Geoprocessing applications in decision support systems for regional planning

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Outline

• Geoprocessing & SDSS
• Typology of SDSS
• Regional Decision Maker
• Creating Geoprocessing services
• Online demo
• Agile strategic planning
What is Geoprocessing?

- Allows to automate the GIS tasks (ESRI Developer Network)
- Links tools and processes in sequence
- Part of geospatial analysis & developing models
- Input dataset → Tool → Output dataset
- Capacity of OLAP (Online Analytical Processing)
  - Multidimensional Database (MDB) vs. Relational Database
- Basis for developing SDSS (Spatial Decision Support Systems)
Spatial Decision Support System

- SDSS is one of many types of DSS (Decision Support Systems)
- DSS varies from data- to knowledge- to model-driven (Power, 2003)
- Earliest example of SDSS-
  - Geo-data Analysis and Display System (GADS) [IBM Research Lab, 1970s]
  - Man computer interaction and problem solving
- Expert systems can be integrated
  - Expert system (rule based) + GIS + sensors [WaterKY.org]
  - Artificial Intelligence & Data Mining techniques
  - Agent-based Modeling Platform, for example GAMA
Typology of SDSS

Category
- Multiattribute Decision Analysis
  - GIS-MADA

Users
- Group
- Individual

Type
- Deterministic
- Probabilistic
- Fuzzy

Dialog Data Modeling


Based on Malczewski, 2006; Jabeur, Sahli and Haddad, 2011
RDM – Regional Decision Maker

- Designed to help in regional planning
- Offers a variety of GIS-based tools
RDM interactive mapping system characteristics

- ArcGIS for Desktop 10.1
- ArcGIS for Server 10.1
- ArcGIS Viewer for Flex
Industry clusters summary tool

- Summarizes employment by industry cluster
- Allows selection of custom region
Creating the Tool

- Data source is ESRI’s File Geodatabase
- Data extent is the entire US including Alaska and Hawaii
Geoprocessing Model

- Area of analysis is user defined polygon
- Uses Model Builder specific tool ("Get field value")
- Outputs a list of clusters with employment values
Geoprocessing Service
Web Application
Web Application
Web Application

[Image of a map with a pop-up open showing industry clusters summary (2010)].

Industry clusters Summary (2010):
- Advanced Materials: 3127
- Ag. businesses, food processing & technology: 21932
- Apparel & Textile: 7381
- Arts. Entertainment, Recreation & Visitor Industries: 34779
- Biomedical/Biotechnical (Life Sciences): 67010
- Business & Financial Services: 16875
- Chemicals & Chemical Based Products: 12602
- Defense & Security: 56885
- Education & Knowledge Creation: 27000
- Energy (Fossil & Renewables): 47180
- Forest & Wood Products: 12387
- Information Technology & Telecommunications: 63191
- Mining: 1367
- Glass & Ceramics: 1652
- Printing & Publishing: 21917
- Transportation & Logistics: 51581
- Manufacturing Supercluster: 40366
- Computer & Electronic Product Manufacturing: 3415
- Electrical Equipment, Appliance & Component Manufacturing: 1505
- Fabricated Metal Product Manufacturing: 1294
- Machinery Manufacturing: 7118
- Primary Metal Manufacturing: 1204
- Transportation Equipment Manufacturing: 19476

[Web site link]
Application for corridor-based region
Questions & Answers

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Thank you!