DYNAMIC VISUALISATION VARIABLES IN ANIMATION: THEIR USE FOR THE MONITORING OF SPATIAL DYNAMICS

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ABSTRACT

Animation is often believed to be *useful* for the representation of real world dynamics because it can represent spatial and temporal aspects of geographic phenomena. However, the question whether animations are also *effective* visualization media is not yet fully answered. Research conducted so far with geo-applications provides mixed evidence (see for examples and a discussion 1). It has been suggested, however, that animations might be particularly useful in applications where detailed sequential information about changes is important (2). Such an application is monitoring.

The main objective of monitoring of spatial dynamics is to gain insights in the spatio-temporal behaviour of geographic phenomena. Insights enables domain experts to warn or act otherwise in case of undesired developments, like hazards. It may also lead to the generation of models of reality which are, for example, used to estimate the effects of interference in a development, or to extrapolation of trends to predict future developments. Monitoring is important for the sustainable development of our world.

Insights in the behaviour of geographic phenomena can be obtained by applying computational methods, but the human ability to quickly 'see' patterns, relationships, trends, movement and other changes is very powerful. Therefore, visual exploration of animations can perhaps complement computational methods.

In an animation data are represented by graphic variables in the spatial dimensions of the maps/images. In addition, dynamic visualisation variables (like order and duration) are applied in the temporal dimension (3, 4). Application of graphic variables is well studied. This research focuses on the use of dynamic visualisation variables by domain experts who visually explore animations to execute monitoring tasks. Previously, the conceptual framework for the use of the variables has been developed. It involved identification of questions relevant for an expert in monitoring (5); aspects of 'change' that are addressed by these questions (5); cognitive tasks required to find answers by visually exploring animations (6); characteristics of dynamic visualisation variables and possible ways to use them to find answers to the questions (7).

The presentation will focus on animation design and empirical testing by domain experts. As a case study, vegetation monitoring is used. Data of an Iranian wetland area have been obtained for a period of more than four years. In total 147 Spot images (ten-day synthesis products of the SPOT 4 Vegetation optical instrument) are used during the evaluations. Questions addressed are: 'Which strategies are used to visually explore differently designed animations; do different designs trigger different cognitive processes; and which design model is most effective?' Animations in which the dynamic visualisation variables can be *viewed only* and, alternatively, can be interactively *controlled* by the experts will be used. Results of a focus group session - organized to discuss animation design, tasks, use scenario's and problems that might occur during later tests - will be described (8). Because of the interest in use strategies and cognitive processes, the think aloud method, followed by a retrospective session, will be used for empirical testing (9,10). The last two tests will be executed in the user test research laboratory, set-up by my colleague Corné van Elzakker, who also applies these methods (11). Finally, results of the analysis of the test data will be described. The ultimate aim of the research is to contribute to the development of methods and tools to visually explore geodata.

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Biography

Connie (C.A.) Blok is employed at the International Institute for Geo-Information Science and Earth Observation in Enschede, The Netherlands (http://www.itc.nl).

She is working in the Department of Geo-Information Processing as assistant professor in Geovisualization, and her major activities are in research and education.

With respect to research, the main interests are in map design and geo-spatial data visualization in general, and more specifically in:
- dynamic and interactive visualisation;
- map use;
- cognitive issues related to map use.

The contribution to this conference can be viewed in the context of her research entitled:
'Dynamic visualization variables in animation; their use for the monitoring of dynamic geo-spatial phenomena.'

Outside ITC, she is actively involved in the Netherlands Cartographic Society (NVK), e.g. as editor of the Netherlands Cartographic Journal (Kartografisch Tijdschrift) for more than 10 years. Internationally, she is involved in the ICA Commission on Visualization and Virtual Environments as a corresponding member.