Crime Mapping Level 1

BCJI WEBINAR
FEBRUARY 23, 2015
What is a GIS?

- Geographic Information System - special kind of computer information system
- Uses information about location that can be examined across space and time
- Combines a database and computerized mapping capability

Specifically: a set of computer tools and procedures used by people to collect, manage, analyze, and display information with a location
GIS Components:

- Hardware
- Software
- Data
- Procedures
- People

Institutional Context

Social & Cultural Context
Offense/Arrest Report (RMS)
911 Call (CAD)
Prosecution (DA/Court System)
Parole/Probation
Community Context
  Businesses
  Schools
  Parks
  Alcohol Establishments
  Bus Stops/Routes

An Integrator for Effective Public Safety
GIS as Integrated Technology

Records System

Geographic Information
Historical Overview

- Mapping has long history of use in law enforcement
IMPORTANCE OF GEOGRAPHY

The four dimensions of crime

1. Legal (a law must be broken)
2. Victim (someone or something has to be targeted)
3. Offender (someone has to do the crime)
4. Spatial (it has to happen at a place - somewhere, in space and time)

Future crime is “six times more predictable by the address of the occurrence than by the identity of the offender. Why aren’t we thinking more about wheredunit, rather than just whodunit?” (Larry Sherman, 1995)
Clerkenwell Hotspot

From wheredunit to whodunnit
Clerkenwell Hotspot

From wheredunit to whodunnit
**Clerkenwell Hotspot**

<table>
<thead>
<tr>
<th>Vehicle type</th>
<th>Camden</th>
<th>Clerkenwell (n)</th>
<th>Clerkenwell(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td>51%</td>
<td>41</td>
<td>18%</td>
</tr>
<tr>
<td>Sports or convertible</td>
<td>3%</td>
<td>5</td>
<td>2%</td>
</tr>
<tr>
<td>Scooter or moped</td>
<td>26%</td>
<td>95</td>
<td>42%</td>
</tr>
<tr>
<td>Motor cycle</td>
<td>13%</td>
<td>70</td>
<td>31%</td>
</tr>
<tr>
<td>Van</td>
<td>5%</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>2.0%</td>
<td>10</td>
<td>4%</td>
</tr>
<tr>
<td>Not known</td>
<td>0.5%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

From wheredunit to whodunnit
Basic GIS Concepts: Points, Lines and Areas/Polygons

- **Point**
  - Street Light
  - Bus Stop

- **Line**
  - Street
  - River

- **Polygon/Area**
  - Neighborhood
  - Police Beat
Basic GIS Concepts:

How does GIS work?

- Information about your community is entered into a GIS as “layers”
- Each layer represents data of a similar type
- All the data attributes for each feature are stored in the GIS
Basic GIS Concepts:

Overlaying Data:

Any combination of these layers can then be analyzed and/or mapped.
Basic GIS Concepts:
Attributes and Locations, Points

<table>
<thead>
<tr>
<th>Crime Type</th>
<th>Address</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robbery</td>
<td>999-2(^{nd}) St</td>
<td>May 22, 1997</td>
<td>22:00</td>
</tr>
<tr>
<td>Robbery</td>
<td>830 Main St</td>
<td>May 15, 1997</td>
<td>20:30</td>
</tr>
<tr>
<td>Robbery</td>
<td>100 Cross St</td>
<td>May 29, 1997</td>
<td>15:00</td>
</tr>
<tr>
<td>Robbery</td>
<td>1000 Main St</td>
<td>June 13, 1997</td>
<td>22:45</td>
</tr>
<tr>
<td>Auto Theft</td>
<td>997 Main St</td>
<td>June 3, 1997</td>
<td>23:00</td>
</tr>
</tbody>
</table>

The database could be queried to find out where the robberies occurred on the map.
Grouping/Categorizing

The data could be mapped by type of crime, date, time or MO.
Area/Choropleth Map

Crime Rates in the US - 2003 vs. Election Results - 2004

Violent crimes per 100,000 people

Murders per 100,000 people

Rapes per 100,000 people

Robberies per 100,000 people

Source: Crime in the United States, 2003, FBI, Uniform Crime Reports
Graduated Symbol Map

Salem Crash Hot Spots 2008-2010

Legend
Crash Locations by Volume
FREQ
- 1 - 3
- 4 - 8
- 9 - 15
- 16 - 23
- 24 - 43

Crash Hot Spots
(Kernel) Density Map
Things to consider when mapping crime...
Points vs. Rates


Homicides Per Square Mile

- 15.0 to 189.0 (17)
- 15.0 to 64.9 (78)
- 0.3 to 14.9 (40)
- No Homicides (47)

Sources: Washington Metropolitan Police Department; 1990 Census of Population and Housing / Author: Dan Sandler
Detroit's hardest hit

Shootings over a two-month period this summer in Detroit varied dramatically by neighborhood & zip code.

KEY
Shootings per 10,000 residents
- Red: Six to eight
- Orange: Four to six
- Yellow: Two to four
- Green: Zero to two

Notes: Population is 2010, from U.S. Census. Shootings are from June 21 to Aug. 21. Overall, there were 3.5 shootings for every 10,000 city residents.
Long, cruel summer
From June 21 to Aug. 21, 38 people were shot and eight died in the northeast corner of Detroit – which saw the most shootings of any ZIP code in the city. Although the 48205 ZIP code has just 6 percent of the city’s residents, it accounted for one-seventh of its murders and more than a tenth of the 303 people shot during that time.

Note: City records indicate a block or an intersection of a shooting, not the specific location on a block.
Source: Detroit Police
The Detroit News
Convenience Store Robberies in Chula Vista 2002-2006 (through 5/19/2006)

Legend
- Robberies
- COUNTOFFACT
  - 1 - 2
  - 3 - 4
  - 5 - 5
  - 7 - 8
  - 9 - 11

- Never robbed
Analyzing public safety issues goes beyond mapping crime data
Putting the crime in context

- What’s near the incidents in my crime pattern?
  - Highways/major routes
  - Methadone clinics
  - Public transportation
  - Budget motels
  - Public housing
  - Schools
  - Gang territories
Syracuse BCJI

Westside Neighborhood

Public Housing & Community Assets
Using CPTED for Neighborhood Problem Solving in Cincinnati, OH
Auto Thefts and Land Use in San Diego
Closed Circuit TV Coverage Areas

Legend:
- CCTV camera
- CCTV coverage:
  - Identification
  - Recognition
  - Detection
Making maps with data that doesn’t yet exist
Digitizing Data: Gang Zones

Gang Injunctions within San Diego County

1. Logan Red Steps
2. Skyline
3. Linda Vista
4. Caney Street
5. Vario Posole Locos
6. Vario Mesa Locos
7. Vario San Marcos
8. Diablos - 2007
9. Diablos - 2010
10. Westside - 2007
11. Westside - 2010
12. Nestor
13. Vista Home Boys
14. OTNC

Legend:
- Non-Injunction area
- Zone 1
- Zone 2
- Zone 3
- Zone 4
Grant Area

MWB Hotspots

Comparison Hotspots
Crime Mapping
Sources of Data

- Criminal Justice
- Other Government
- Community
  - residents
  - businesses
Sharing maps with the public
Bike Theft Rate per 1,000 (Portland, OR)

Bike Theft by Month (Portland, OR 2009-2013)

Offenses Per Day

Above Avg. (+1 StDev)
Average
Below Avg. (-1 StDev)

Rate per 1,000 Residents

Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
2.1 | 2.3 | 2.7 | 3.2 | 4.1 | 5.1 | 6.5 | 7.0 | 7.6 | 6.0 | 4.2 | 3.0

Portland Police Bureau
Crime Analysis Unit
Bike Theft Rate per 1,000 (Portland, OR)

Bike Theft by Month (Portland, OR 2009-2013)

Bike Theft (Portland, OR)
By Time of Day and Day of Week (2009 - 2013)

Note: The number listed in the time/day cells above indicates the estimated number of offenses using a weighted time-span for incidents with a range rather than a specific hour (e.g., "It happened between 8:00am and 11:00am").
GIS Resources

DATA
- http://www.census.gov/geo/maps-data/data/tiger.html
- http://freegisdata.rtwilson.com/
- http://www.google.com/publicdata/directory
- Don’t forget your local Council of Governments, City/County GIS, local or transportation agencies

OTHER
- http://www.socialexplorer.com/
Thank You.

JULIE WARTELL
JULIE.WARTELL@ATT.NET
858.204.3887