Helping patrons navigate GIS (Geographic Information Systems)

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UMKC
University Libraries
Learning Objectives

This presentation should help you:

- Understand more GIS vocabulary
- Appreciate the scope of applications and the variety of professions using GIS
- Identify key/popular GIS software by name
- Know about Social Explorer, an easy-to-use database for simple analysis of U.S. Census Data
- Be able to access and share a stable URL from UMKC Libraries providing a Research Guide pointing to directories of GIS datasets
- Know where to point motivated patrons to quality open courseware tutorials on GIS
Application - Mapping High/Low Water Use

882

24
Application - Mapping Educational Attainment
Application - Damage Assessment

Damage Assessment Operation View

Residential Structures in Map
- 70 George Rd
  - Property Loss: $0
  - Extent of Damage: Inaccessible
- 1405 Woodland Beach Rd
  - Property Loss: $0
  - Extent of Damage: Inaccessible
- 1059 Trails End Rd
  - Property Loss: $0
  - Extent of Damage: Inaccessible

Damage Estimate
- 181,955,928

Total value of residential structural damages. Values in US Dollars.

Extent of Damage
- Destroyed
- Major
- Affected
- Minor
- Inaccessible

Residence at 1756 Nanticoke Rd
- Inspection Date: Unknown
- Parcel ID: 123123123123
- Extent of Damage Affected
- Value Before Damage: $1,388,834
- Estimated Structural Loss: $94,490
- Estimated Content Loss: $59,640

Inspector Details:
- Jean Gonzalez
  - 410-345-9892
Application - State Birth Outcomes Briefing

Maryland Birth Outcomes Briefing

Low Birth Weight Hot Spots

Hot Spot analysis enables us to readily determine the spatial pattern of the Low Birth Weight Rates across the state.

Areas shown in warmer colors are statistically significant Hot Spots. Areas shown in cooler colors are Cold Spots.

Using Optimized Hot Spots we are able to determine the statistically significant hot and cold spots using the Getis-Ord Gi* statistic. It evaluates the characteristics of the input feature class to produce optimal results.

Socioeconomic and Demographic Factors
Key GIS software

ESRI - stands for the Environmental Systems Research Institute, its ArcGIS products have the largest global market share of GIS software (+40%). Other estimates indicate that 70% of all GIS software users are using ArcGIS in one form or another. *Patrons looking to build job-translatable skills will want to learn ArcGIS.*

There are also *freely available GIS softwares*, the most prominent of which is QGIS (formerly Quantum GIS).

There are many, many other options! Wikipedia helpfully maintains a *list of GIS software* as well as a *comparison of GIS software* features.
What about Google Earth?

Google Earth is a GIS application that lets the user look at satellite imagery, aerial photogrammetry, and GIS information superimposed over the globe.

Google Earth Plus is a downloadable software that lets you add spatial data to the GIS data available through Google Earth.

Use of Google Earth has *significant copyright restrictions* not present when using USGS GIS data (government GIS data is public domain). From [Wikipedia](https://en.wikipedia.org):

“Every image created from Google Earth using satellite data provided by Google Earth is a copyrighted map. Any derivative from Google Earth is made from copyrighted data which, under United States Copyright Law, may not be used except under the licenses Google provides. Google allows non-commercial personal use of the images (e.g. on a personal website or blog) as long as copyrights and attributions are preserved.....Works created by an agency of the United States government are public domain at the moment of creation. This means that those images can be freely modified, redistributed and used for commercial purposes.”
Looking at GIS Datasets - File Types/Formats

There are several file formats for GIS datasets, including:

- Shapefiles (*.shp) - a vector-based GIS format promoted by ESRI
- ESRI GRID - a raster-based GIS format promoted by ESRI, implemented as a structured set of files (*.adf, *.dat, *.nit, *.dir, *.stk) in grid directories
- Keyhole Markup Language (*.kml) - a vector-based, XML-native open standard (utilized by Google Earth)
- **ArcInfo interchange format** (*.E00) - a data exchange format from ESRI

A listing of GIS Format Descriptions (very detailed!) is being developed and maintained by the National Digital Information Infrastructure and Preservation Program at the Library of Congress.
What’s the difference: vector vs. raster?

**Raster** files store data in the same way a digital camera stores an image. The data are rows and columns of cells, each cell containing one value describing cell color.

**Vector** files store data by considering geographical features as shapes. The data on geographical features are stored as geometrical shape data linked to a database file of data that describes attributes of that feature.

Raster files can be LARGE and make it more difficult to “stack” data from multiple files. Individual raster files are less computationally expensive - a plus!

Vector files are generally MORE COMPACT and can be used to represent continuous variables, and allow for much easier analysis. Vector files are also easier to maintain and to add new geographic features to existing files.
Where to find GIS datasets

Government resources

- US Geological Survey (Example: The National Map)
- Missouri Spatial Data Information Service (MSDIS)
- Regional city/county groups (Example: MARC GIS Data)

International organizations and NGO’s

- United Nations Environmental Programme (Environmental Data Explorer)
- Harmonized World Soil Database
- The Nature Conservancy (Global Conservation GIS data and maps)
Where to find GIS datasets, part 2...

Find authoritative web directories you can trust. Use your librarian skills!

- **Free GIS Data** - this site compiled by Robin Wilson, a researcher in remote sensing at the University of Southampton (UK). Lists 300+ sources.

- **ArcGIS Open Data** - 55,000+ datasets from 3,400+ organizations. Anyone can use data published at this source for free.

- Academic library research guides - like ours at UMKC Libraries!
What about making spatial data?

Patrons may find that they have developed (or found) a set of data that could be visualized spatially.

That’s where motivated patrons can learn to use an GIS software like ArcGIS to map that set of data onto a set of appropriate shapefiles.
Social Explorer - GIS App for U.S. Census Data

Social Explorer allows you to create maps of U.S. Census demographic data from the Decennial Census as well as from the American Community Survey, in addition to being able to map several other data resources.

- Easy to use
- Graphically (point-and-click) based
- Analysis easily exported
- Clearly brings the value of GIS home for patrons new to thinking about and using GIS

Note: only held in Missouri by UMKC, UMSL, Saint Louis University, and Washington University in Saint Louis - limited to use by subscribers.
When patrons want to learn GIS

There are many options to point patrons in directions to learn more about using and developing GIS:

1. Search for MOBIUS-available books on specific patron interests / applications (Example from UMKC Libraries, Introduction to Geospatial Technologies)
2. Recommend online tutorials to gain expertise (Example: MIT Open Courseware Geographic Information System Tutorial)
3. Point to vendor-sponsored learning tools (Example: ESRI Learn ArcGIS)
UMKC Libraries has your back!

UMKC Libraries has produced a Research Guide for GIS resources:

http://libguides.library.umkc.edu/GIS

Please link to this guide from your library if you find it useful!

Also, feel free to adapt parts of this guide for any search guides for your library!

Note: While some resources (notably eBooks) mentioned in the guide are for UMKC students/faculty/staff, most resources are freely accessible via an internet connection!
Questions?

Thank you very much!

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