Space-Time Analysis of Auto Burglary Patterns in a Fast-Growing Small City

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ABSTRACT

Auto burglary is a rising concern for small cities that rely so highly on revenues from malls and shopping. The fear of auto burglary dispels possible business partners, shoppers, and workers. This piece of research was conducted in Shenandoah, a small city near Houston, Texas. Shenandoah has been experiencing a fast-growing economy and annexation process. The research highlights the potency of space-time analysis for the local police department. The paper describes the temporal trends of auto burglary offenses. Hot spots of auto burglary offenses in different time periods are identified, which provide a clue for police to prioritize limited resources. In addition, this project analyzes the repeatability of auto burglary incidents in the same locations. The space-time analysis reveals that, once an auto burglary incident occurred, one week is the optimal time period for police to actively patrol, or adopt other preventive strategies on the same location to deter the potential follow-up auto burglaries.

Keywords: Auto Burglary, Burglary Patterns, Cluster, Hot Spots, Space-Time Analysis

INTRODUCTION

With an explosion in economic development, Shenandoah City, Texas is undergoing a dramatic increase in population density, the number of commercial facilities, and annexations. Accompanying such economic prosperity, however, Shenandoah City faces an increase in auto burglaries. The situation does not present an optimistic outlook to such a city, which heavily relies on business investment and consumer spending from surrounding communities. Untreated auto burglary risk and victimization will inevitably make business partners and shoppers lose interest in this region. Thus, Shenandoah Police Department (SPD) views auto burglary prevention as an important task.

Criminological theories, such as situational crime prevention theory and routine activity theory, suggest that auto burglary is mainly an opportunistic crime. More specifically, motivated auto thieves “rationally” commit...
offences based on the suitability of targets, the availability of capable guardians, the surrounding environment, the parking location, and timing. Prosperous business areas with high floating populations, such as Shenandoah City, are especially prone to auto burglary. From a prevention perspective it is important to understand the patterns and characteristics of auto burglaries. Moreover, spatial-temporal analysis of auto burglary occurrence will help police to design more effective crime prevention strategies.

This research highlights the potency of space-time analysis for the Shenandoah Police Department (SPD). Focusing on the analysis of auto burglary, this project contains three parts. The first part involves the process of geocoding the addresses of all criminal offenses (finding associated geographic coordinates). The second part describes the trend of auto burglary offenses across time periods and the auto burglary patterns across different months and dates in a week. The last part focuses on spatial and spatial-temporal analyses of auto burglary. Spatial analysis helps us identify hot spots of auto burglary offenses in different time periods. It will suggest the possible areas needing saturation patrol or place-oriented strategies. Besides general auto burglary, we are also interested in the repeat auto burglary phenomenon. Repeat location (or “hot spot”) means a parking lot where at least two auto burglary incidents occurred within a certain time interval. Spatial-temporal analysis is used to test the repeatability of auto burglary incidents on repeat locations. It will suggest, after an auto burglary incident occurred in a certain location, the optimal time period to adopt preventive strategies on the same location to deter the potential follow-up auto burglaries.

BACKGROUND OF AUTO BURGLARY

Auto theft is defined as a person entering a vehicle with the intent to steal cars or items from cars. In other words, it include two types of offenses: the thefts of cars and burglary of cars (theft from cars), which involves a person entering a vehicle without the consent of the owner of said vehicle but for the purpose of stealing property, not the vehicle itself. Thefts of cars include thefts for joyriding, for prolonged car use, and for export with or without disassembling. Auto burglaries include thefts of personal items left in cars and thefts of interior or external components of cars. Different types of offenses are committed by various groups of offenders with diverse motivations (Clarke, 2002).

Federal governments have made long-term efforts to fight against auto burglary. Federal antitheft legislation criminalized interstate transportation of stolen vehicles in 1919, toughened penalties for violations of export laws and penalized the counterfeiting of car title certificates in 1984, required major vehicle parts to be inscribed with vehicle identification numbers (VIN) in 1985, criminalized carjacking in 1992, and established the tracing system among car repair shops, states, and customs based on FBI’s VIN database in 1994.

State governments also adopted various approaches to prevent and reduce auto burglary. Take Texas for example, the Automobile Burglary and Theft Prevention Authority (ABTPA) supports statewide law enforcement through education and public awareness as well as auto burglary reduction initiatives. The Southeast Texas Auto Theft Task Force, a special unit sponsored by ABTPA, concentrates its efforts in four counties where they are believed to have the greatest opportunity to impact auto burglaries. This special force monitors local repair shops, focuses on street gang related burglaries and organized burglary rings, and provides training to area patrol officers in the detection and recovery of stolen vehicles. Texas is the first state to implement a statewide vehicle registration program aimed at reducing auto theft and burglary—Help End Auto Theft program (H.E.A.T.). H.E.A.T. helps peace officers identify stolen vehicles by getting agreement from the car owners to stop the vehicle and verify ownership if they observe it being