

Map Notes

Southeast Texas Arc User Group



March 28, 2006

The group held its first quarterly meeting of 2006 in the boardroom at Jefferson County Drainage District No. 6 in Beaumont. Twenty-two users attended representing TxDOT, City of Beaumont, Lamar Institute of Technology, Southeast Texas Regional Planning Commission, Jefferson County Tax Appraisal District, Lamar University Earth & Space Science Department, Sabine River Authority, Lumberton ISD, Little Cypress Mauriceville ISD, Chambers County, Chambers County Navigation and Waterway District, Jefferson County County Drainage District No. 6, Smithcorp Real Estate Services, and WORTECH Land Surveyors, Inc. were present to hear Adam Pittman, ESRI San Antonio, give a presentation on advanced annotation tips & tricks, importing CAD annotation, using model builder for automating tasks, and geocoding and geoprocessing. His presentation was based upon user group input in requesting specific topics, problems and solutions. David Dignum, ESRI Houston was present to help answer questions as well.

Dale Boyette with the City of Beaumont had submitted an interesting problem needing a solution. Using police reports, he needed to be able to quickly generate maps identifying violent crime hotspots to enable the police department to focus their resources more effectively reduce violent crimes in those areas. The solution uses a Composite Address Locator, Spatial Analyst Tools, and Modeling. The Beaumont Police Department purchased ESRI's Spatial Analyst Extension for this purpose. Dale describes the process as follows:

A single model has been created. It performs the following:

1. Imports crime data from an Excel spreadsheet, into a Personal Geodatabase
2. Creates an address field
3. Populates the address field with street num and street name
4. Geocodes addresses
5. Filters hospitals and the Police Department
6. Creates point and kernel density layers
7. Selects and exports specific types of crimes
8. Creates point and kernel density layers for specific crimes

The composite address locator performs the following:

1. Checks the address (point) layer for an exact match. The point layer was created from the Jefferson County Appraisal District's parcel map. Duplicate points were removed.
2. Checks the street centerlines from the street map of Beaumont. Normal street names, prefixes, suffixes, and directions are used.

3. Checks our "Computer Aided Dispatching" street names that have been matched to the street centerlines. This acts as a cross reference for street names used in CAD and in the centerlines. This is helpful in that, the addresses received from Police, originate from the CAD system.

Two Spatial Analyst tools are currently being used:

1. Point Density - a simple 1/4 mile radius circle is drawn around crime locations. Circles are colored according to the # of crimes within the 1/4 mile search radius. This tool is the most exact measurement of crime data. The value of a given pixel is determined by taking the number of points within the circle and dividing it by the area of the circle. (I had to go back to school on this one.)
2. Kernel Density - a "radar" map of the city is created. It measures crime totals as opposed to rain; a 1/2 to 1 mile radius works best. A given pixel on the map is colored according to the number of crimes that are within the radius distance. This tool has proven to be the most "visually" discernible tool found so far. Due to how the tool works, I have not been able to attach the number of crimes to the colors. (A little more schooling will be needed.)

The Result: Highly accurate and timely identification of Violent Crime Hotspots in the City of Beaumont.

In the past, more than 8 hours was spent downloading data and "cleaning up addresses" from the CAD system. Only then, could it be analyzed. Data must still be downloaded, but the majority of the cleanup is now unnecessary. Defining and attaching to the data takes less than 5 minutes and the model processes 5 months of data in just under 3 minutes. The use of the Composite Address Locator gives us a 90% geocoding success rate.

The Future:

We will be presenting this to the Police Department for review, and if necessary, adjust the model based on their comments. We would like to automate the running of the model "after hours", when our ArcSDE server is up and running.

We would like to use these same tools to map Health Department data. It has been noted that violent crime hotspots are located in areas with high occurrences of certain, infectious diseases. These types of "indicators" are expected to be exposed through the continued use of GIS.

In other news, the user group elected to schedule regular quarterly meetings. This year, the meetings are scheduled for 10:00 AM on Wednesday, July 19th and October 25th. Topics and locations will be announced on the user group website.

Thanks also to Colin Hepburn, JCAD for being the "go to" guy for help on writing scripts and expressions for annotations. Got a question, just call him. He'll gladly help.