Spatial Sciences Institute

GIS and Location Analytics

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Outline

• Background
  o Geography | Maps
  o Geographic Information Science
  o Geographic Information Technologies
  o Geospatial Technical Competency Model
• Spatial @ USC
• Location Analytics
  o Business Analyst
  o Esri Maps
  o ArcGIS Online
• Final thoughts

Geography as a discipline ...

• Focuses on what is or what has been
  o Tracks interactions and flows to understand how and why things happen
  o Increasingly relies on visual thinking to handle ever-larger amounts of data and to make ever more complex connections between phenomena
  o Has excelled in helping us to understand the nature and impact of an exponentially growing human population, using finite resources at unsustainable rates, damaging the natural environment at an ever-increasing rate, and concentrating wealth and power among an increasingly small number of people
• Few geographers have focused on what to do about these problems going forward

Maps ...

Geographic information science

Typical Geospatial Workflow

Synthesis courtesy of Tom Fisher, University of Minnesota

Slide courtesy of Paul Bolstad, University of Minnesota
Vector and Raster Data Models

Where, What & When ...

Spatial analysis

Context ... location ... location ... location!

Geospatial technologies

What Does a GIS Look Like?

- Information about what is where (when)
- The contents of maps and images
- You would know when a computer was being used for GIS because the data stored in it would include maps and images
Multiple Platforms

- Provides multiple entry and exit points for users
- Bundles software with data
- Supports geo-processing workflows and services
- Rapid growth in demand for people with spatial skills

Workforce development

- Geospatial Technology Competency Model
  - Positioning and data acquisition
  - Analysis and modeling
  - Software and application development
- UCGIS GIS&T Body of Knowledge
- Los Angeles County

Web / GIScience 2.0

Spatial @ USC

- Spatial Sciences Institute was established in July 2010
- New classes
- New Minor in Spatial Studies
- New B.S. in GeoDesign
- New Online M.S. & Graduate Certificate Programs in Geographic Information Science & Technology
- New Ph.D. in Population, Health & Place
- Enhanced support for spatially enabled research & teaching across USC

Spatial ... cross-cutting ... the spatial turn

- Rapid spread of spatial thinking and GIS throughout the sciences
  - Snow’s 19th century work on cholera
  - ACM SIGSPATIAL
- Has swept through social sciences and humanities as well
  - All human action literally takes place somewhere
  - Spatial dimension of social interaction key for understanding all of the classic questions about the human condition
- Cf. with statistics as a field of study

Spatial science ... technology ... discovery

Map showing clusters of cholera cases in London epidemic of 1854

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Spatial science ... technology ... discovery

Geographic Information Science

Scientific Discovery

Geospatial Technologies
Geographic information infrastructure

- Contains knowledge describing natural and human environments on Earth
- Includes multiple components
  - Data
  - Data models that provide structure to the data
  - Models and analytic tools that show predictions or suitability
  - Geospatial workflows
  - Metadata, which describes the aforementioned components, and is key to sharing, discovery and access
- Relies on web & mobile environments to make these ways of thinking about the world more accessible

Map projections ...

- Flat-earth thinking. Thank you to those readers who pointed out that, by superimposing concentric circles on a Mercator projection, the map in our May 3rd issue (now corrected online) greatly underestimated the potential reach of North Korea’s missiles. We stand corrected.

The Modifiable Area Unit Problem

The Broader Context

- Big Data
  - Barcodes
  - RFID tags
- Cloud Computing
- Analytics ...
  - Gain insight
  - Drive decision-making

Business Analytics

- Key features
  - Organizational data | actionable information
  - Patterns | trends | relationships
  - Statistical data | tables | charts | graphs
- Independent systems
  - Cognos
  - MicroStrategy
  - SharePoint
- Enterprise systems

Location Analytics

- Slow growth
  - Desktop | Business Analyst™ | Integration & technical barriers
  - Web | Integration & limited functionality
- Current status
  - Growing realization adding geographic locations to business data and mapping it gives a whole new context that is not possible with tables, charts, and graphs
  - Geospatial visualization listed by Deloitte’s as 1 of top 10 technical priorities for business in 2012
Esri Maps

- Mapping visualization
  - Point, color-coded, temporal, clustered, heat maps
- Spatial analysis
  - Bidirectional interaction, map filtering, proximity, drive time, trade area, and advanced analysis tools
- Geographic information enrichment
  - Base maps, imagery, demographics, consumer & lifestyle data, environment & weather, social media, business, etc.
- Esri Maps for IBM Cognos
- Esri Maps for MS Office

ArcGIS Online (arcgis.com)

- Large web mapping platform
  - Provides enterprise mapping & spatial analysis services for whole organization
- Spatial analytics ...
  - Can share, visualize, & analyze all kinds of organization data using geography as a common framework
  - Can incorporate data that has been mapped using location analytics
- Geospatial data integration
  - Can create mash ups by adding geospatially referenced data available on the web

Starbucks’ GIS Strategy

- Statistics (2009)
  - 16,635 U.S. stores
  - $9.8 billion in revenue
- GIS Operations
  - Global Market Planning Group uses ArcGIS Desktop plus several extensions to perform advanced analytics, business & geospatial intelligence
  - Real Estate Partners uses ArcGIS Server with tablets and smart phones to run reports, view maps & models, generate commentary, etc.

The GIS Business Case

- Many aspects of retail are defined by place ...
  - Where customers live, work & travel
  - Where your competition is
  - How your merchandise moves through the supply chain
  - Where your next store should be located
- Many potential benefits ...
  - Merchandising mix improvement
  - Better management of your portfolios & assets
  - Better promotions execution

Spatial @ USC ...

- SSCI 101 Spatial Analytics Workshops (2 units)
  - GIS for Business
  - GIS for Design
  - GIS for Environment
  - GIS for …
- New GIS courses
  - Maps & Spatial Reasoning
  - Principles of Geographic Information Science
  - Spatial Sciences Practicum
- GIS help desk

Questions ...

- Project for Public Spaces
  - Placemaking plans
  - City-wide strategic plans
  - Capacity building and cultural change

- Placemaking 101
  - Lighter
  - Quicker
  - Cheaper
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