

A SURVEY OF DIGITAL VECTOR MAP WATERMARKING

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ABSTRACT. The application of digital vector maps faces some unsolved issues such as digital copyright protecting, data authenticating, and data source tracing, etc. These issues could be obstacles restricting the further usage of digital vector maps. The technique of watermarking provides potential solutions for the problem. Comparing with the watermarking schemes designed for general multimedia data, watermarking a 2D vector map has some distinct features due to the special data structures and application environments of vector maps. These distinct features will be summarized in this paper by analyzing the characters of vector map data. Furthermore, an overview of the existing typical algorithms will be presented to show the state of the art of the study.

Keywords: Vector map, Spatial data, Map object, Vertex, Reversible watermark

1. **Introduction.** The rapid development of computer communication and internet makes it very easy to losslessly exchange data via networks. On the other hand, it also becomes crucial to protect the digital copyright of various digital medias. Watermarking has been studied for more than ten years as a possible solution for the issue. In addition to copyright protecting, watermark can also be designed for other purposes such as hiding communication, data authentication, data tracing (fingerprinter), etc. Many data types can be used as the cover data for watermarking, e.g. digital image, audio, video, text, bar-code, 3D model, CAD data, 2D vector data, softwares, VLSI, etc. Among these data types, some general multimedia data such as digital images, audios, videos and 3D models have been paid much more attentions than other data types. This paper focuses on the state of the art of watermarking 2D digital vector maps, which are the most important data of Geographical Information System(GIS) and have attracted relatively less attentions in watermarking world.

Generally speaking, the application of GIS has to share its geographical data within its user group in kinds of manners, e.g. via web, or distributing CDs. It means that the map