Geographic Information Systems (GIS) and spatial analysis in the analysis and modeling of crime have become increasingly important. New software specific to the analysis of crime events (STAC, CrimeStat), the establishment of the Mapping & Analysis for Public Safety (MAPS) program in 1997 (http://www.ojp.usdoj.gov/nij/maps/index.html), the organization of crime mapping research conferences (http://www.ojp.usdoj.gov/nij/maps/savannah2005/index.html), and the dissemination of crime maps and related information by police departments through their websites (http://www.ojp.usdoj.gov/nij/maps/related.html) all provide examples of recent advances in spatial approaches to criminal investigations.

COURSE OBJECTIVES:
1. To understand and appreciate the roles that geographic information systems and technology play in contemporary crime analysis, including crime mapping, forensic analysis and homeland security
2. To demonstrate geographic information technology relevant to law enforcement operations, and understand the advantages and disadvantages of implementing these technologies. Students will examine various Geographic Information Systems approaches relevant to:
   a. Crime Mapping
   b. Geographic Profiling
   c. Investigative and Forensic Sciences
3. To utilize the Internet and search engines to research and document a variety of technologies and crime information applicable to law enforcement.
4. To research and create a specific applied research project focusing on crime or problem analysis directly related to the student’s forensic interests, allowing the student to scope out and design a specific research effort (final class project).
5. To present this technology or research project to their colleagues, offer constructive criticism and positive feedback to each student for improving each student’s findings.

The class introduces you to ArcInfo GIS software that allows for the input, storage, analysis and output of spatial data. The output, in many cases, is a map but it may be a report, data for input to another program, etc. Then, we will learn how to make thematic maps using computing technology. This includes a discussion about map design, types of thematic maps, cartographic generalization and the use of color in maps. Following a review of the elements of thematic mapping, we will introduce important concepts in statistics, including the difference between descriptive and inferential statistics and statistical significance. The fourth and largest part of this class deals with crime analysis and modeling using ArcInfo GIS, CrimeStat III and GeoDa. It starts out with the discussion of important concepts in spatial analysis and crime analysis, in particular, such as Tobler’s First Law of geography, types of spatial distributions, and theories and concepts in environmental criminology. Two groups of methods are important in the analysis of crime events. The first group tries to find crime hot spots, cold spots and spatial outliers. The second group is concerned with serial offenses. The goal of these so-called criminal geographic profiling models is to estimate the likely residence or place of offense of a serial offender.
PREREQUISITES FOR THIS COURSE: None, except :-
A lively interest in space and place and how they influence human behavior. Interest in exploring the spatial dimension of investigating, analyzing and representing crime. A willingness to explore this topic, read consistently, share your findings with your colleagues, and participate in discussions actively.


READINGS: Readings will be handed out during class time or can be downloaded from the Internet. Other materials will be placed on reserve. You will be expected to review and report on your understanding of the material on a regular basis.

LABS: Lab assignments will be handed out and discussed during class. Students will be expected to use the lab periods assigned during the semester for guidance and assistance in completing the exercises.

GRADING: This is a seminar and your participation is vital. 30% of the grade will be comprised of your completion and presentation of ‘position papers’ based on the readings coupled with your participation in discussions. A further 30% will be comprised of lab projects assigned to further your understanding of the uses of GIS and spatial data related to forensic science and crime mapping. 40% will be derived from a term paper / project.

SOFTWARE


CrimeStat III: Is a crime analysis and modeling software. Crime data have to be in the form of coordinate pairs (x- and y-coordinates). It can be downloaded for free from the following website: http://www.icpsr.umich.edu/NACJD/crimestat.html/

GeoDa: Can be downloaded for free from the following website: http://sal.agecon.uiuc.edu/geoda_main.php

DATA SETS

Street network data
Census TIGER/2000 street network data can be downloaded from the Geography Network at the ESRI website (http://www.esri.com/). TIGER stands for Topologically Integrated Geographic Encoding and Referencing files.

Census data
Political boundaries, demographic and housing data can be downloaded from the Geography Network at the website (http://www.geographynetwork.com/)
Imagery

Digital Orthophoto Quarter Quadrangle (DOQQ). DOQQ’s are 3.75-minute color infrared (CIR) orthophotos for West Virginia at one meter or about three feet resolution. High-resolution orthoimages. These orthoimages are natural color orthophotos at 0.3-meter pixel resolution (approximately 1-foot) dating from 2002. They provide imagery for a 1,500- by 1,500-meter block on the ground and consist of 5,000 by 5,000 raster pixels. These images can be downloaded from the WVGIS Tech Center website (http://wvgis.wvu.edu/)

Crime Data

To be identified during the semester

References

Anselin, Luc. 2004a. GeoDa 0.9.5-I Release Notes. Spatial Analysis Laboratory and Center for Spatially Integrated Social Sciences (CSISS), Department of Agriculture and Consumer Economics, University of Illinois, Urbana-Champaign. Software and manual can be downloaded for free from the following website: http://sal.agecon.uiuc.edu/geoda_main.php


