May 2017

ArcGIS
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What it is
ArcGIS is a powerful data mapping application that helps you visualize, analyze, and understand spatial data mapped to a coordinate system. Used in the sciences, engineering, and the humanities ArcGIS can reveal relationships, patterns, and trends related to physical spaces in ways that may not have been initially apparent. In addition to mapping objects on the Earth's surface, there are 3D solutions that allow above and below surface examination. It is also possible to work on expansive scale, e.g., the universe or on a small scale, e.g., the human body. In essence, if it can be mapped, ArcGIS is the tool to use.
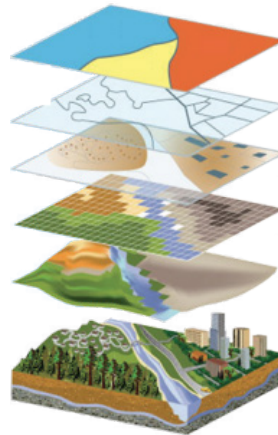
make informed decisions about interactions with complex geographical situations. ArcGIS can be an excellent educational tool for students who wish to explore spatial datasets in the context of existing environments. The skills that students gain from using a GIS application will give them a foundation for how to use similar applications in their own research (or simply for their intellectual curiosity) in the future.

Why it was made
ArcGIS was developed by ESRI (Environmental Systems Research Institute), a company formed in 1969 with a focus on land use and urban planning. ESRI has since helped cities worldwide with their redevelopment plans, in addition to assisting with emergency management efforts. ArcGIS has become a professional grade Geographic Information System (GIS) that allows researchers to investigate distributions across existing environments, identify clusters or randomly dispersed data points, and analyze the significance of the distributions.
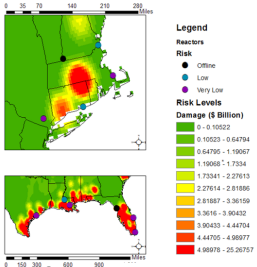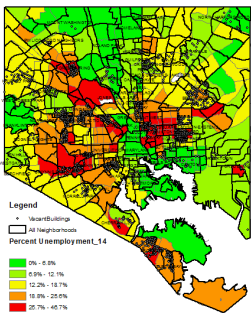
How it can be used
A popular use of ArcGIS is mapping the wide variety of demographic information available from the decennial census. For example, students in an introductory Sociology course overlay poverty, racial, disability, unemployment, and gender variables by census tract with vacant buildings to determine whether there are correlations among different Baltimore City neighborhoods.

Data sets that might not otherwise seem to be related may be found to have commonalities based on geographic location. Engineering students use GIS to analyze meteorological patterns and create models that predict the destructive results of weather occurrences by calculating who (people) and what (buildings and natural structures) would be affected. Using the same weather pattern data, GIS could model alternate power sources by analyzing energy-needs data to determine which energy source would be most efficient and sustainable based on a location's conditions.

Why it matters
With an ever-growing number of valuable datasets being created, applications are needed that are capable of performing extensive calculations to make sense of the data. Applications such as ArcGIS have become a necessary tool for researchers to

illustration, http://doc.arcgis.com/en/arcgis-online/reference/geo-info.htm

Who's using it

Examples of how GIS is being used in the classroom:

- Public Health students and staff in the Center for a Livable Future, part of the Bloomberg School of Public Health, have surveyed multiple times all food outlets within Baltimore City to determine Healthy Food Availability Indexes (HFAI) in hopes of informing residents where the Food Deserts are located. Exposing the food environment in this way gives policy makers the necessary information to prioritize areas that are in need of attention. Public Health students also survey businesses with tobacco ads to correlate their location to areas with high populations of juvenile residents in order to launch public service efforts in those same locations.
- Anthropology students published a map in ArcGIS Online, which allowed crowd-sourcing data to determine whether the safety perceptions concerning the neighborhoods around the Homewood campus were where crimes were actually occurring. They then delved deeper to see if they could change the community's view of the areas falsely deemed unsafe.
- Business students (and those in related fields) can access business data from an ArcGIS extension, Business Analyst. Business Analyst allows a user to locate favorable markets for business expansion, evaluate marketing efforts, compare sites, and create impressive business infographics that show demographic, financial, and other relevant data.

Examples of ArcGIS uses, unemployment in Baltimore with vacant housing overlay, an a historical analysis of U.S. natural catastrophes

image, http://desktop.arcgis.com/en/apps

Additional resources

- The Library's GIS guide - http://guides.library.jhu.edu/gis
- ESRI's Resources website - http://resources.arcgis.com
- ArcGIS tutorials - https://learn.arcgis.com
- Everything about Pro - http://pro.arcgis.com
- Example of ArcGIS, MD Food Systems Map - http://mdfoodsystemmap.org

Author's background

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GIS Specialist, Geospatial Service Librarian, MSE Library

Bonni Wittstadt works in the Data Services group specializing in GIS research consultations. Having over 15 years of GIS experience, Bonni provides GIS support and training along with advanced consultation to faculty, students, and staff within the Hopkins community. Bonni has a Master's Degree in Library and Information Science from Drexel University and a Master's Degree in Geographical Information Science from Johns Hopkins University.

Where it is going

ArcGIS has a full featured desktop version and an online version that can be accessed using a web browser. While features in ArcGIS Online may be more limited, you can create maps using your own data, share them with the world, and collaborate with others. Recently, ESRI combined the versatility of both versions in one application, ArcGIS Pro. Through its online integration, this latest release provides a user with greater functionality for high-end computing using desktop power, as well as the ability to collaborate with others.

How to get started

There are a variety of options for learning ArcGIS offered not only through the MSE Library but also from ESRI.

Workshops - GIS staff provide training on the Homewood campus and on the East Baltimore campus in association with the Welch Medical Library's regularly offered classes. http://welch.jhmi.edu/welchone/welchcourses
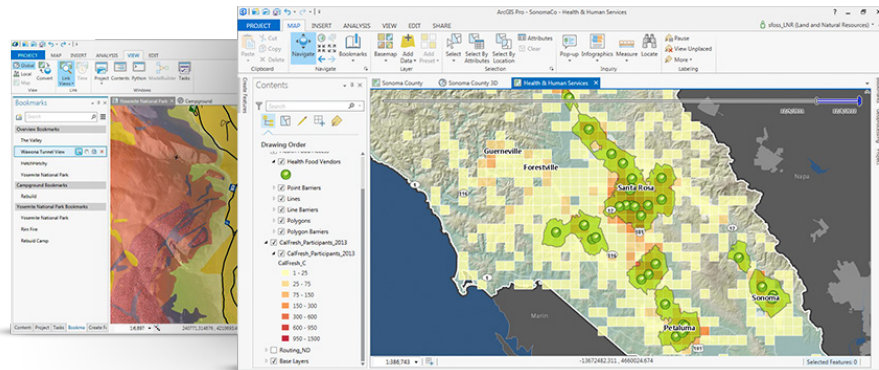
Web-Based Training - Johns Hopkins users can request authorization to take web courses at no cost via ESRI's Self-Paced E-Learning https://www.esri.com/training

Classroom Training - GIS staff offer customized classroom instruction sessions so that faculty can focus their efforts on the way they use GIS rather than the "how to" of the various GIS tools.

Research Consultations - GIS staff provide individual and group consultations and can help you find the best tools and resources to fit your research needs.

Other thoughts

Collecting the right data is half the battle in any GIS project. In addition to helping users with a GIS application, GIS & Data Services staff help users find the right data sets and provide advice for making informed decisions.