Accessing Knowledge, Information and Resources for Planning and Spatial Decision Support: Introducing the Spatial Decision Support Knowledge Portal

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ABSTRACT

To help synthesize and systematically organize the information, knowledge and resources for spatial decision support (SDS), and to help researchers and practitioners engaged in an actual planning process find relevant information and resources for solving their specific planning problems, the SDS Consortium and University of Redlands have developed a conceptual framework for SDS and a collection of SDS resources, hosted on the SDS Knowledge Portal. The conceptual framework includes a set of defined, inter-connected concepts pertaining to planning and spatial decision support, such as planning and decision problem types, application domains, knowledge domains and planning process including phases and steps. This conceptual framework is further used to organize a representative set of SDS resources, such as planning process workflows, methods, tools and models, data sources, case studies, literature, and so forth. The SDS Knowledge Portal facilitates learning of SDS and accessing SDS resources, promotes semantic clarity by adopting a common vocabulary for the user community, and promotes interoperability among SDS resources by using a standard set of concepts to define and classify these resources.

Keywords: Knowledge Portal, Ontology, Planning Process, Planning Support Systems, SDS Case Studies, Spatial Decision Support, Spatial Decision Support Systems, Spatial Decision Support Tools and Models, Workflow

INTRODUCTION

Spatial decision support (SDS) plays an important role in any planning process that has a spatial dimension. SDS is defined by the Spatial Decision Support Consortium as follows:

"Spatial decision support is the computational or informational assistance for making better informed decisions about problems with a geographic or spatial component. This support"
assists with the development, evaluation and selection of proper policies, plans, scenarios, projects, interventions, or solution strategies. (SDS Consortium, 2008; http://www.spatial.redlands.edu/sds/ontology/?n=SDSSAbout:SDS)

This is a broad definition. It encompasses any computational and informational support for all the stages during a planning process, including the “condition assessment” and “design” stages, not just the “decision” stage during which the choice among alternative plans is made. In addition, it covers all aspects of the planning process including, for example, participatory vs. non-participatory decision making.

To date, there is a vast body of knowledge accumulated in the area of planning and spatial decision support, encompassing related fields of study such as spatial decision support systems (Malczewski, 1999; Sugumaran & Degroote, 2010), planning support systems (Batty, 2008; Geertman & Stillwell, 2009), participatory GIS and public participation GIS (Jankowski & Nyerges, 2001; Sieber, 2006), etc. This “knowledge” includes understanding of the underlying planning/decision processes, selection and application of appropriate methods and tools, and other best practices for making informed decisions. There have also been a large number of planning and decision support related resources such as algorithms, tools and models developed to date (Malczewski, 2006; Sugumaran & Degroote, 2010; Geertman & Stillwell, 2009).

To help synthesize and systematically organize the information, knowledge and resources for planning and spatial decision support, and to help researchers, practitioners engaged in an actual planning process find relevant information and resources for solving their specific planning problems, the SDS Consortium and University of Redlands have developed a conceptual framework for SDS. We analyzed a representative set of SDS literature to identify major knowledge components in SDS, including essential concepts and the important relations among these concepts. We further identified the fundamental granules of the planning and decision making process and other important concepts for describing SDS resources, all organized by the SDS conceptual framework.

THE SDS KNOWLEDGE PORTAL

The SDS conceptual framework (Li, Raskin, & Goodchild, 2008), currently including more than 700 concepts, and an initial collection of SDS resources, are hosted on the SDS Knowledge Portal (http://www.spatial.redlands.edu/sds). The conceptual framework is developed with the practical objective in mind to provide useful information and resources for solving real planning problems, as well as help people gain knowledge about various aspects of SDS. To support these goals we provide several ways to access the information on the Portal.

Browsing the Taxonomy

The content of the Portal consists of several major components including planning/decision problem types, planning process phases and steps, methods and techniques, technology, domain data and knowledge, people and participation, and resources for planning processes. Figure 1 below shows these components.

The Planning/decision problem type taxonomy includes categories such as location allocation, site search or selection, network design including transportation, vehicle routing and scheduling, and so forth. Besides the taxonomy, a set of attributes are identified for describing planning problem types, such as problem objective, spatial scale, temporal extent, institutional, legal, social, cultural and geographical context, application domain, etc.

A structured or semi-structured planning process often consists of some typical phases and steps (which may be iterative and may not follow a rigid order). These phases and steps are defined in the component of planning/decision making process phases and steps. Examples include issue articulation (with sub steps such as problem identification, goal specification and stakeholder engagement), process mapping,
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