Quality Metrics Driven Approach to Visualize Multidimensional Data in Scatterplot Matrix

Overall Research Goals:
(1) Derive representative and generalizable quality metrics for visualizations.
(2) Apply metrics to amplify interesting patterns, as well as to mute the uninteresting noise for multi-dimensional visualizations [1,2].

Scatterplot matrix (SPLOM) Sorting Approach:
Rearrange SPLOM cells by sorting scatterplot dimensions based upon their visual quality; Groups of adjacent visual patterns may form “scatterplot motifs” (helps analysts to gain a clear overview and to delve into specific areas of interest more easily).

SPLOM Reordering Pipeline:
(1) Scatterplots are encoded by its contained visual motif, such as presented in [3]. The motifs can be encoded into a binary feature vector by describing a space-filling z-curve starting from the top-left.
(2) A pair-wise comparison of all scatterplot motifs with a preselected overlap feature vector comparison results in a distance matrix.
(3) This distance matrix can be sorted with a standard 2D numeric sorting algorithm, such as TSP Ordering, Optimal-Leaf Ordering, or the Sloan sorting algorithm.
(4) In the final step the distance matrix’s ordering can be applied to the initial SPLOM to achieve a visually coherent SPLOM ordering.