

DEVELOPMENT OF VIEWERS FOR INTERACTIVE 3-D VISUALISATION OF GEODATA

Admire Kandawasvika and Michael Hahn
University of Applied Sciences Stuttgart
Faculty Surveying and Geoinformatics
Schellingstr. 24
70174 Stuttgart, Germany
m.hahn.fbv@fht-stuttgart.de

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EXTENDED ABSTRACT

Advancements in three-dimensional (3-D) geographic data acquisition techniques have led to a continuous growth of geographic information. The challenges imposed are how to handle such data in a more effective way. A research project has been carried out which focused on 3-D visualisation of geodata in an interactive mode. Since human needs differ in terms of culture and exposure, which in turn affect how data are perceived by such different people, there is a variety of specific 3-D visualisation application requirements. Henceforth, there will be need for software interfaces for geodata applications.

The main objective of this research was to develop a viewer interface or a simple viewing system for the purpose of visualising parts of interest of a Stuttgart city model. Realisation of this task guides the way to subsequent, specific applications that can be developed according to the user or customer's needs. There are some complex visualisation systems on the market, but most applications cannot be implemented fully without some customisation or new interface development.

In order to develop a viewer interface that provides interactive functionality and dynamic levels-of-detail (LOD), along with dynamic movements and weather simulations (for inducing the feeling of an environment), an existing software development kit (SDK) from a company called Skyline Software was used. Microsoft Visual C++ and MFC programming, together with TerraSDK, were used for the development of a first viewer interface. The interface enables the following functions: 1) a user can move dynamically within the scene (virtual city); 2) weather simulations such as snow and rain can be generated; 3) 3-D objects (i.e., billboards or labels, buildings, trees, etc.) can be loaded on the terrain or removed from the scene at will; 4) selection and 'jumping' to places of interest is possible; and 5) route-following and observing objects of interest from four cardinal positions (i.e. north, east, west, and south). The whole interface implementation was realised using an ActiveX control.

Furthermore, this research showed the feasibility of developing viewer interfaces for specific applications with the customer or user in mind. Currently, more applications of this nature are being developed and realised on the Internet. Factors such as data streaming and data traffic are crucial for the success of this interfaces. Three-dimensional visualisation will integrate more geographic imaging fields such as digital photogrammetry, remote sensing, and GIS. There also will be a continuing demand in the realisation of specific viewer interfaces in the fields of forestry, real-estate marketing, virtual tourism, geology, archaeology, and other geodata marketing fields.