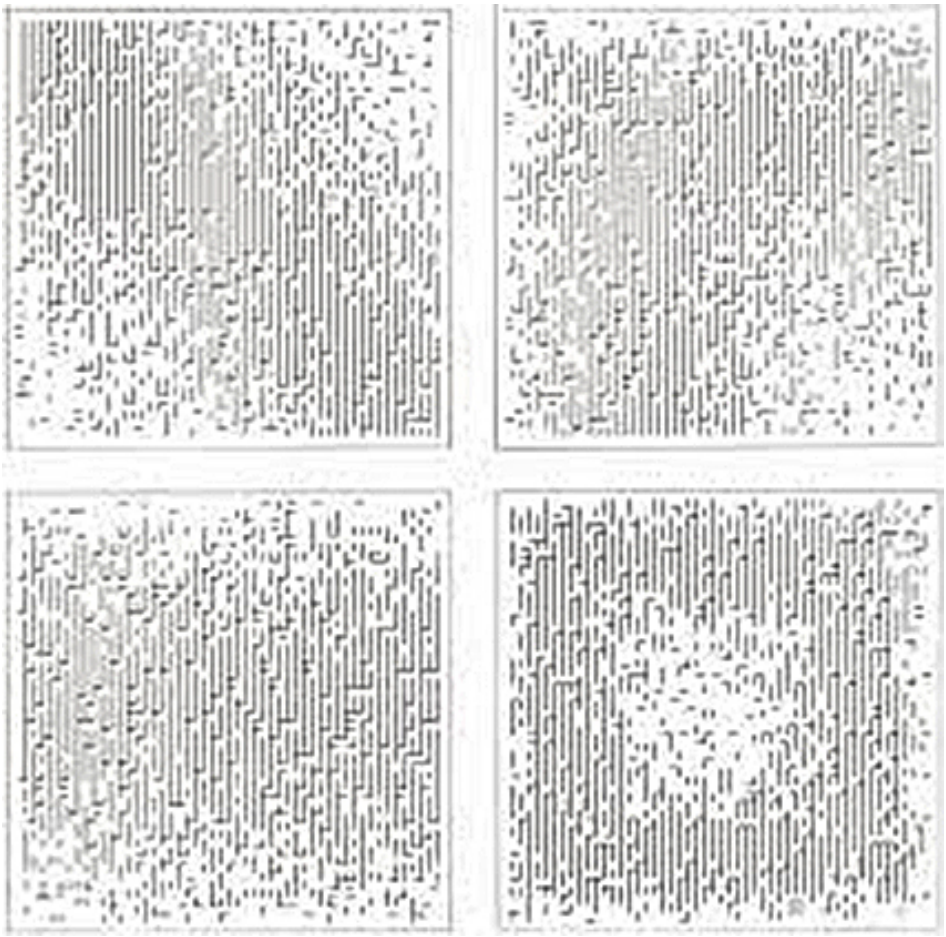
This first operation produces a chain of signs. Our second operation then maps the chain of signs into the cells of the picture plane. The first sign of the chain is put into the top left-most cell of the picture plane. The second sign of the chain is put into the next cell, etc., until all signs have been put into the picture's cells.

But what is the "next cell"? We need one more ingredient! We are also given

5. a set of *modes* that map the elements of a chain into cells of the picture plane, *mapping modes*

The second operation mentioned above – the mapping of the chain of signs into the cells of the picture plane – is carried out according to the chosen mapping mode.

This is all se need to construct a very powerful picture generator. Its power rests in the transition probability distribution. It gives us some power to control what is happening during the construction of the picture. Below, I give a few examples.



The *repertoire* in these four pictures consists of

a short horizontal stroke, a short vertical stroke of same length, and the empty sign (!).

The *mapping modes* are obviously different:

top left: diagonals from top horizontal to right vertical, and from left vertical to bottom horizontal

top right: top horizontal from right to left, then vertical down to bottom; repeat this, one line down horizontally and one line to the right

bottom left: horizontal from left to right, then same one line down, etc.

bottom right: start in upper left corner, go horizontally to the right, then down to bottom, continue horizontally to the left, continue up to the top; repeat the same, but one line into the picture, this way going in squares around, but more and more into the plane

In each case, in the beginning the probability for the empty sign is high, and only occasionally a vertical or horizontal stroke appears. But gradually, the probability for the vertical stroke increases at the cost of the empty sign. The horizontal stroke keeps its low probability. When the middle of the chain is reached, the probability for the empty sign starts to grow again until it is dominating. The different modes determine where "beginning" and "end" are located.

The appearing long vertical lines are made up from short strokes.

These four pictures nicely demonstrate, I believe, what my principle of picture generation means and is capable of:

THINK THE IMAGE, DON'T MAKE IT!