Crime Mapping Techniques
Mar 21, 18

Point mapping

- Most common
- Pins represent crime events on a map
- Event metadata can consist of: type, date, time, conditions
- Difficulty in interpreting larger datasets

Spatial ellipses

- Hierarchical clustering
  - Uses nearest neighbor analysis technique
- K-means clustering
  - Groups crime point clusters
  - Identifies areas that need closer inspection
  - Not particularly strong for identifying hotspots
  - Requires multiple, user-defined parameters; produces different interpretations based on analyst input
- Note: crime and crime hotspots do not occur in ellipses

Thematic mapping of geographic boundaries

- Boundaries are formed based on borders created by beats, census blocks, polling districts, wards, borough boundaries, etc.
- Relies on defining distribution methods and layers to depict what the audience wants to see
- Can mislead in identifying where the spatial cluster of crime may exist, hence also missing where hotspots exists
- Suited for advising managerial actions associated with administrative and political purposes

Quadrat thematic mapping

- Ignores political/administrative boundaries and utilizes uniform grids laid over the interested area
- Can count crimes per grid square or density of grid squares
- Doesn't completely eliminate the issue of creating borders
- Can be victim to inaccurate interpretation
- Representation restricted by grid size

Interpolation and continuous surface smoothing methods

- Interpolation
  - Uses a search radius of aggregated points
- Quartic kernel density estimation

- Grid placed over interested area
- Points are weighted depending upon how the radius search performs; points closer to the center of the radius search are weighed more heavily
- Grid cell size and bandwidth (search radius) must be set to perform this method
- Bandwidth relates to the mean nearest neighbor distance

Takeaways:

- Neighborhoods, crime mapping
- Criminology theories associated

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Kernel density estimation

- Platform: CrimeStat III, National Institute of Justice, Free
- Highest PAI
- Second lowest RRI
- Geospatial supplement needed

Risk terrain modeling

- Platform: Risk Terrain Modeling, Rutgers University, Proprietary/Commercial
- Highest RRI
- Second highest PAI
- Geospatial supplement needed

Predictive accuracy index

- Accuracy of forecasting future events

Recapture rate index

- Precision over a period of time

Takeaways:

- Layering overlays, crime mapping
- Clustering methods