Yair Koren

Adaptive Multiscale Redistribution for Vector Quantization

P O Box 55405
Haifa 34981
Israel
yair$_k$@*cs.technion.ac.il*
Irad Yavneh

Vector quantization is a classical problem which appears in many fields. Unfortunately, the quantization problem is generally non-convex, and therefore affords many local minima. The main problem is finding an initial approximation, which is close to a "good" local minimum. Once such an approximation is found, the Lloyd-Max method may be used to reach a local minimum near it. In recent years, much improvement has been made with respect to reducing computational costs of quantization algorithms, while the task of finding better initial approximations received somewhat less attention.

We present a novel multiscale iterative scheme for the quantization problem. The scheme is based on redistributing the representation levels among aggregates of decision regions at changing scales. The rule governing the redistribution relies on the so called point density function and the number of representation levels in each aggregate. Our method focuses on achieving better local minima than other contemporary methods such as LBG. When quantizing signals with sparse and patchy histograms, as may occur in color images for example, the improvement in distortion relative to LBG may be arbitrarily large.