A VIEWER INTERFACE FOR INTERACTIVE
THREE-DIMENSIONAL GEO-DATA VISUALISATION

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ABSTRACT:

Advancements in three-dimensional (3-D) geographic data acquisition techniques has led to continuous growth of geographic information. The challenges imposed are how to handle such data in a more effective way. A research 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 is perceived by such different people, there is a variety of specific 3-D visualisation application requirements. Henceforth, there will be need for different software interfaces for different 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, which can be developed according to the user's or customer's needs. There are some complex visualisation systems on the market but most applications can not be implemented fully without some customisation or new interface development.

In order to develop a viewer interface, which provides interactive functionality and dynamic levels-of-detail (LOD); 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 programmming, together with TerraSDK, were used for the development of a first viewer interface. The interface enables the following functions: a user can move dynamically within the scene (virtual city), weather simulations such as snow and rain can be generated, 3-D objects (i.e. billboards or labels, buildings, trees, etc.) can be loaded on terrain or removed from the scene at will; selection and 'jumping' to places of interest is possible, 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 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, GIS, etc. There will be continuing demand in realisation of specific viewer interfaces in the fields of forestry, real-estates marketing, virtual tourism, geology, archaeology, and other geodata marketing fields.