

# Parameters for Realizing the Visualization of the Future

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## Introduction

Data and information visualization (data *viz* or information *viz*) is an interdisciplinary field concerned with the graphical representation of data and information. This is a particularly efficient method of communication for large amounts of data or information, such as time series. It is also a study of visual representations of abstract data to enhance human cognition. Abstract data includes both numeric and non-numeric data, such as text and geographic information. It is related to info graphics and scientific visualization. One difference is that when a spatial representation is chosen (such as a page layout in graphic design) it is information visualization, and given a spatial representation it is a scientific visualization.

## Description

From an academic point of view, this representation can be thought of as a mapping between the original data (usually numbers) and graphical elements (such as lines and points on a graph). Mapping determines how the attributes of these elements change with data. From this point of view, a bar chart is a mapping of bar length to variable magnitude. Mapping is a core competency in data visualization because the graphical design of mapping can affect the readability of charts. Data and information visualization is commonly considered a branch of descriptive statistics, as it has its roots in the field of statistics. However, effective visualization requires both design skills and statistical and computer skills, leading authors such as Gershon and Page to argue that visualization is as much an art as it is a science increase. By studying how people read and misinterpret different types of visualizations, you can determine the types and characteristics of visualizations that are most understandable and effective in conveying information. Surface flow visualization: This causes flow streamlines to appear in the bounding area when approaching a solid surface. An example is colored oil applied to the surface of a wind tunnel model (the oil responds to surface shear stress and forms a pattern). Particle tracking method: Particles such as smoke or microspheres can be added to the flow to track the movement of the fluid. By illuminating the particles with a sheet of laser light, slices of complex fluid flow patterns can be visualized. Assuming that the particles faithfully follow the streamlines of the flow, we can not only visualize the flow, but also measure its velocity using particle image velocimetry or particle tracking velocimetry. Particles whose density matches the liquid flow show the most accurate visualization. Optical method: Some streams reveal patterns through changes in the optical refractive index. These are visualized by optical techniques known as shadowgraphs, schlieren photography, and interferometry. More directly, a dye can be added to a (usually liquid) stream and the concentration measured. Typically, light attenuation or laser-induced fluorescence techniques are used. In scientific visualization, flows are visualized using two main methods: Analysis methods analyse specific flows and display properties such as streamlines, dashes, and path lines. Flow can be given as a finite representation or as a smooth function. A texture advection method that "bends" a texture (or image) according to the flow.

## Conclusion

Since the image is always finite (the flow can be given as a smooth function), these methods visualize an approximation to the real flow. Visual analytics is defined as "the science of analytical thinking supported by interactive visual interfaces". His focus is on the discourse (interaction) of human information within a large and dynamically changing information space. Visual analytics research focuses on supporting perceptual and cognitive manipulations that enable users to recognize what to expect and discover the unexpected in complex information spaces. Technologies born from visual analytics have applications in nearly every field, but are driven by critical needs (and funding) in biology and national security.

