Chapter 14
Urban Crime and Security

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Abstract Scientists have an enduring interest in understanding urban crime and developing security strategies for mitigating this problem. This chapter reviews the progress made in this topic from historic criminology to data-driven policing. It first reviews the broad implications of urban security and its implementation in practice. Next, it focuses on the tools to prevent urban crime and improve security, from analytical crime hotspot mapping to police resource allocation. Finally, a manifesto of data-driven policing is proposed, with its practical demand for efficient security strategies and the development of big data technologies. It emphasizes that data-driven strategies could be applied in cities due to their promising effectiveness for crime prevention and security improvement.

Keywords Urban security · Crime mapping and analysis · Road network · Crime prediction · Data-driven policing

14.1 Introduction

Crime is largely an urban phenomenon (Baldwin et al. 1976). Globally, crime and violence are typically more serious in some urban areas than others and are exacerbated due to rapid urban growth. According to a UN report (UN Habitat 2007), though the crime rates have significantly decreased in some developed countries of North America and Western Europe over the past two decades, in other districts, such as Africa and Latin America, the total crime rate increased. Specifically, the report has shown that 60% of urban inhabitants in developing countries have been victims of crimes and the rate of victimization has reached 70 percent in some cities of Latin America and Africa over five years (UN Habitat 2007). On the other hand,

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security is usually considered as a concept (Baldwin 1997) that confronts the crime problem, by incorporating both the policing to implement crime prevention and the public's perception of crime and safety. Therefore, understanding urban crime and security would mitigate urban crime and violence, as well as enhancing the quality of inhabitants' life and improving urban sustainability (Cozens 2008).

Conventionally, crime pattern theory, routine-activity theory, and rational-choice theory—which extensively investigate criminal behaviors to explain how and why crimes occur—have been the main approaches for crime prevention. Environmental criminologists have a long and enduring interest in place and its effect on producing crime (Weisburd et al. 2009). They think that environmental factors have a substantial influence on criminal behaviors so that crime prevention should focus on solving the problems at the place of crime. Inspired by such perspective, crime prevention through environmental design (CPTED) and situational crime prevention (SCP) have been developed to tackle urban crime problems. Thus, the environmental perspective can bridge the gap between urban crime occurrence, crime understanding, and crime mitigation using scientific and effective crime prevention practices.

Recently, big data technology has gained much attention. Such technology enables a further understanding of the dynamics of crime, and it can lead to developments and improvements in crime and security analysis tools. These improvements range from retrospective to prospective approaches, from grid-based to network-based methods, and from isolated to integrated analysis. For example, network-based crime hotspot mapping or the online police patrolling deployment toolkit have been developed and applied in crime prevention. It is difficult to separately discuss urban crime and urban security due to their interdependence in complex urban environments. From the viewpoint of intelligent data-driven policing, the whole procedure, from data collection to policing outcomes, should be addressed when tackling the urban crime and security issues.

The rest of this chapter is organized as follows. Section 14.2 reviews the development of crime studies, including their historic roots in understanding urban crimes and the latest development of environmental criminology. Section 14.3 presents the concerns and theories in urban security which is devoted to reducing the urban crime problems and protecting citizenship. Section 14.4 introduces the improvement of crime analysis and security applications and the latest tools for tackling the challenges in security practices. Finally, Sect. 14.5 proposes a holistic and intelligent data-driven policing system that serves as a synthetical framework for urban crime prevention and security improvement.

14.2   Urban Crime

As an urban-related issue, crime has been extensively discussed in many research areas including ecology, sociology, geography, economics, and political science. For example, income inequality, wage structure, and labor market are considered as important contributors to the crime rate from the perspective of economics (Freeman 1999). Researches have also shown that there exists a strong relationship between

crime, the criminal, and the urban environment, which provides an environmental perspective that can explore and analyze crime at different geographic levels (Wortley and Mazerolle 2008).

Nowadays, the environmental perspective in criminology has been popular among many urban and criminological research areas and has gradually shaped a multi-disciplinary approach: environmental criminology. In this section, we will first depict the historical roots of understanding urban crime from an environmental perspective. We then outline the key concepts and theories in environmental criminology.

14.2.1 Historical Roots in Understanding Urban Crime: An Environmental Perspective

Traditional criminological research focuses on the criminality of offenders and explores how biological factors, life-course experiences, and social forces influence and create criminals. Therefore, the crime is seen as the expression of the offender's deviance, influenced by events that occurred in his or her childhood. However, the concerns of the environmental perspective differ greatly from other criminological approaches. They argue that the criminal is just one portion of the crime event, and the concern is the dynamic of crime pattern, such the time, space, victim, and type.

In addition, there has been an enduring interest in place (environmental perspective) in criminology (Weisburd et al. 2012). Different crime theories explain crime at different spatial levels, ranging from the country level, province level, city level, and community level to the street segments level. Brantingham and Brantingham (2017) suggested three geographic levels of analysis—the macro-level, the meso-level, and the micro-level—within the domain of environmental criminology.

This classification matches the development of the unit of analysis in geographic analysis, which also reflects the historical roots of understanding urban crime from an environmental perspective. Briefly, studies started in the nineteenth century were mainly referred to as macro-level (e.g., countries, provinces) analysis (Guerry 1833).

Then, the early twentieth century witnessed the urban crime studies led by the Chicago School, which mainly focused on the meso-level of analysis, such as cities and big urban areas (e.g., Burgess 1928). Lately, micro-level (e.g., community and street segments) studies, starting from the late twentieth century, have attempted to achieve a fine-resolution analysis of urban crime (e.g., Sherman and Weisburd 1995), which makes crime more predictable than before.

14.2.1.1 Macro-Level Studies

Macro-level studies focus on analyzing crime distribution between countries, states, or provinces. The world's first crime map was made by Guerry and Balbi (1829).

Leveraging the geographic map, they demonstrated that crime in urban areas was more than that in the rural areas in some provinces in France.

Many interesting findings were obtained based on macro-level studies. For example, Quetelet (1831) explored the correlations between crime and many factors (e.g., levels of poverty, ethnicity, the attraction of city) in different cities of different countries. Especially, in terms of common sense, poverty may cause crime, even if violent crimes were more prevalent in poorer rural districts, and property-related crimes showed a higher level in wealthy districts than in rural areas. Such findings indicated that poverty was not highly associated with property crime, but the opportunities existed because wealthy provinces contained more valuable targets (Guerry 1833).

After that, similar studies have compared crime between different areas, such as countries. In the mid- and late nineteenth century, empirical studies in England showed distinctive differences in crime levels and rates across various counties. This study also reported higher crime rates in urban and industrialized areas than in rural areas (Mayhew 1851).

14.2.1.2 Meso-Level Studies

Meso-level studies involve the analysis of crime patterns within cities or metropolises. Studies at this level investigate crime concentrations based on a medium scale of geographic areas. For example, concentration tends to exhibit a difference between central urban areas and suburbs.

In the 1900s, a group of American sociologists known as the Chicago School took a leadership role in the development of environmental criminology at the meso-level. They treated crime as a social problem that is spatially distributed in urban areas. Park (1915) argued that urban life must be studied for crime analysis, such as "its physical organization, its occupations, and its culture" and especially the changes therein. Neighborhoods in his view were the elementary form of social cohesion in urban life. In addition Thomas and Znaniecki (1927), introduced an important concept of social disorganization, which means a decrease of the influence of existing social rules of behavior upon individual members of a group. This concept has drawn attention to communities and neighborhoods. Then, Burgess (1928) split the city into five concentric rings, and he also suggested that the urban functional zone strongly shaped the crime pattern. Inspired by the zone model developed by Burgess (1928), Shaw and Mckay firstly detected the spatial distribution of urban crime by an original method of crime mapping (Shaw and Mckay 1942). Shaw and Mckay (1942) also explored the spatial patterns of juvenile delinquency in Chicago City by comparing the spot maps of delinquency rate with the urban racial zone map and showed that crime rates varied over the urban area.

14.2.1.3 Micro-Level Studies

Micro-level studies examine crime patterns based on spatial areas at a fine resolution, such as the community level, the street level, and prime locations. In the 1980s, urban crime researchers still focused on using social disorganization theory to explain the dynamics of crime patterns at the community level. For example, Bursik Jr (1986) found that long-term crime stability was affected by community stability. More typically, Sampson et al. (1997) proposed a concept of collective efficacy which significantly influences crime in different communities. Since then, research attention has been shifted from macro- or meso-level analysis to micro-level crime study (Weisburd et al. 2009).

After the emergence of various sophisticated spatial analysis tools (e.g., GIS) in the late twentieth century, researchers could explore how various environmental factors influence specific crime locations in practice. These micro-level areas include buildings, addresses (Sherman et al. 1989), street segments (Johnson and Bowers 2010), or locations (Sherman and Weisburd 1995). Current studies confirm that street- or location-level analyses about crime sustainably enrich environmental criminology and make crime more readily forecasted (Cozens 2011).

14.2.2 Theoretical Concepts in Environmental Criminology

Environmental criminology (i.e., the environmental perspective in criminology) emphasizes the influence of the environment on crime patterns, considering that crime is the convergence of offenders, victims, and law enforcement at particular times and places (Wortley and Mazerolle 2008). Research in this area explores the spatiotemporal patterns of crime events and explains the patterns by referring to the features from the urban fundamentals—street networks, road segments, buildings, and so on. Consequently, the strategies of crime prevention derived from the explanations are becoming popular among both urban managers and inhabitants who want to manage and live in an environmentally friendly city.

Environmental criminology is mainly based on three hypotheses, which have their own implications for crime prevention (Scott et al. 2008). First, apart from the offender's ability or the accessibility of victim information, the instant environment where crime occurs could significantly affect the offender's behavior by affecting the criminal's person–situation interaction. In this principle, environmental criminology not only argues that crime is derived from criminogenic individuals but also aims to explore and explain how the environment affects the offender and why some places are criminogenic. Second, the spatiotemporal distribution of crime is not random. Crimes are spatially concentrated at places where the environmental features would promote crime opportunities. They are also concentrated around the intersection of routine activities between offenders and victims. Such crime patterns explain why crime hotspots are stable during extended periods in particular areas, a phenomenon known as the law of crime concentration (Weisburd 2015). Third, knowledge of the

criminogenic environment and crime patterns could help law enforcement to allocate resources to mitigate crime in a particular location. Practically, environmental criminology could provide new insights into solutions for proactive crime prevention, such as crime prevention through environmental design, or situational crime prevention, which will be further discussed in the next section in the context of urban security implementation issues.

14.3   Urban Security

Security involves various concepts within a complex social system. As Zedner (2010) suggested, security is a strong emotion carrying multiple meanings simultaneously arising from individuals. Traditionally, security refers to the supply of private services to protect people or information from crime or violence, and properties for individual- or community-level safety (Smith and Brooks 2012). Security also relies on the public policing that is operated by the government or public services, including but not limited to crime prevention, security technology, and risk management (Brooks 2010). In the context of the urban environment and the aforementioned urban crime, urban security refers not only to crime prevention practices and implementations but also to the public perception of crime. In this section, we will review the literature about the fear of crime in urban areas and about the necessity of studying urban security, followed by a depiction of contemporary crime prevention.

14.3.1   Fear of Crime in Urban Areas

In the 1960s, a fear of crime emerged in the USA where national public opinion polls started to involve open-ended questions relating to the public perception of crime (Furstenberg 1971). The national survey reported by The President's Commission on Law Enforcement and Administration of Justice (1967) stated that the fear of crime could influence the basic life-quality of citizens. The report also found that fear of crime varied with race, income, gender, and the experience of victimization.

However, the results from public opinion polls showed that high levels of fear were found not only in areas with high crime rates but also in areas with low crime rates (McIntyre 1967). The mismatch between the fear of crime and crime rates has been evidenced in public polls in Australia (Borooah and Carcach 1997), New Zealand (Doeksen 1997), the UK (Smith 1987), and Switzerland (Killias and Clerici 2000) and has aroused the interest of researchers.

Though the fear of crime is possibly irrational and expressed in individual perceptions, it still attracts the attention of policymakers. The motivation to study the fear of crime stems from the belief that the results of these studies could be translated into practical policies for reducing fear (Box et al. 1988). Such claims are based upon the

asserter that perceptions of crime are more essential than the actuality in terms of the influence on urban lives.

14.3.2 Implementation of Crime Prevention

Crime prevention from the perspective of environmental criminology differs from many other approaches. It focuses on the criminals or the reason for committing a crime and the places in which crime occurs. Here, we will review two crime prevention approaches: crime prevention through environmental design (CPTED) and situational crime prevention (SCP), both of which are highly practical and effective ways of mitigating urban crime.

14.3.2.1 Crime Prevention Through Environmental Design

CPTED, also known as designing out crime, aims at reducing crime through the design and handling of the built environment in urban areas. It focuses predominantly upon designing out crime opportunities before they occur (Armitage 2007). As a multi-disciplinary crime prevention method, CPTED derives strong theoretical support from environmental criminology, that is, the correlation between crime and environment. CPTED is concerned about the identification and modification of the social and physical conditions that potentially may generate criminal opportunities, in the hope of mitigating urban crime (Brantingham and Faust 1976).

The basis of CPTED is the concept of defensible space proposed by Newman (1972). Defensible space aims to depict the features by design that improves territorial behaviors, such as by utilizing such space among local residents. Then Poyner (1983), developed the principles of CPTED comprising surveillance, movement control, activity support, and motivational reinforcement. Cozens et al. (2005) extended to six principles: access control, territoriality, surveillance, target hardening, image, and activity support.

In practice, the US Department of Housing and Urban Development and the US Department of Justice both expressed interest in CPTED based on inspiration from the early research of Newman and Franck (1982). The concept of defensible space in CPTED is now commonly considered in many processes of urban planning, in Florida, British Columbia, the Netherlands (Saville and Cleveland 2008), the UK, South Africa, Australia, and New Zealand (Cozens et al. 2005). In this way, CPTED linked with urban sustainability is devoted to improving the quality of urban living.

14.3.2.2 Situational Crime Prevention

SCP is an efficient strategy for analyzing and reducing specific crime issues. Specifically, it aims to change the situational factors of crime so as to reduce crime opportunities. Similar to CPTED, situational prevention is grounded in theoretical perspectives in environmental criminology and environmental psychology.

In early literature, the situational prevention opportunity was used synonymously with the situation (Clarke 1980). Nevertheless, later studies concluded that situations provide not only opportunities for criminals but also temptations, inducements, and provocations (Wortley 2001). This argument emphasizes that crime is always a personal choice, which widens the scope of situational prevention. Specifically, the interaction between motivation obtained and the situation involved must be mediated in the process of an offender's decisions making (Cornish 1994).

For crime prevention Clarke (1997), offered a framework for evaluating security with 25 techniques for SCP under five main headings: increase the effort, increase the risks, reduce the rewards, reduce provocations, and remove excuses. This discussion of solutions argues that situational prevention could be easier to utilize than long-term social efforts to change the situation. The effectiveness of situational prevention is shown in its impact on most property crime, such as burglary, theft, or vandalism (Smith et al. 2002) and has recently been applied to child abuse (Wortley and Smallbone 2006) and terrorism (Clarke and Newman 2007).

However, like CPTED, situational prevention provides very simple strategies for crime prevention so that it simply displaces crime instead of preventing it; that is, it moves crime somewhere else or changes its form after such intervention. In contrast Clarke (2008), stated that crime is rarely a compulsion and the displacement is overstated. It may be credible for some types of crimes, but not for all. For example Hesseling (1994), found no evidence of crime displacement in 22 of the 55 areas he examined. In the remaining 33 areas, though some evidence of displacement was found, the crime displaced was less than what had been prevented in every examined case.

14.4 Latest Tools in Urban Crime Analysis and Security

Crime analysis is an investigative tool, defined as "the set of systematic, analytical processes that provide timely, pertinent information about crime patterns and crime-trend correlations" (Wortley and Mazerolle 2008). It utilizes crime and police data to examine crime problems, involving the features of crime scenes, offenders, victims, and crime patterns. Crime analysis aims to provide tactical suggestions to policing with respect to criminal investigations, deployment of resources, planning, assessment, and crime prevention strategies.

In this section, we will review the development of the tools that help the police deter crime and secure the city; in particular, the crime analysis tools of hotspot mapping and security approaches to online police patrolling.

14.4.1   Crime Hotspot Mapping: From Retrospective Analysis to Prediction

Crime hotspots are small geographic areas with high rates of criminal activity (Weisburd and Telep 2014). Various studies define the geographical features of hotspots differently, ranging from street segments to individual addresses. Weisburd (2015) proposed an essential attribute of a crime hotspot: stability, which suggests that crime concentrations tend to remain hot over space and time. This provides an important implication for effective policing: crime problems can be migitated by gathering appropriate data. Crime hotspot mapping is a spatial technique that concentrates on the detection of clusters of crime events across an urban area (Zhao and Tang 2018). There are several methods to producing crime hotspot maps for different purposes, such as the standard deviational ellipse, the Getis-Ord Gi* statistic, and kernel density estimation. Empirically, these analytical methods can evaluate the concentration effects across various crime types. For example, kernel density estimation (KDE) is a kind of nonparametric spatial statistical approach for calculating the probability density function of crime incidents. This method is quite popular for crime mapping owing to its fast parameter inference process. In addition, a reaction-diffusion-based technique has been proposed to explain the dissipation and displacement of hotspots (Short et al. 2010).

Traditional methods of crime hotspot mapping mainly aim to generate risk surfaces that suggest where the crime events have clustered previously. Due to fast and automatic data acquisition and computation, both the researchers and practitioners are trying to make the traditional methods suitable to predict the crime risk in customized space and time.

For example, Bowers et al. (2004) proposed a method of predictive crime mapping named ProMap. The risk at a location for a particular period could be calculated by the density function of crime that has occurred at or near that location. Continuously, empirical studies have shown that the prediction precision of ProMap is reliable (Johnson et al. 2007). Kennedy et al. (2011) advocated risk terrain modeling (RTM) to forecast monthly crime risk and focused more attention on exploring why criminogenic places generate crime rather than the crime itself. To predict crime within a short interval, Mohler et al. (2011) utilized a self-exciting point process (SEPP), which was initially used to model the propagation of earthquake aftershock or disease, to predict future crime risk based on grid cells. This approach is capable of forecasting the next day's crime risk, and it has been allied in some law enforcement in the USA. Lately, Rosser et al. (2017) proposed a network-based crime hotspot predictive mapping, and the authors showed that its predictive accuracy outperforms the state-of-the-art grid-based model. This prospective crime mapping technique based on the road network provides micro-level prediction results based on which police resources could be deployed precisely and effectively.

14.4.2   Advanced Police Patrolling Strategies

Police patrols aim to deliver police services to prevent crimes (Novak et al. 2016) and to make response to crime incidence more rapid. Police patrolling strategies are of significant importance to improving policing effectiveness and public security. Nowadays, various models have been developed for police patrolling area allocation and patrol route planning.

Allocating patrol areas aims to arrange management precincts derived from urban areas for police officers. Gholami et al. (2015) proposed a computational learning framework that leveraged a dynamic Bayesian network to connect police officers with crime events. Further, Mukhopadhyay et al. (2016) developed a bi-level optimization method, including a linear programming patrol response formulation and Bender's decomposition, to optimize police patrolling allocation so as to reduce the expected crime response time. However, offenders may commit new crimes in different locations and times. To solve this problem, Zhang and Brown (2012) used an iterative Bender's decomposition with a discrete-event simulation model to optimize patrolling area allocation, speed up response, and reduce work variation.

The goal of patrol route planning is to design routes to make patrols more effective, to deter crime or to make a quick response when crime incidents happen, which should be more impartial and effective than a random patrolling mode. For instance, Chen and Yum (2010) proposed an efficient algorithm leveraging cross-entropy for real-time police patrolling in dynamic environments. However, there exists a time lag between consecutive patrols and target visits. To solve this issue, a real-time cooperative routing strategy using online agent-based simulation was introduced to improve the effectiveness of police patrol (Chen et al. 2017). Furthermore, Chen et al. (2018) designed a street-network-based patrolling algorithm, which enables multiple police operators to patrol across different police districts on street networks and enhances effectiveness and workload balance.

In addition, the assessment of the effectiveness of police patrolling in crime deterrence has been studied for decades. It concerns where police officers visit and what they actually do during patrolling, which is useful to avoid diluting benefits and to enhance the effectiveness of resource allocation. Sherman and Weisburd (1995) compared the patrolling time in crime hotspots with associated crime reduction to assess police strategies. Lastly, Shen and Cheng (2016) proposed a framework to identify groups of police officers by clustering their GPS trajectories. This approach helps to synthetically understand police officers' patrolling behaviors across space and time, which is essential for the evaluation, planning, and optimization of police patrolling strategy.

14.5 Intelligent Data-Driven Policing

Recently, big data and AI technology have changed the traditional structure of industries such as finance and online retail industries and have been employed in a diverse range of domains. However, the application of big data technology in policing has been limited, in sharp contrast to other domains (Babuta et al. 2018).

The use of big data technology could tackle the current difficulties associated with time-consuming data analysis tasks. It could improve the effectiveness of policing by automatic or data-driven decision-making, rather than manual experience-based decision-making. Instead of simply responding to crime events when they occur, this advanced technology might allow police forces to develop proactive crime prevention strategies and targeting.

Intelligent data-driven policing is an approach that integrates such techniques as hotspot policing, intelligence-led policing, and predictive policing (Cheng et al. 2016). In particular, it emphasizes the interactions of crime, policing, and citizens in space–time. Measuring, modeling, and predicting these interactions may lead to an intelligent and holistic approach to policing in the big data age. Conceptually, it includes four inter-related issues that arise in the process from data collection to policing outcomes (Cheng et al. 2016).

First, data-driven tools must be easy to utilize and must transfer directly into policing practices. Nevertheless, the outputs of most existing tools are far from suitable on these criteria: the current large box or grid hotspots identified by predictive mapping methods, for instance, include many road sections and cannot suggest precisely where police officers should be deployed. To ensure their suitability, tools should be explicitly designed with police operation in mind. For this, network-based crime hotspot mapping tools developed by Rosser et al. (2017) and Zhang and Cheng (2020) should be deployed to enhance the chance of technology adoption, because these tools pin the crime hotspots to road segments, the fundamental structure supporting urban life and human activities, as well as police patrolling.

Second, predictive accuracy is paramount if police forces are to adopt the tools, and thereby to enhance policing efficiency. Accuracy evaluation is important to enhance the confidence of the application. For example, Adepeju et al. (2016) proposed a practical evaluation tool in different metrics for spatiotemporal crime prediction. This requires the refinement of analytical techniques for specific policing contexts, as well as the selection of appropriate units of analysis, so that police resources can be effectively deployed. In addition, given that police and offender activities are constrained by road networks in urban areas, the greater accuracy and precise methods on road networks will have a higher chance for deployment.

Third, police patrol strategies should be coordinated to enhance the efficiency and effectiveness of crime deterrence. Police need to deal with emergencies and routine patrolling, involving the movement and placement of police officers in large numbers and spatial diversity. It is vital to effectively allocate the tasks and design the routing (Chen et al. 2018). For this purpose, police resources should be first districted in a

balanced way, and then a dynamic real-time online dispatch strategy could be adopted to deal with emergencies and patrolling implementation (Chen et al. 2017).

Finally, it is necessary to evaluate the implementation and refine policing strategies, as part of an intelligent policing system. To evaluate policing implementations, Davies and Bowers (2015), proposed to compare the supply of policing (i.e., police activities) and the demand for policing (i.e., call for services) in order to support the commanding officer's decision. Examining police patrolling patterns across space and time could help our understanding of patrolling behaviors (Shen and Cheng 2016). In addition, public confidence in policing is always a top priority of the government agenda (Skogan 2006). However, public views of data-driven policing are ambiguous with the advent of big data and artificial intelligence technologies due to worries about the use of machine decision-making in conducting policing activities.

To put all these principles together, an end-to-end solution with functions of prediction, online patrolling, and real-time feedback is needed for intelligent policing. For this purpose, a Web-based prototype has been developed and is shown in Fig. 14.1. This prototype integrates analysis and evaluation across crime events, policing strategies, and citizenship, and it establishes an entire framework to secure the public.
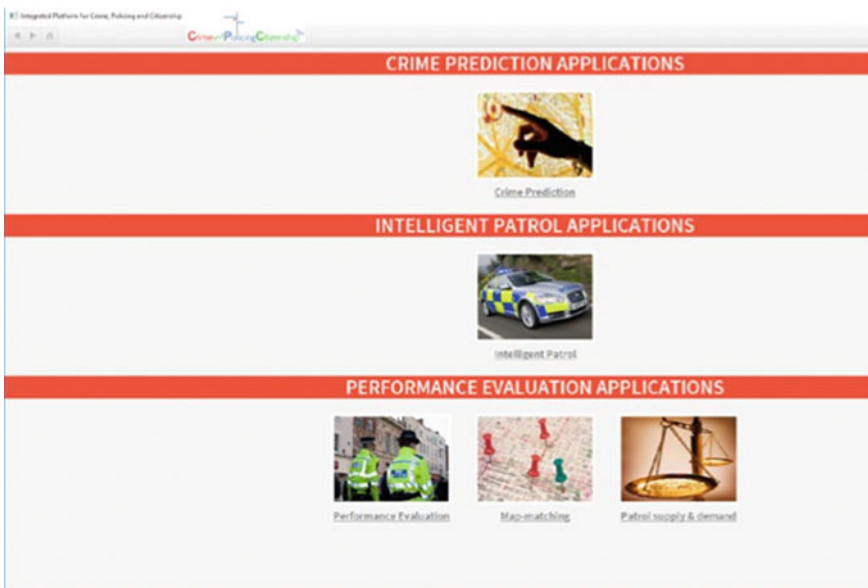

Fig. 14.1 Spatiotemporal patterns formed by crime, policing, and citizenship activity form dynamic, interdependent networks (Cheng et al. 2016)

14.6   Summary

Urban crime and security play a continuing and essential role in the sustainable development of urban cities and the quality of citizens' life. In this chapter, we gave an overview of urban crime and security from a historical and practical perspective. We first reviewed the theories of environmental criminology and the historical roots of understanding urban crime, and then the state-of-the-art crime and security applications; predictive crime hotspot mapping and police patrolling strategies. Finally, we proposed an intelligent data-driven policing associated with big data and AI, a comprehensive perspective that ranges from spatial units and accuracy of data analysis to police patrolling and effectiveness evaluation, leading to an intelligent and holistic policing system for urban crime prevention and security enforcement.

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