

INSIGHTS INTO VISUALIZATION

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This presentation addresses several issues arising in visualization. In particular, the trade-off between accuracy, information content and subjective informative-ness will be discussed. The issue of optimally smoothing/pruning the data while keeping its most important features is intuitively understood, but very difficult to address quantitatively, and hence almost impossible to do automatically, with well-specified algorithms. Several examples from image analysis and representation will be given.

EXAMPLES

The first example deals with visualizations of optic flow fields for motion analysis in video sequences. It is quite easy to rely on "off-the-shelf" optic flow algorithms that provide a vector of motion at each pixel, however images that display these vector fields are highly uninformative. Both the humans looking at these pictures and, of course, the computer vision algorithms that have to analyze them to determine what objects are moving in which directions, are easily confused. The message is clear: there is a great need for pruning the data, even exaggerate some portions of it and deciding on ways to be informative rather than overwhelmingly accurate.

The second example deals with one-liner representations of images. An image is highly informative and adapted to our most informative sense. "A picture is worth a thousand words" is technically an understatement, but we quite often enjoy seeing line drawings that contain far fewer bits, concentrating on giving us a general feel of what is depicted using several well chosen lines. A good artist like Calder or Picasso, can convey a lot in only one line, a feat terribly difficult to emulate. A caricature is often better than the real thing! Advanced edge-detection algorithms cannot choose and enhance the visually significant edges, and cannot connect them in interesting a suggestive ways.

Other examples discussed involve image segmentation and edge integration issues, all regarded as methods for data reduction for visualization or for image-based metrological purposes. Finally, the issue of logo design as an ultimate graphical visualization process will be demonstrated.