FRANKLIN MENDIVIL, Acadia University

A V-variable approach to fractal image compression

Most fractal image compression methods rely on variations of Jacquin's fractal "block coding" algorithm. In his approach, the image is first partitioned twice, once into "large" blocks and again into "small" blocks; the small blocks are typically one-half the size of the large blocks. Given these two block partitions, the algorithm works by scanning through all the small blocks and, for each one, searching the large blocks to find the "best" match when suitably transformed. The theory underlying fractal block coding is that of "local" IFS fractals.

In this talk, I will discuss a completely new fractal-based algorithm for image compression, one which is inspired by the theory of V-variable fractals. V-variable fractals are intuitively fractals with at most V different "forms" at each level of magnification. In the context of a block partition, this means that for a given size of block, there are at most V different blocks of that size.

Our algorithm also works with a block decomposition of the image and progresses down the size scale. However, we define no contractive mappings from larger scale to smaller scale, but instead we sort and cluster blocks of a given size to find V "representatives." The inspiration from V-variable fractals is in the way the structure of the image is encoded into the V-variable tree representation. At each size "level" there are only V types and so we need only store how each type at level n is composed of the types at level $n+1$.