Geospatial Frontiers in Health

Toward an Spatial Infrastructure for Health

Douglas Richardson
Association of American Geographers

NGAC Meeting, June 12, 2013
The AAG Initiative for an NIH-Wide GIS Infrastructure
NIH-WIDE GEO-SPATIAL INFRASTRUCTURE WORKSHOP
FEBRUARY 22–23, 2011

AAG-NCI-NIDA
ESTABLISHING AN NIH-WIDE GEOSPATIAL INFRASTRUCTURE FOR MEDICAL RESEARCH: OPPORTUNITIES, CHALLENGES, AND NEXT STEPS

Report of the AAG-NIH Workshop on Geospatial Infrastructure for Medical Research, 2011

www.aag.org/health_geoinfrastructure
Geospatial Frontiers in Health and Social Environments
(National Institutes of Health)

PI: Douglas Richardson
Sara McLafferty, Mike Goodchild, Mei-Po Kwan, Jonathan Mayer
Gene-Environment Interactions
Exposure assessment with GPS/GIS data of individuals. Space-time paths of individuals collected with GPS (with time being the third dimension) can provide more accurate assessment of exposure to environmental risk factors (e.g., traffic-related air pollution, carcinogenic substances, etc.) when integrated with detailed data about the spatial and temporal variations of these risk factors. [Kwan, 2012]
Geospatial Data Confidentiality and NSF

Addressing Challenges For Geospatial Data-Intensive Research Communities:

Unique Confidentiality Risks and Geospatial Data Sharing within a Virtual Data Enclave

(National Science Foundation)

PI: Douglas Richardson
George Alter, Mei-Po Kwan, Jean McKendry
Introduction

- Research that uses large amounts of georeferenced data is spreading across many scientific domains,

- Several trends are driving this: massive quantities of data from Real-Time Interactive GPS/GIS-enabled devices, sensors, and location-aware technologies, advances in web-services and cyberinfrastructure, new geoprocessing tools for analyzing, exploring, and visualizing large, multi-scale spatiotemporal datasets (Richardson 2013).
Implementation:
AAG-Michigan joint project

Specifically, research on the following areas is currently being conducted through this AAG-Michigan joint project:

1. Research on the unique confidential characteristics of large georeferenced data sets (including issues associated with geospatial cyberinfrastructure and “big” data), and on viable ways to manipulate these data and their geovisualizations to protect confidentiality and privacy of research subjects;

2. Research on methods and procedures to assess and reduce disclosure risks in maps, statistical analyses and other research projects derived from locationally identifiable data.
A Promising Approach: The Geospatial Virtual Data Enclave

- We propose an alternative method to provide data for analysis in a secure environment: the geospatial Virtual Data Enclave (VDE).

- It helps researchers develop and implement procedures for accessing and sharing georeferenced data in ways that offer adequate protection of geoprivacy and confidentiality, and provides guidance on and procedures for re-distributing, re-using and publishing georeferenced data.

- It will also help researchers formulate robust plans for securely archiving data and survey samples while allowing interested researchers to access and use them.
Geospatial Frontiers in Health and Social Environments

Workshops:

1. Spatiotemporal Analysis for Health Research
   (Washington DC, April 2012)

2. Enabling a National Geospatial Cyberinfrastructure for Health Research
   (San Diego, July 2012)

3. Synthesis and Synergy: Towards a Shared Vision
   (Washington DC, June 2013)
Geography, GIScience and Health: Spatial Frontiers of Health Research and Practice

- Explore new research frontiers in health and social environments
- Provide input for the AAG Initiatives for an NIH-wide Geospatial Infrastructure for Health Research

AAG Annual Meeting, Los Angeles
April 10-12, 2013
www.aag.org/annualmeeting
Spatial Turn in Health Research

by Douglas B. Richardson, Nora D. Volkow, Mei-Po Kwan, Robert M. Kaplan, Michael F. Goodchild, and Robert T. Croyle

Science. March 22, 2013