

Design and implementation of a panoramic image-based virtual reality prototype

Stephen Rawlinson¹ and Y.C. Lee²

¹ The Focus Corporation Ltd.

² Department of Geodesy and Geomatics Eng., UNB, CANADA

Abstract

Conventional approaches to adding virtual reality-based realism in a GIS environment involve the development of complicated 3-dimensional geometric models through the use of sophisticated computer hardware and software. While these approaches provide for some benefits with regard to increased user comprehension, they are often limited due to the complexity of their creation and inability to provide realistic visual cues for the user. This is especially significant in the development of interactive computer-based touring guides, where the uninitiated user must be able to quickly and efficiently interpret directions provided on a computer display.

This research focuses on the integration of digital terrestrial photographs in a map-based environment acquired with a set of non-metric cameras mounted on a simple tripod system. A novel combination of stereo-photographic and image processing techniques are used to link 360-degree panoramic virtual environments to a dynamic map-based environment within a software and hardware prototype developed by the authors. The linked panoramic and map interface allows for user query and interaction. Techniques and results are outlined for the creation of the system, including: acquisition, processing (data reduction), and visualization. Ease of use and low cost were primary considerations for the development of the prototype. Results suggest that an un-calibrated stereo and camera setup can provide appropriate accuracy for the purposes of GIS integration. Further, the successful implementation of the prototype provides proof of concept for an alternative approach for spatially enabled virtual reality and map integration.