GEOG 176A: Introduction to Geographic Information Systems

Lecture 19: GIS in Action

GeoSpatial Revolution

(chapter 10)

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Outline

- Episode 1: Positioning, technology, public inputs
- Episode 2: GIS and our daily lives, planning, business and many other issues
- Episode 3: GIS in military actions, safety, and privacy issues
- Episode 4: Climate, hunger, and disease
Recall:

● **Episode 1: Positioning, technology, public inputs**
  ○ GPS and navigation
    ■ 3 satellites can give you some locations, but not so accurate; to get more accurate locations, you need **at least 4 satellites**! (an error in the video!)
  ○ Location-based services
    ■ GIS changed the way we live today!
    ■ Examples: navigation + find nearby restaurants
  ○ Disaster responses
    ■ Volunteered geographic information
    ■ Mapping task was outsourced to thousands of online volunteers
    ■ GIS’s definition in terms of society!
Episode 2: GIS and our daily lives, planning, business and many other issues

http://geospatialrevolution.psu.edu/episode2
Episode 2: GIS and our daily lives, planning, business and food issues

- Enhancing public access to geographic information
  - Pipelines, public transit, crimes
  - Graffiti report

- Urban planning
  - GeoDesign: design and simulate the future of urban environment and then evaluate

- How does GIS help UPS?
  - Better routes reduce costs (e.g., gas and tire costs)
  - Telematics: combine sensors with telecommunications
  - Dynamic mapping

- GIS helps identify food desert
  - Where is fresh food most needed?
Episode 3: GIS in military actions, safety, and privacy issues

http://geospatialrevolution.psu.edu/episode3
Episode 3: GIS in military actions, safety, and privacy issues

● How GIS assist military actions?
  ○ 3D terrain mapping and terrain analysis (LiDAR)
  ○ Route finding

● Safety
  ○ Buffer based on road network and time
  ○ Hotspot mapping: where to patrol?

● Privacy issues
  ○ Ubiquitous monitoring system
  ○ Someone else can track you!!!
Episode 4: Climate, hunger, and disease

http://geospatialrevolution.psu.edu/episode4
Episode 4: Climate, hunger, and disease

● Climate
  ○ Quantitatively mapping the climate change
  ○ Help decide how severe the problem is

● Hunger
  ○ More informed decision on crop growth around the world
  ○ How much the food is needed?

● Disease
  ○ The famous John Snow example: simple but effective!
  ○ Tracking disease distribution

● Community mapping
  ○ Geographic information helps residents in Kibera and Kenya

John Snow’s 1854 Cholera Map - 1854
In summary

- Using GIS to facilitate information management and decision making in many domains:
  - Climate change, transportation, city planning, security, health, disaster responses, resource allocation, agriculture, business management, military and so on.....

- Research on GIS → GIScience
  - Studies geographic information: how can we use geographic information to change the world!
Your tasks

- Start lab 6
- Review slides

Next lecture: The Future of GIS