

DYNAMIC VISUALISATION VARIABLES AND THEIR CONTROL IN ANIMATIONS OF GEOSPATIAL DATA

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Nowadays, animation is commonly used for the visualisation of geospatial data. Main reasons for its use are the availability of abundant data (e.g. cloud cover images), technological advances (e.g. powerful computers, the Web as medium) and user expectations (current generations are used to dynamics). Animation of geospatial data is believed to be useful because of its ability to mimic real world dynamics, to represent processes, track changes and attract attention. However, the few usability tests conducted so far provide mixed evidence. In some cases animation is found to enhance information processing, in other cases static displays are preferred. However, animations are often not used to their full potential. More research into aspects like application of the dynamic visualisation variables and user control will contribute to further evidence about the usability of animation for the visualisation of geospatial data.

A dynamic display is created by the use of graphic *and* dynamic visualisation variables. The ways in which graphic variables can be linked to geospatial data and are understood by users of a graphic display are well studied (e.g. by Bertin, and by others). A sound theoretical framework for application of the dynamic variables (variables of display time, like moment, order, duration, frequency, and rate of change) is still missing. Dynamic visualisation variables can be used in several ways, but comparative usability tests have not yet been conducted.

Limitations in perceptual and cognitive information processing may hinder the understanding of a running display, with changes happening over time and simultaneously at several locations of the display area. Control over such a complex display is desired, particularly for exploration purposes. Currently, interaction (if available) is often limited to the simple controls provided by media players (e.g. on the WWW). More sophisticated interaction is possible, but its effectiveness depends on consideration of usability issues.

This paper deals with the role of dynamic visualisation variables in the representation of geospatial data and their control for exploration purposes. The result of an investigation of the available variables is describe. The variables are defined, and their main characteristics are explained. Some variables cannot be used in isolation: existing dependencies are explained. Next, the ways in which the variables can be linked to geospatial data is described. It is possible to link the variables of display time to aspects of world time, but other options are also explained. Examples

will illustrate the different types of use. The main aim is to provide a theoretical framework which links dynamic visualisation variables to geospatial data for representation. Attention is also be paid to possibilities to incorporate user control of the variables. In subsequent research, animations in which the dynamic visualisation variables are linked to geospatial data and controlled by the user, will be tested in a particular exploratory use context: the monitoring of changes in the physical environment. Results of this testing will provide further evidence for the usability of cartographic animation.