Detecting and Summarizing Perceptually-Separable Patterns for Exploratory Data Analysis

Tell Me What Do You See:

Visual Data Exploration

Visualization plays an important role in the exploration of scientific datasets. By engaging our visual perceptual system, we can detect trends and spots outliers in the data. Visualization thus enables people to see patterns we have not thought about.

Too much data to look at

But often there are too many data points or variables to look at.

Can computers speed up data exploration by visually scanning data plots and summarizing trends and outliers they "see"?

Visual machine learning

Clustering techniques are widely used, but interpreting clusters of high-dimensional points can be difficult. Rather than attempting to cluster the raw data, we cluster the visual projections specified by users.

We employ "visual distance" metrics in the frequency domain to detect and group views that exhibit perceptually-similar characteristics (e.g., similar trend lines and histogram shapes).

Exploring the US census

Which US counties have similar trends with respect to age and demographic breakdown of their population?