



Chapter V

Argumentation Mapping in Collaborative Spatial Decision Making

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Abstract

Collaboration and decision-making of humans usually entails logical reasoning that is expressed through discussions and individual arguments. Where collaborative work uses geospatial information and where decision-making has a spatial connotation, argumentation will include geographical references. Argumentation maps have been developed to support geographically referenced discussions, and provide a visual access to debates in domains such as urban planning. The concept of argumentation maps provides for explicit links between arguments and the geographic objects they refer to. These geo-argumentative relations do not only allow for cartographic representation of arguments, but also support the querying of both space and discussion. Combinations of spatial queries and retrieval of linked arguments provide a powerful way of analyzing and summarizing the current state of a debate. In this chapter, we provide an overview of the

original argumentation model, and we discuss related research and application development. We also link argumentation mapping to related concepts in geographic visualization, spatial decision support systems, and public participation GIS under the umbrella of collaborative GIS.

Introduction

Collaboration almost imperatively entails argumentation, that is, the exchange of personal views on certain topics, in particular using logical reasoning. Argumentation is often structured into discussions, or debates, with contributions by individual participants responding to each other. In spatial decision situations, most discussion contributions will contain geographic references. For example, in urban planning, arguments in favour or against a new building might contain references to the building's location and to neighbouring buildings or streets. A common geographic reference in contributions to public debates is the participant's home location.

Argumentation maps were developed by Rinner (1999b, 2001) as a concept for computer support of geographically referenced discussion by cartographic visualization and query functionality. Argumentation maps have since been discussed in the context of "place-based group knowledge building" (MacEachren, Gahegan, & Pike, 2004) and geocollaboration (MacEachren & Brewer, 2004), and the approach has been summarized in a textbook on "Information Systems for Urban Planning" (Laurini, 2001). In this chapter, we will review the original concept and related research from a collaborative GIS perspective, and comment on existing argumentation map implementations.

Section 2 describes concepts and techniques for recording, structuring, and visualizing human argumentation. Formal models for debates were developed in the 1950s and 1970s, and have been implemented in graphically oriented software tools in the sequel. In section 3, theoretical considerations for linking discussion contributions to geographic objects are examined. Section 4 discusses the resulting argumentation maps from the perspective of collaborative GIS, while section 5 presents selected implementation examples, and describes the functionality of an optimal argumentation map from a user's and a content provider's point of view. Section 6 concludes this chapter with an outlook on the development of research and applications of argumentation maps within the field of collaborative GIS.

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