Crackle Weave, Part 3: Path Design

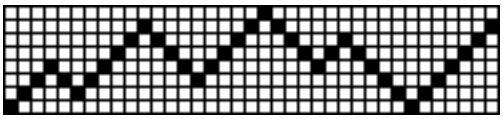
The method of crackle weave design using a motif along a path was introduced in the first article in this series [1].

Except for the path, all is formular in conventional crackle weave design: the 1,2,3,2 motif and specified ways for fixing problems that may occur between the boundaries of the successively placed motif. The only design element is the path.

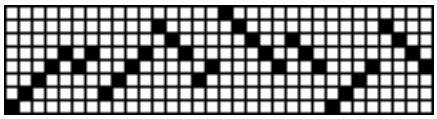
In design, a path is not constrained to a specified number of shafts. Adaptation to a specified number of shafts is done after the motif is placed along the path.

Path Properties

Paths can be classified in a variety of ways. For example, a path may be connected or disconnected, as shown in these examples:

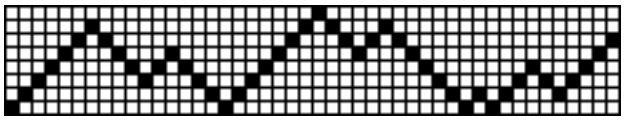


connected

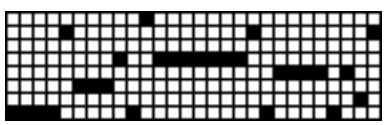


disconnected

A path may be "friendly" or "unfriendly" [2]. A friendly path is one in which each value is one greater or one less than the preceding one. Friendly paths are, of course, connected. Here are examples of friendly and unfriendly paths:

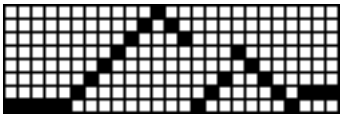


friendly



(very) unfriendly

Unfriendly paths may, of course, have friendly segments, as in

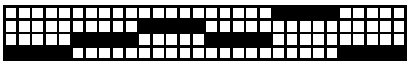


(somewhat) unfriendly

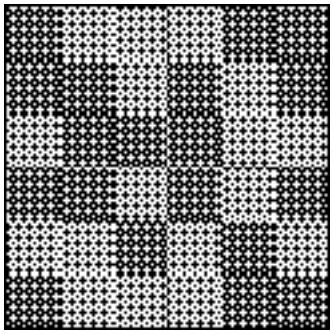
The *extent* of a path is the difference between its largest and smallest values, plus 1. Without losing anything (or, as a mathematician would say "without loss of generality"), the smallest value can be taken to be 1, so that the extent of a path is given by its largest value.

Design Considerations

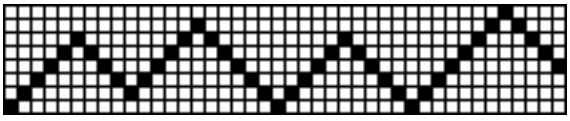
Paths with "flats", runs of the same value, as in



produce blocky, rectilinear patterns. The path shown above produces this drawdown for 4 shafts and a 2/2 twill tie-up, treadled as drawn in:



Friendly paths can produce varied patterns. An example is



A drawdown based on placing the motif on this path is

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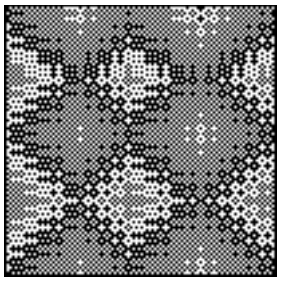
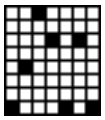
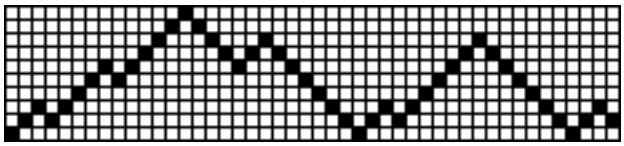


Paths with large extents are capable of producing more elaborate patterns than paths with small extents. However, the number of shafts used limits the possibilities once the motif has been placed along the path.

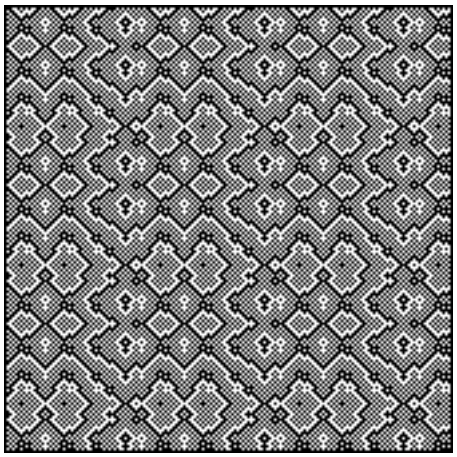
Perhaps surprisingly, disconnected paths are capable of producing the most dramatic patterns. Here is an example of a disconnected path:



Although the path is short, placing the motif along it produces a much longer sequence because of the incidentals needed to connect separated motifs:



A drawdown with this sequence adapted to 8 shafts is



The reason disconnected paths can produce elaborate patterns is the runs introduced by the initials needed to connect separated motifs. One problem with disconnected paths is that they may result in floats longer than 3. Nonetheless, they often produce sound fabrics and the marvelous patterns that can result may more than compensate for the increased float lengths.

Horizontal reflection of a threading sequence to produce a palindrome usually produces a pattern that is more attractive than the unreflected sequence. However, since the motif itself is not symmetric, the result of placing a motif along a palindromic *path* is not a true palindrome. Palindromic enhancement is best done after the motif is placed along the path.

Results of Motif Placement

When the motif is placed along a path, the maximum value in the resulting sequence is two greater than the extent of the path, since the motif goes up two above the largest path point.

Once the motif is placed along the path, modular reduction [3] can be used to bring the sequence within the range of the number of shafts to be used.

Experimenting with Crackle Design

The number of possible paths for all but trivial situations is very large. If the range of a path is n and its length is k, there are n^k possible paths. For example, if n is only 4 and the k is only 8, there are $4^8 = 65{,}536$ possible paths.

Even with a program to run through the possibilities, it is impractical to create, much less evaluate, all crackle weaves of even modest extent.

But that is the challenge of intelligent, artistic exploration — to find gems in vast mountains of debris.

References

1. *Crackle Weave, Part 1: Designing with Blocks and Motifs*, Ralph E. Griswold 2004:
http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_crk1.pdf

2. *Befriending Sequences*, Ralph E. Griswold, 2004:
http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_frnd.pdf

3. *Drafting with Sequences*, Ralph E. Griswold, 2004:
http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_seqd.pdf

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