Break and Enter Crime Opportunity Spaces in Regina

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Abstract

Criminal activity is inherently spatial: crime happens somewhere. Crime analysts study the spatial distribution of criminal activity to try and apprehend the offender(s) and/or to predict where crime may happen again. However, any analysis of crime patterns will reveal that offenses are not distributed randomly in time and space. GIS can help us understand why some crimes occur more frequently at some places than in others.

In this paper we assess the potential of a GIS model to predict the frequency of break and enter crimes in Regina. This work was developed as part of the National Summer Institute for the Statistical and GIS Analysis of Crime and Justice Data held annually at the University of Regina.

We found that the model's predictions generally compare favourably with the locations of actual break and enter events obtained from the Regina Police Service

Background and Relevance

Crime pattern theory proposes that offenders are more likely to commit a crime in areas that are familiar to them (Brantingham and Brantingham, 1981). Like us, criminals have cognitive "awareness maps" that arise from their daily activities of journeying between their places of residence and jobs, schools, shops, restaurants, bars, movie theatres, etc. Like us, criminals are more at ease and feel less conspicuous in their spaces of routine activity. Many offenders are also aware of places where the opportunities for successfully committing crimes without getting caught are better. It is at the intersection of their awareness and opportunity spaces, then, that a criminal will most likely commit an offence (Felson and Clarke, 1998). GIS can play a vital role not only in mapping crime, but also analyzing where it frequently occurs (Boba, 2005; Chainey and Ratcliffe, 2005).

Moffatt (2005) generalized these concepts to produce maps of opportunity spaces for residential break and enters in Ottawa, Ontario. He identified 6 characteristics of the built environment that had a spatial relationship with burglaries. In particular, he created a spatially predictive model for break and enter crimes in Ottawa that demonstrated that there was a high probability of occurrences in areas within 289m of commercial land uses, 360m of parks and vacant land, 308m of major transportation routes, 98m of 4-node intersections, 684m of urban trails, and 280m of recreation land uses.

The purpose of this research is to assess the validity of this model to break and enter crimes in Regina, SK.

Methods and Data

Land use and transportation data were obtained from the GIS Unit at the City of Regina. Decaying raster buffers were created around each of Moffatt's 6 environmental characteristics and numerically overlaid to derive spatially distributed break and enter crime prediction indices. Higher index values indicated areas of greater crime potential.

Break and enter data from 2005 were obtained from the Regina Police Service. The burglary data were geocoded to the city's street network by address matching.

The efficacy of Moffatt's model was evaluated by tabulating the crime prediction indices for each break and enter incident reported in the 2005 data.

Results

The results of our analyses show that while Moffatt's model is generally applicable in Regina there is some room for improvement, particularly in the peripheral areas.

Kernel-density ("hot spot") maps were created to help us visualize the strengths and weaknesses of the derived mode. In addition we computed some basic spatial statistics (mean centre, standard distance, standard deviational ellipses) as well as assessed the spatial autocorrelation (nearest neighbour statistic, Moran's *I*) present in the Regina break and enter data.

Conclusions

Felson and Clarke (1998) note that opportunity spaces are concentrated both spatially and temporally; they have different spatial foci at different times and in different locations. Although we did not detect any significant temporal differences in the locations of break and enters in Regina when examined as monthly aggregates, we did find important differences in the predictive capacity of Moffatt's model in Ottawa and Regina. We suggest that these differences are due not only to the dissimilarities in the sizes of the two cities, but also due to differences in their socio-economic makeups (Wallace *et al.*, 2006).

References

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