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**Research Paper**

# How Can the Built Environment and Studentification Explain Crime Occurrence in Urban Areas?

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***Abstract***
*This study investigates crime, particularly robbery, in Mashhad, the second largest city in Iran. It examines whether urban facilities and students—representing the built environment and studentification—act as crime attractors or detractors. The study also introduces crime prevention strategies in urban contexts, focusing on crime detractors. To this aim, quantitative analysis and spatial statistics methods such as correlation, regression, Moran's I index, and Getis-Ord Gi are applied. These tools are used to explore the spatial distribution of robberies and their relationships with urban facilities and students. The findings reveal that robberies are often concentrated in impoverished and marginalized neighborhoods. Commercial, residential, educational, green spaces, farms, gardens, and warehousing generally act as robbery attractors. In contrast, cultural facilities and students, as culturally expressive social groups, serve as robbery detractors. Challenging the assumption of purely rational offenders, the study argues that crime is primarily driven by life necessities. Since most facilities attract crime, while cultural facilities and students reduce it, a culture-led crime prevention strategy is suggested as a potential pathway to lower crime rates.*

***Keywords:*** *Crime prevention, Cultural facilities, Detractors, Robbery, Studentification, Urban facilities.*

## INTRODUCTION

Living in highly urbanized cities can be seen as a double-edged sword. On one hand, residents benefit from the opportunities that city life provides. On the other, they face risks and harms that may directly or indirectly affect their quality of life. Urban crime and delinquency are among the most critical urban issues. They endanger residents physically and economically, increase anxiety and fear of crime, and discourage active participation in city life (Yun et al., 2010). From a structuralist perspective, urbanization itself predisposes environments to crime and contributes to rising crime rates (Fitzgerald, 2011). Because of these significant consequences, many scholars have examined the spatial distribution of crime and attempted to predict it using sociological, environmental, economic, political, and demographic factors (Fitzgerald, 2011; Zhang et al., 2012; Livingston et al., 2014).

Most studies on urban crime have focused mainly on Western contexts (Yun et al., 2010; Kim & Hipp 2021). In terms of variables, ethnicities, races and immigration (Yun et al., 2010) as well as land-use and urban facilities have been more studied than other variables (Kim & Hipp 2021; Sukartini, Auwalin and Rumayya 2021; Alguera & Meave, 2021). Although immigrants are frequently examined in crime research, Ousey & Kubrin's (2018) systematic meta-analysis indicated that the presence of immigrants in a spatial unit does not necessarily lead to higher crime rates. Similarly, with respect to urban land uses, Wilcox & Eck (2011) argued that the majority of specific land uses are criminogenic. In contrast to these dominant studies—which largely emphasize Western contexts, ethnicities, immigrants, races, and criminogenic urban

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facilities—the present paper seeks to stand out. It does so by focusing on three main distinctions, which also form its central objectives.

First, this study contributes to global knowledge by presenting evidence from an understudied Middle Eastern context: Mashhad, located in north-eastern Iran. Mashhad is the capital of Razavi Khorasan province and the second-most-populous city in Iran. Historically, it has been recognized as a cultural and religious center. Due to its importance, Mashhad has recently undergone major demographic and physical transformations, becoming a metropolitan area with nearly 3 million residents, along with millions of tourists and pilgrims who visit annually (Shahivandi et al., 2017; Ghazaie et al., 2017). Additionally, rural-to-urban migration and immigration from neighboring countries, especially Afghanistan, have made Mashhad one of the five Iranian cities most prone to attracting (im)migrants (Ghazaie et al., 2021a). These immigrants, usually from middle- and lower-income households, often settle in the city's peripheries. These marginalized areas—mainly located in the northern parts of Mashhad—now constitute almost one-third of its population (Bazargan & Ajza Shokouhi, 2020). Such demographic shifts, coupled with the ongoing economic crisis, have turned Mashhad into Iran's second major crime hotspot, after Tehran (Jelokhani-Niaraki et al., 2020). Although crime takes many forms, the present paper focuses on robbery and its most frequent types for three main reasons.

Statistics indicate that the number of robberies in Mashhad has been steadily increasing, in line with national and provincial trends. Between 2018 and 2021, robbery rates rose by 16 percent in Iran and by 32 percent in Razavi Khorasan province, according to the Statistical Centre of Iran. In 2021, there were 1063 robbery cases per 100,000 people nationwide, while Razavi Khorasan recorded 1,924 cases per 100,000—representing nearly 14 percent of all robberies in Iran. Almost half of the province's crimes are robberies, and 62 percent of these occur in Mashhad. The city itself witnessed a 60-percent rise in robberies between 2016 and 2019. Due to this alarming frequency and rising trend, robbery has become one of Mashhad's most serious urban problems, particularly in marginalized areas. It is also a top priority for the police in their crime prevention strategies. Among the 12 identified types of robbery in Mashhad, five are the most prevalent: shoplifting, home burglary, street robbery, car theft, and motorcycle theft. Together, they account for nearly 40 percent of all robberies and thus receive greater focus in prevention policies. Finally, robbery offences affect a broader range of citizens because they are more likely to take place in streets and open urban spaces—areas where people spend much of their daily lives (Zhang et al., 2012).

Secondly, from the perspective of environmental criminology, this paper examines the spatial distribution of crimes in Mashhad and their links to spatial locations—particularly in areas marked by concentrated disadvantage and poverty. According to Cook (1986) such conditions are closely associated with robbery. More importantly "... the study of crime, criminality, and victimization as they relate first, to particular places, and secondly, to the way that individuals and organizations shape their activities by placed-based or spatial factors" (Bottoms & Wiles 1997, p. 305; Siegel, 2001). In this regard, the paper investigates the relationship between the number of urban facilities—representing the built environment—in each police district and the number of robberies recorded. The central aim is to highlight urban facilities not covered by Wilcox & Eck's (2011) criminogenic framework, but which may instead serve as **non-criminogenic facilities**, acting as deterrents or preventers of crime.

Finally, drawing on the behaviorist perspective and Bottoms & Wiles's (1997, p. 305) argument—while placing *studentification* at the core—the paper shifts the analytical focus away from immigrants and ethnicities toward students. The aim is to examine whether the presence of students increases crime rates or, conversely, contributes to reducing robberies. Smith (2002) first introduced the concept of *studentification* to describe the sociocultural, economic, and physical transformations caused by students in host communities, a process further elaborated by Tallon (2010). As predominantly middle-class residents (Hubbard, 2008) students are seen as agents of both positive and negative impacts on their neighborhoods (Smith, 2008). Accordingly, the social contexts of spatial units—encompassing both offenders and victims—may be shaped by the multidimensional and co-constitutive relationships students form within their environments (Burke et al., 2009). Their daily commuting patterns and influence on family dynamics also align with the principles of social control theory (Zembroski, 2011; Glaeser & Sacerdote, 1999). Beyond these theoretical justifications, the case of Mashhad highlights the importance of students: they represent nearly one-fifth of the city's population, and educational facilities are the fourth most common urban land use, following housing, commercial areas, and unclassified units.

In the following, we first establish the theoretical foundation. Next, we discuss the study area, data, dependent and independent variables, and methods. Finally, the findings and results are presented. The results indicate that both cultural facilities and

students are indirectly associated with robbery rates, suggesting that they can be introduced as key factors in culture-led crime prevention.

## LITERATURE REVIEW

Considering that the definitions of crime are historically and spatially contingent, it can be argued that its meaning varies across time and place. Regardless of such variations, causes and harms are what ultimately transform an act into a crime (Garside, 2011). Accordingly, crime and its causalities have been interpreted through a wide range of theoretical lenses, including religious, biological, personal, social, cultural, economic, political, legal, environmental, and behavioral perspectives (Loader & Sparks, 2016; Fitzgerald, 2011). These perspectives typically focus on four core dimensions of crime—law, offenders, targets, and place (Brantingham & Brantingham, 1981)—to explain why, when, and where crime might occur, who might commit it, and who might be considered potential targets. Although these approaches are interconnected and collectively significant in explaining crime, the present study concentrates more specifically on crime facilitators and inhibitors, with particular emphasis on environmental and behavioral perspectives.

Crime pattern, rational choice, and routine activities theories are three primary approaches in environmental criminology (Sypion-Dutkowska & Leitner, 2017). These theories view offenders as rational individuals who decide to commit a crime based on their evaluation of potential opportunities and risks (Cornish & Clarke, 2017). According to routine activities theory, a crime occurs only when a motivated offender, a suitable target, and the absence of capable guardians coincide within a spatial unit. Therefore, activities that reduce the presence of potential offenders or attractive targets, or increase capable guardianship, can lower crime rates (Felson, 2017). Crime pattern theory introduces the concept of **action space**, where offenders' activities overlap with potential targets and victims, which may include individuals or facilities. Accordingly, rational offenders are likely to select the least risky and most rewarding targets for crime. Because these targets are often recognized by other offenders, their geographical locations—i.e., action spaces—tend to experience higher concentrations of criminal activity (Brantingham et al., 2017).

From an environmental criminology perspective, and considering the concept of action space, crime occurrence and its spatial distribution in urban environments can be explained through three primary components: (1) the geographical locations where crimes are committed, (2) the physical characteristics of these locations, and (3) the individuals concentrated in these areas, who may act as potential victims or offenders. While multiple factors can influence crime rates across urban locations, Warner (1999) emphasizes poverty as a key consideration in crime studies. Research conducted in Mashhad also highlights poverty as one of the most influential determinants of criminal behavior. For example, Fouladiyan and Rezaeebahrabad (2019), drawing on social anomie and relative deprivation theories, argue that residents of marginalized and impoverished neighborhoods are more likely to commit crimes due to high unemployment, low literacy, low life satisfaction, and experiences of inequality. Similarly, Alimoheseni and Zoghdarmoghadam (2018) identify poverty as a significant explanatory factor for criminal acts. Likewise, economic factors are also considered primary drivers of crime in Mashhad (Shahivandi et al., 2017; Bazargan et al., 2017).

Considering international contexts, such as Germany and the United Kingdom, research emphasizes that poverty and inequality significantly influence crime rates (Lymperopoulou & Bannister 2022; Mehlum et al., 2006), with inequality appearing particularly important in the Chinese context (Song et al., 2020). Welfare spending as a pro-poor policy in Argentina has also been shown to reduce overall crime (Meloni, 2014). In Sweden, Larsson (2006) suggests that the risk of property crime is higher for the poor than for the non-poor, primarily due to their socioeconomic status.

Using data from 875 cities, Neapolitan (1994) links poverty and crime to spatial units, finding that poverty has little effect on property crime in small or less populated urban areas, while its impact is significant in larger cities. Consequently, poverty affects crime in two main ways: it increases the likelihood that individuals commit crimes to compensate for deprivation, and it exposes poor individuals as potential victims due to their limited capacity to maintain property and safeguard themselves. However, poverty may also reduce crime in some contexts by limiting opportunities for offenders (Cook, 1986).

Considering the built environment and the physical characteristics of action spaces as the second component in explaining crime and its spatial distribution, urban facilities are often analyzed as factors that can generate, attract, or deter crime (Kinney et al., 2008). **Crime generators**, such as bars and clubs, which are context-dependent and may not exist in some areas due to cultural, religious, or legal constraints, bring potential victims and offenders into a location. **Crime attractors** are places that draw

offenders, whereas **crime detractors** prevent or discourage criminal activity (Ratcliffe & Rengert 2008).

Cozens (2011) identifies public routes, recreational settings, public transport, retail stores, educational institutions, offices, human support services, and industrial areas as high-risk settings for crime. Sypion-Dutkowska and Leitner (2017) in a review of studies related to land-uses and nine types of prevalent crimes indicate that housing project blocks, residential blocks with taverns or cocktail lounges, subway stations, public housing, neighborhood parks (Kimpton et al., 2016), sports clubs, youth clubs, restaurants, multifamily apartment blocks, malls, schools, universities, retail properties, at-risk housing, pawnshops, and drug markets experience higher rates of crime. In their study conducted in Poland (2017), they further suggest that alcohol outlets (Livingston et al., 2014), clubs and discos, cultural facilities, municipal housing, and commercial buildings increase crime risk. Similarly, Meshkini et al, (2016) and Mohamadi et al., (2017) show that residential and commercial facilities attract offenders and criminal acts in Tehran and Tabriz, respectively.

Tillyer et al., (2020), in their study in San Antonio, indicate that banks and credit unions, gas stations, fast-food outlets, hotels, grocery and food stores, convenience stores, bars, liquor stores, and pharmacies act as generators of violent, property, and drug crimes. They also suggest that the direct relationship between these facilities and crime is stronger in neighborhoods with higher levels of concentrated disadvantage and traffic congestion, but weaker in areas with stronger civic engagement. While most businesses are directly correlated with violent and property crime, local businesses, especially small ones, have significantly lower crime-enhancing effects (Kim & Hipp, 2021).

Bernasco and Block (2011) report that blocks containing bars and clubs, barbers, fast-food restaurants, groceries, merchandise stores, liquor stores, gas stations, Laundromats, pawn shops, and check-cashing services show higher rates of street robbery. Educational facilities are also associated with increased crime rates (Zhang et al., 2021). Conversely, urban linear parks, ironmongers, doctor offices, college hostels, and tailor shops are associated with lower crime rates. Grandstands, cemeteries, green areas (Branas et al., 2011), allotment gardens, and depots or transport bases also contribute to crime reduction (Sypion-Dutkowska & Leitner, 2017). Green spaces are also believed to have a mitigating impact on robbery (Sukartini et al., 2021; Shepley et al., 2019; Wolfe & Mennis, 2012).

Zamiri and Sharifi Noghabi (2021), in their study in Bojnord, suggest that neighborhood green spaces encourage social activities and consequently reduce opportunities for criminal acts. Cultural facilities, which strengthen social cohesion, are also considered crime deterrents in Ahvaz (Sajadyan et al., 2015). Alguera and Meave (2021) indicate that convenience stores can deter home robberies and burglaries. However, (Lee et al., 2021) note that although nearly all facilities may generate property crime, their management and ownership significantly affect their impact on crime.

Apart from facilities that act as crime detractors or generators, other social factors also influence crime, forming the third explanatory component. Dominant social groups' behaviors can significantly affect crime occurrence (Fitzgerald, 2011). Most research has focused on (im)migrants and ethnic or racial groups, which, according to Ousey and Kubrin (2018), have only a weak effect in deterring crime, while other social groups have received less attention. Among these, students—who often constitute a substantial proportion of urban populations—are considered particularly important. Hubbard (2008) argues that students can significantly contribute to either increasing or reducing crime due to their ambivalent socio-spatial position: they are culturally expressive, typically belong to middle socioeconomic groups, possess highly valued and professionally accredited knowledge, may carry debts, and can be socially excluded from mainstream life.

Studentification is the term smith (2002) used to describe the impact of students on their living environments and the resulting spatial outcomes (Sage et al., 2011). Studies have shown that these impacts can be both positive and negative across different contexts (Tallon, 2010; Sage et al., 2012). (Paige et al., 2002, P. 6-7) describe student-led crime prevention as "youth-adult collaboration and trusting the capacities of young people to make a real difference in an area important to them—the safety and security of themselves, their friends, their school and their community". Students living in urban settings are expected to influence broader neighborhood attitudes and behaviors (Kenna, 2011). Research indicates that families with children and individuals with higher education levels are particularly sensitive to crime occurrence (Cullen & Levitt 1999). In the U.S., Kim (2020) found that higher high school enrollment in 229 major cities correlates with lower violent crime rates. However, some studies show contrasting effects: Barbaret et al., (2004) report that student-dominated areas may have higher burglary rates, and Allinson (2006) notes that the presence of students can attract burglars. Thus, understanding crime in urban areas

requires considering both the built environment and the social composition of neighborhoods.

As a result, this study has a two-fold focus. First, it examines the spatial distribution of crime—particularly robbery and its five main types—and its relationship with poverty as a representative of geographical location. Second, it aims to identify crime attractors, generators, and detractors by considering urban facilities and students as independent variables.

## METHODOLOGY

### *Study Area*

As a northeastern city of Iran, Mashhad is located between the Kopeh-Dagh mountain range in the north and Binalud in the south. Covering an area of 35,147 hectares, it is the second-most-populous city in Iran (Firoozi et al., 2019). Mashhad is also the second-largest holy city in the world due to the presence of the shrine of Imam Reza, the eighth Shia Imam. In 2017, it was designated the Capital of Islamic Culture at the 7th ISESCO Summit in Algeria, reflecting its rich cultural heritage, including landmarks such as the Ferdowsi tomb. Consequently, religious and cultural considerations have historically been key drivers of governance in the city.

Administratively, Mashhad is divided into 13 municipal regions, 41 districts, and 158 neighborhoods. According to the 2016 census by the Statistical Center of Iran, the city had approximately 3,057,679 inhabitants, with a population density of around 87 individuals per hectare. The city is served by 31 police stations, mainly concentrated in the central areas where the Imam Reza Holy Shrine and many trans-regional functions are located. Mashhad is equipped with an international airport, a train station, and three interurban terminals (Figure 1). Eghbali et al., (2016) indicated that Mashhad attracted the highest number of tourists in 2012. Almost 30 million pilgrims and tourists visit Mashhad annually, especially for religious purposes (Shahivandi et al., 2017). Consequently, the city's economy heavily relies on religious tourism, while large shopping and entertainment centers, along with advanced medical facilities, have contributed to the growth of recreational and health tourism (Saberifar, 2018). Thus, millions of pilgrims and tourists from other parts of Iran and predominantly Islamic countries constitute a third significant factor shaping the city's social and economic relations.

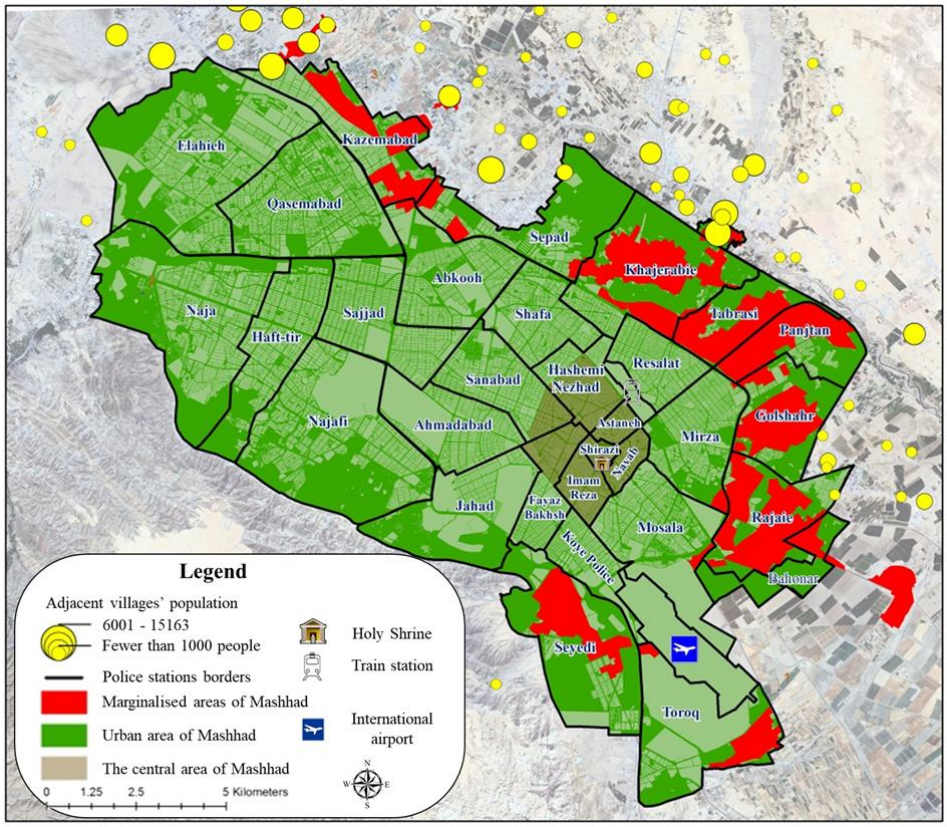



**Fig 1.** Mashhad City and its Major Elements

The fourth influential factor affecting various aspects of Mashhad is the (im)migration phenomenon, involving people moving from neighboring countries and other urban and rural parts of Iran. Mashhad is considered the primary destination for (im)migrants in the eastern part of the country. As a result, the city's population and area expanded by 11.25 and 18.75 times, respectively, between 1956 and 2011 (Firoozi et al., 2019). Approximately one-sixth of Mashhad's population consists of (im)migrants, with around 33% and 25% of them leaving their origins due to joblessness and low quality of life, seeking better wealth and employment opportunities in the city (Fouladiyan & Rezaeebahrabad, 2019; Rafieian et al., 2018).

According to Fouladiyan and Rezaeebahrabad (2019), in marginalized areas, migrants from other cities and villages make up nearly 40% and 17% of the population, respectively. These areas—mainly in the northern, northeastern, and northwestern parts of Mashhad—house about one million people, accounting for one-third of the city's population and one-seventh of Iran's marginalized population, within just 3,695 hectares (approximately 10% of Mashhad's total area and 6% of Iran's marginal areas). Additionally, the population of adjacent villages, primarily in the northern part of the city (Figure 1), has increased ninefold over the past forty years, heightening the potential risk of rising criminal activities as these areas gradually integrate into the urban fabric.

Rafieian et al., (2018) also suggested that the lower the socioeconomic status of (im)migrants' origins, the more likely they are to reside in marginalized areas. Compared to the rest of the city, these areas are predominantly characterized by poverty, higher crime rates, and a lack of social sustainability and security. Additionally, drug dealing and drug addiction, which are closely associated with robbery and poverty, are mainly concentrated in the northern and northeastern parts of Mashhad (Mafi & Abdoulahzadeh 2017; Azami & Rusta, 2012).

According to Farhadikhah et al., (2018), Farhadikhah et al., (2019), Hataminezhad et al., (2022), as well as Soleimani Moghadam et al., (2021), the spatial concentration of poverty in Mashhad, which is one of the crucial explanatory factors of crime in its context (Fouladiyan & Rezaeebahrabad, 2019; Alimoheseni & Zoghdarmoghadam, 2018; Shahivandi et al., 2017; Bazargan et al., 2017), follows a clustering pattern. Poverty is mainly concentrated in the northern and northeastern parts of the city, where marginalized areas are predominantly located. This pattern also highlights a severe economic imbalance in Mashhad, indicating that neighborhoods closer to the north and northeast are more deprived (Figure 2).

Overlaying the poverty map with population distribution and the five types of robbery shows that nearly 41% of Mashhad's population lives in areas with very high or high levels of poverty. Furthermore, 49% of home burglaries, 46% of motorcycle thefts, and 49% of shoplifting incidents occur in these high-poverty areas. In contrast, less deprived areas are associated with higher rates of car theft (41%) and street robberies (42%). The police districts of Khajerabie, Panjtan, Rajaie, Tabarsi, and Golshahr collectively account for nearly 55% of the most deprived individuals in the city.

To sum up, Mashhad can be described as a heterogeneous city, comprising pilgrims, tourists, national and international (im)migrants, and local residents, and is primarily shaped by religious and cultural governance. The current situation has produced several adverse consequences, including poverty, marginalization, social anonymity, rising crime rates, weakened sense of belonging, and reduced social sustainability.

### *Spatial Unit of Analysis*

Scholars have commonly used census tracts or neighborhoods as their spatial units of analysis; however, the current study focuses on police station districts in Mashhad. Given that this study relies on police reports concerning rising robbery rates and the authorities' interest in crime prevention, analyses are conducted at the level of police station districts to ensure results are more practical and actionable for law enforcement. Mashhad has 31 police station districts, and crime-related data are typically collected and analyzed according to these districts. These districts also encompass areas that are closely linked to the city but not formally part of the municipal boundaries. Notably, police station districts, officially established for crime monitoring, do not necessarily align with municipal regions, and all are supervised by Mashhad's central police station.

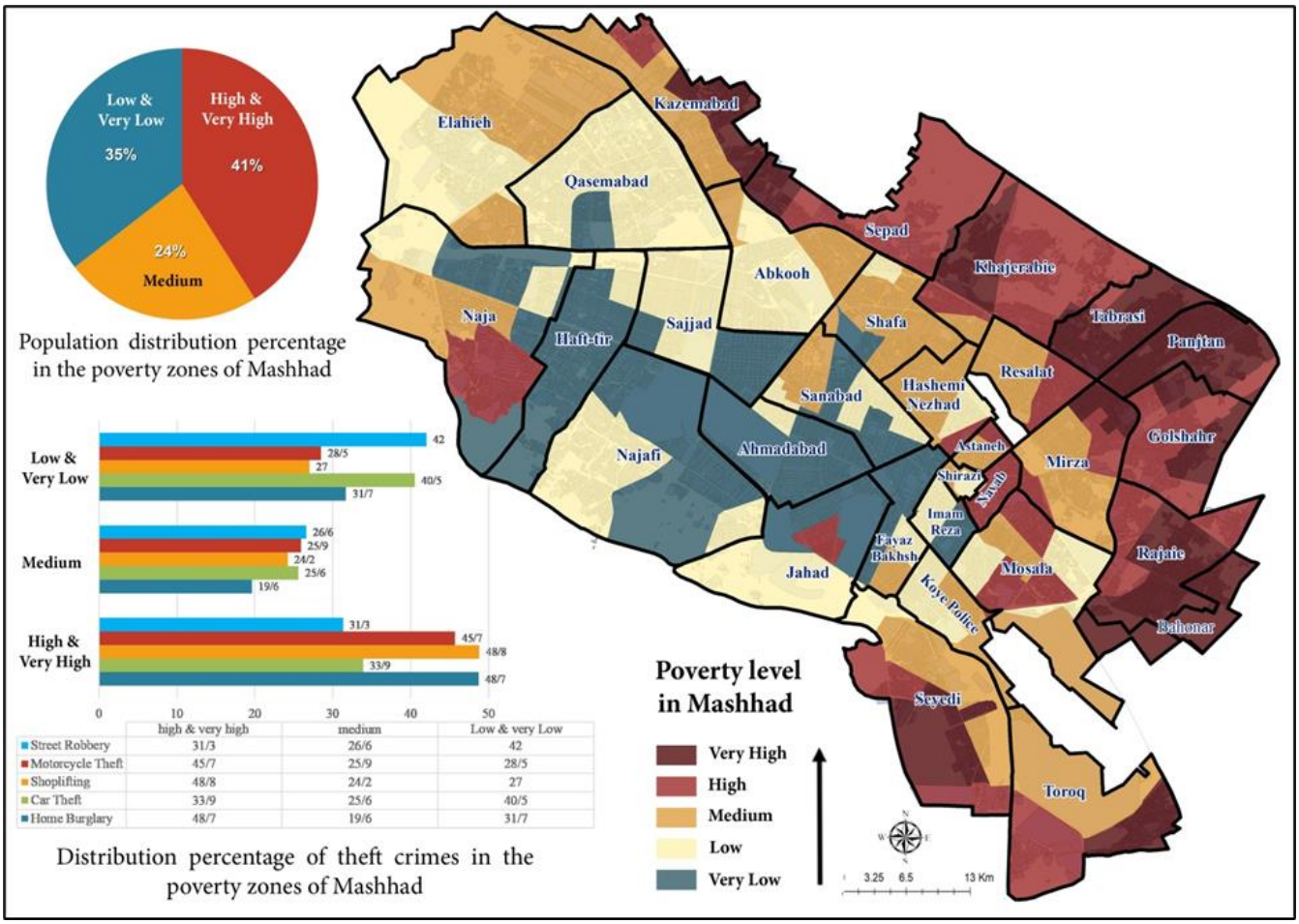



**Fig 2.** Spatial Distribution of Poverty and its Overlap with Population and Robbery in Mashhad (Farhadikhah et al., 2018)

## DATA AND VARIABLES

Considering limitations in accessing data due to the confidentiality of crime-related information, and given that robbery affects a wide range of individuals, robbery and its types are the primary focus of this study. Robbery data were collected in 2018 by the Central Police Station Department (CPSD) and categorized into 12 main types. Among these, home burglary, street robbery, shoplifting, car theft, and motorcycle theft are prioritized by the police due to their high frequency. The total aggregation of these crimes for each police station district is referred to as total crime. To examine potential relationships between robbery and its geographical context, the level of poverty is selected as a variable representing both the socioeconomic and physical characteristics of geographical locations simultaneously.

Farhadikhah et al., (2018), Farhadikhah et al., (2019), Soleimani moghadam et al., (2021) and Hataminezhad et al., (2022) all studied the status of poverty in Mashhad, considering social, economic, and physical factors in their analyses. Their results demonstrate a high level of consistency, indicating that the highest concentrations of poverty are located on Mashhad's periphery, particularly in the northern and northeastern parts of the city. Given the similarity of these studies in terms of variables and findings, the current study focuses on Farhadikhah et al.'s (2018) paper. Accordingly, poverty-related data were extracted from this study and adjusted to align with the spatial units of the present research (Figure 2). Like other researchers investigating poverty in Mashhad, Farhadikhah et al., (2018) emphasized socioeconomic and physical factors, employing nearly 30 variables in their analysis.

Children's mortality rate, illiteracy rate, graduate education rate, access to computers, family size, elderly rate, proportion of the disabled, and fertility rate were used to examine social poverty. Economic poverty was calculated using the dependency ratio, unemployment rate, women's unemployment rate, tenant rate, car ownership rate, and activity (economic participation) rate. Family income, although a relevant variable, was not included because Iranian households are generally unwilling to disclose their income, and

census data—the primary source for these studies—does not provide this information. Consequently, Farhadikhah et al., (2018) but Farhadikhah et al., (2019), Soleimani Moghadam et al., (2021) and Hataminezhad et al., (2022) all omitted family income from their analyses. Physical poverty was assessed through variables such as family per house, persons per room, housing unit, population density, proportion of houses without electricity, gas, or drinking water, housing area, and housing quality. Using these variables along with their respective weights, the total level of poverty in different parts of Mashhad was calculated (Figure 2) (Farhadikhah et al., 2018).

To identify crime generators, attractors, and detractors, robbery and its types were treated as the dependent variables, while two sets of independent variables were considered (Figure 3). The data for these variables were derived from the 2016 census conducted by the Statistical Center of Iran. The first set consists of a single variable: the total number of students and pupils living in each police station district. Selecting students as an independent variable has a twofold rationale. First, it aligns with studentification and behaviorism perspectives. Second, it relates to both the presence of students and educational facilities, which bring them into urban environments and action spaces. According to the 2016 census, Mashhad had approximately 650,000 students, constituting nearly one-fifth of the total population. Additionally, the proportion of different urban facilities indicates that educational facilities are the fourth most common urban facility (0.41%) after housing (78.3%), commercial (9.49%), and unclassifiable (7.34%).

The second set of independent variables includes the number of facilities across the following land-use categories: residential, commercial, educational, administrative, sanitary, sport, green space, cultural, religious, infrastructural, warehousing, farms and gardens, and unclassifiable.

## METHODS

To address the main aims of this study, two complementary analyses were conducted. First, the spatial distribution of robbery and its types, along with their potential relationships with the built environment, was examined. Second, exploratory variables—namely the number of urban facilities and students—were investigated through inferential statistics to understand their potential role in defining robbery and its types (Figure 3).

The spatial distribution of crime was analyzed using GIS-based spatial analysis. Initially, Moran's I index was employed to determine whether similar types of robberies tend to occur in neighboring police station districts. Moran's I index ranges from -1 to 1, where values closer to 1 indicate clustered occurrences, and values closer to -1 indicate dispersed occurrences (Ghazaie et al., 2021b). Since the Moran I index does not provide a visual understanding of the concentration of crimes, a Getis-Ord Gi* analysis was subsequently applied to robberies exhibiting a clustered pattern. This analysis not only identifies the geographic concentrations of similar robbery types but also provides a Z-score for each district, with higher values indicating stronger local clustering (Ord and Getis 1995). Finally, a Pearson Correlation between Z-scores and poverty levels extracted from Farhadikhah et al., (2018) was performed to examine potential relationships between robbery occurrence and geographical location.

After exploring the spatial distribution of crime, the study examined the relationship between crime and the number of urban facilities and students, aiming to identify crime generators, attractors, and detractors and to understand how the presence of students affects crime. To this end, the total number of facilities in each land-use category (from Mashhad's comprehensive plan), the total number of students (from the 2016 census), and robbery data (from CPSD records in 2018) were considered. Regression analysis was conducted, with total robberies and their types as the dependent variables.

Because the police station districts vary in area, robbery data were normalized by spatial unit area (Figure 4). Independent variables were selected after examining potential collinearity using Variance Inflation Factor (VIF). Variables with VIF values of 10 or higher were excluded from the regression analysis, resulting in eight out of thirteen variables being retained (Figure 3).

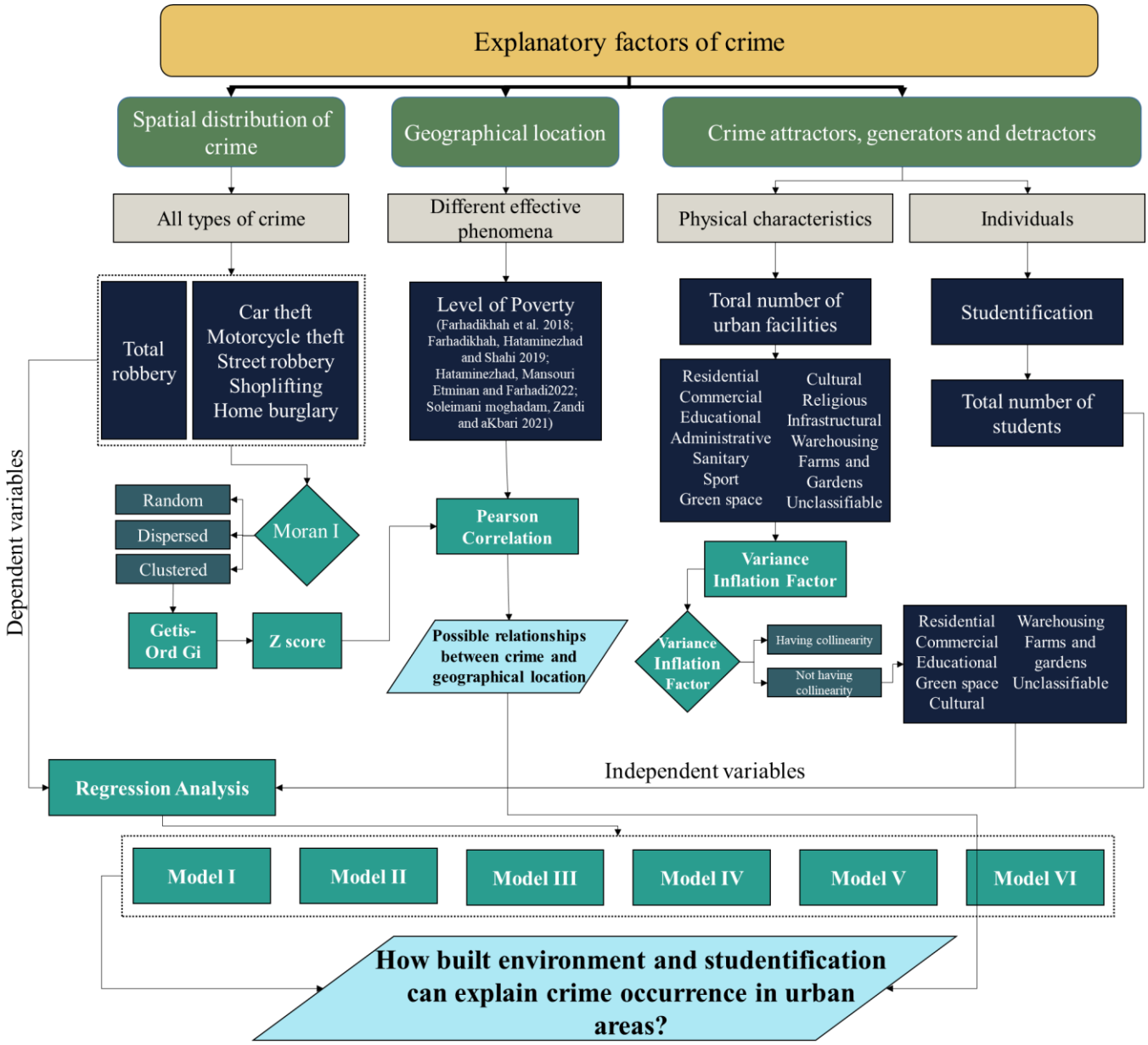



**Fig 3.** The Procedural Model of Studying the Influence of the Built environment and Studentification on Crime Occurrence in Urban Areas

## RESULTS

### *Spatial Distribution of Robbery and its Types in Mashhad*

According to CPSD, a total of 29,332 robberies occurred in Mashhad in 2018, with Shirazi and Khajerabie districts recording the lowest and highest numbers of robberies, respectively (Figure 4). As illustrated in Figure 5, the northern districts experienced the highest overall robbery rates. Among the different types of robbery, home burglary, car theft, and street robbery were the most frequent in 2018.

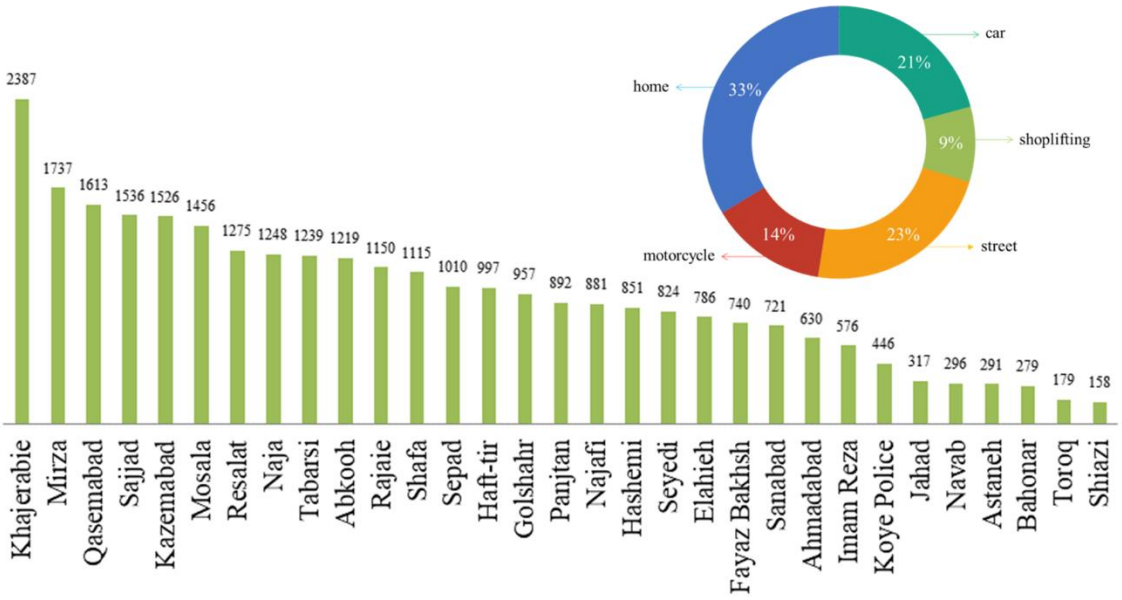



**Fig 4.** Total Number of Five Selected Types of Robbery in Police Station Districts

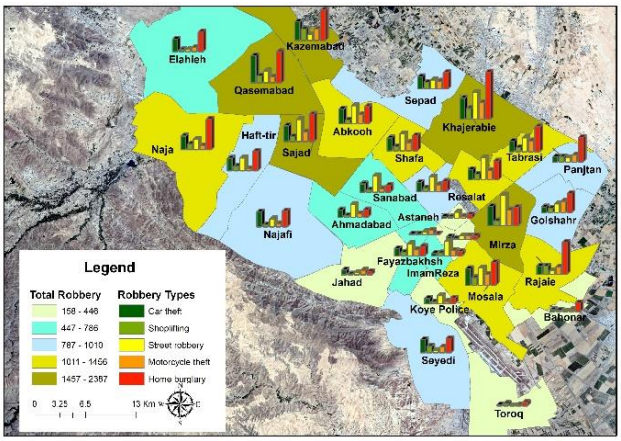



**Fig 5.** Number of Robberies and Their Types in Mashhad Police Station Districts

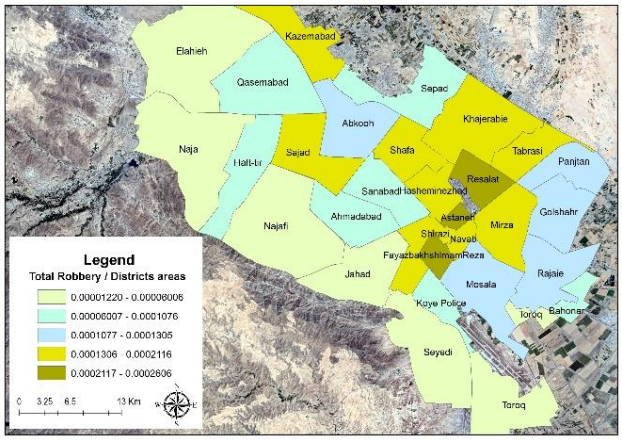



**Fig 6.** Number of Robberies in each District

As Figure 6 illustrates, accounting for district areas can influence the probability of a district attracting offenders. For example, Resalat, Astaneh, and Imam Reza districts are considered the most robbery-prone despite not having the highest raw number of robberies, which is why robbery data is normalized by area. Moran I indices further indicate that offences generally occur in geographically proximate districts.

The concentration of robberies in Mashhad can be classified into three main categories based on Moran I values. The first category includes total robbery, shoplifting, car theft, and home burglary, which exhibit the most clustered patterns. The Moran I value for total robbery is 0.3014 (p = 0.01), while the values for shoplifting, car theft, and home burglary—which constitute 8.87%, 21.1%, and 33.88% of total robberies, respectively—are 0.2583, 0.3387, and 0.3904 (p = 0.01). Home burglary, with the highest Moran I value, indicates that districts attracting home burglars are highly clustered.

The second category, motorcycle theft, which accounts for 13.57% of total robberies, has a Moran I value of 0.1847 (p = 0.05), showing less clustering. The third category, street robbery, representing 22.58% of total robberies, follows a random spatial pattern with a Moran I value of 0.068 (p = 0.28).

Consequently, all types of robbery, except street robbery, exhibit a tendency to cluster, with motorcycle theft being less clustered than the others. Therefore, crime-prone districts are primarily located adjacent to one another. Positive Z-scores further support the clustering patterns of robbery in Mashhad. In the next step, a Hotspot analysis is conducted, with results for the clustered variables presented in Figure 7.

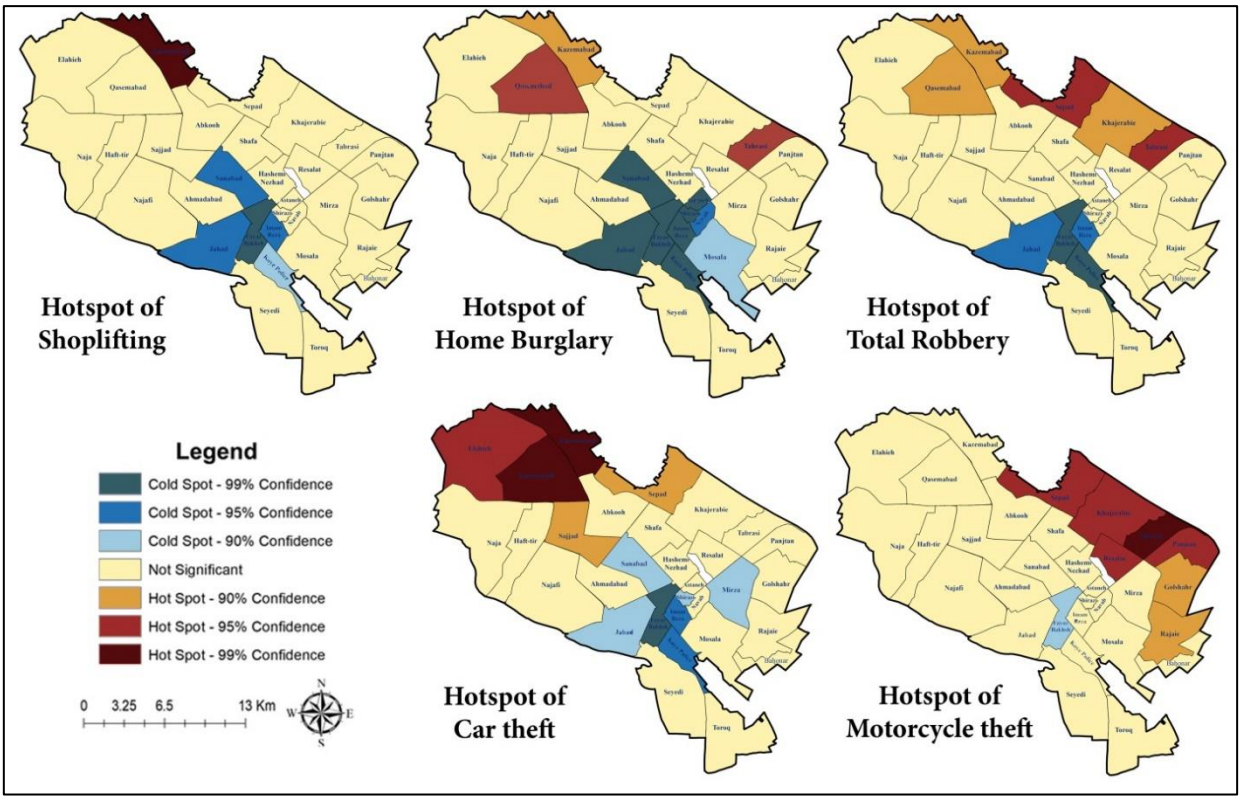



**Fig 7.** Robbery-prone districts in Mashhad City

As Figure 7 indicates, in general, northern districts are more prone to robbery and its types and southern ones have the least concentration of crime. Hotspot analysis also suggests that separated Hotspots or Coldspots could hardly ever be found. Considering hotspot maps, it is stated that Kazemabad, Qasemabad, Sepad, and Tabrasi are the most crime-prone police station districts in Mashhad. However, Fayazbakhsh, Koye police, Jahad, and ImamReza are the least crime-prone districts. Crime-prone districts are usually newly-built parts of the city, which can be divided into planned and unplanned developments. Northern districts, especially those located next to the Northern border of the city are mostly inhabited by (im)migrants and lower-income families. These are places where marginalization and spontaneous growth are common. In contrast, Qasemabad is one of the newly built and planned districts of Mashhad whose higher rate of crime could be explained by residents' dependency on private cars, lower social cohesion as well as anonymity (Ghazaie et al., 2018; Lotfi & Ghazaie, 2019). Car theft is the only type of robbery in which its occurrence is more concentrated in districts like Elahieh and Sajad usually inhabited by higher incomes.

Furthermore, the results of the Pearson Correlation indicate that there is a significant relationship between crime and geographical location. Analysis indicates a relatively positive correlation (R=0.356, Sig=0.05) between poverty and total crime, which means that poverty could predispose the urban environment to be prone to crime. A relatively positive correlation between home burglary (R=0.395, Sig=0.028), and strong positive correlations between motorcycle theft (R=0.543, Sig=0.002) and shoplifting (R=0.591, Sig=0) and poverty are also suggested. Hence, shoplifting and Motorcycle theft are consequently more common in more impoverished districts. Besides, since shoplifting, as a kind of petty robbery and/or pilfering usually committed by addicts, has the greatest correlation with poverty, which is more concentrated in northern parts of the city where drug addicts are also frequent, it can be claimed that shoplifting has more to do with meeting basic needs. On the other hand, there is no significant correlation between poverty and car theft (R=0.075, Sig=0.687). Consequently, stealing cars is not necessarily related to geographical location and/or poverty and compared to shoplifting, which seems to be related to individuals' needs, has more to do with rational offenders who consider merits and demerits before committing a crime and their action has less to do with being poor or not.

### *Robbery Generators, Attractors, and Detractors*

Here, an attempt is made to find crime attractors, generators, and detractors and see if studentification

could affect crime occurrence. Based on the VIF's values, administrative, sanitary, sports, infrastructural, and religious facilities were removed owing to their high collinearity with other facilities. Table 1 gives information about the descriptive statistics of either of the remaining facilities and Figure 8 illustrates their Kernel density as well as the number of students in each district.

**Table 1.** Descriptive Statistics of Mashhad's Urban Facilities in 2016

| Urban facilities | Number | Percentage | Area (h) | Percentage |
|---|---|---|---|---|
| Residential | 451932 | 78.3 | 7508 | 33.6 |
| Commercial | 54788 | 9.5 | 609 | 2.7 |
| Educational | 2417 | 0.4 | 1277 | 5.7 |
| Green space | 1011 | 0.2 | 1048 | 4.7 |
| Cultural | 219 | 0.04 | 23 | 0.1 |
| Warehousing | 2201 | 0.4 | 315 | 1.4 |
| Farm and Gardens | 1284 | 0.2 | 4666 | 20.9 |
| Unclassifiable | 42378 | 7.3 | 4790 | 21.5 |
| Other facilities | 20763 | 3.6 | 2091 | 9.4 |
| Total | 576993 | 100 | 22327 | 100 |

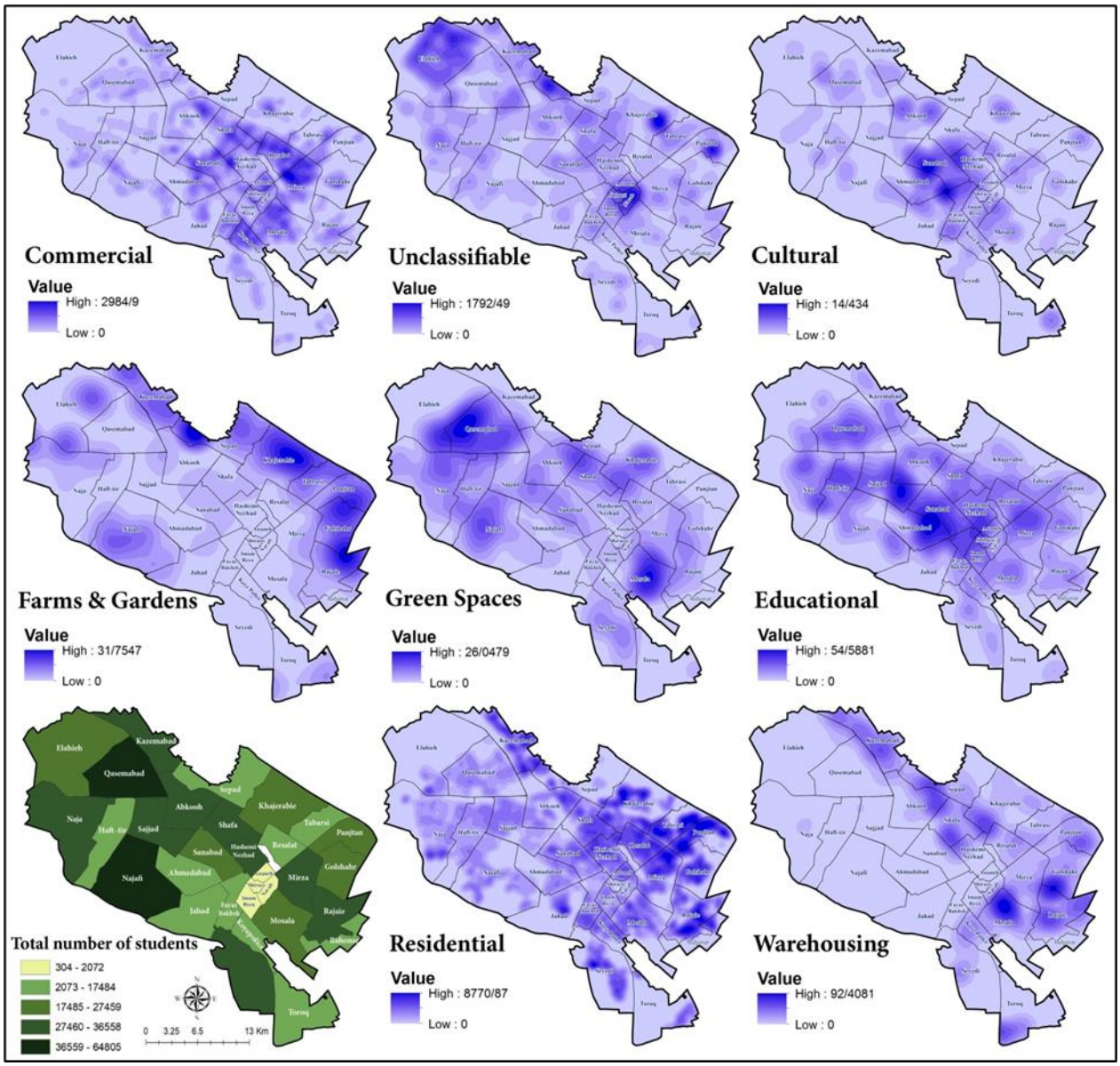


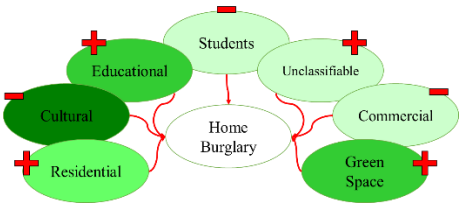

**Fig 8.** Urban Facilities' Kernel Density, and the Number of Students in each District

As Figure 8 shows, commercial, educational, cultural, and unclassifiable facilities are concentrated in the city center, whereas farms, gardens, and residential facilities are more prevalent in the northeastern districts. A regression analysis is conducted to examine the causal relationships and determine how these variables influence robbery and its types (Table 2).

**Table 2.** Exploratory Variables of Robbery and its Types

| Model | Variable type | Variable name | Coefficient | Probability | $R^2$ | Adjusted $R^2$ | N |
|---|---|---|---|---|---|---|---|
| Model I | Dependent variable | Total Robbery | | 0.00 | 0.906 | 0.866 | 31 |
| | Independent variables | Constant | 85.197 | 0.327 | | | |
| | | Residential* | 0.034 | 0.001 | | | |
| | | Commercial* | 0.093 | 0.011 | | | |
| | | Educational* | 4.228 | 0.00 | | | |
| | | Green space* | 3.354 | 0.006 | | | |
| | | Cultural* | -17.332 | 0.003 | | | |
| | | Warehousing | -0.479 | 0.485 | | | |
| | | Farms and gardens* | 2.625 | 0.013 | | | |
| | | Unclassifiable | 0.029 | 0.26 | | | |
| | | Students* | -0.011 | 0.031 | | | |
| Model II | Dependent variable | Car theft | | 0.00 | 0.842 | 0.775 | 31 |
| | Independent variables | Constant | 8.663 | 0.748 | | | |
| | | Residential | 0.002 | 0.454 | | | |
| | | Commercial* | 0.023 | 0.037 | | | |
| | | Educational* | 0.741 | 0.032 | | | |
| | | Green space* | 1.151 | 0.003 | | | |
| | | Cultural | -2.824 | 0.091 | | | |
| | | Warehousing | -0.078 | 0.717 | | | |
| | | Farms and gardens | 0.492 | 0.113 | | | |
| | | Unclassifiable | 0.009 | 0.262 | | | |
| | | Students | 0.001 | 0.60 | | | |
| Model III | Dependent variable | Shoplifting | | 0.00 | 0.812 | 0.732 | 31 |
| | Independent variables | Constant | 19.958 | 0.124 | | | |
| | | Residential* | 0.003 | 0.017 | | | |
| | | Commercial | -0.002 | 0.665 | | | |
| | | Educational | 0.216 | 0.167 | | | |
| | | Green space | 0.311 | 0.06 | | | |
| | | Cultural | -1.013 | 0.189 | | | |
| | | Warehousing* | 0.222 | 0.036 | | | |
| | | Farms and gardens | 0.152 | 0.286 | | | |
| | | Unclassifiable | -0.0003 | 0.917 | | | |
| | | Students | -0.001 | 0.151 | | | |
| Model IV | Dependent variable | Street Robbery | | 0.00 | 0.797 | 0.71 | 31 |
| | Independent variables | Constant | 24.07 | 0.517 | | | |
| | | Residential | 0.005 | 0.221 | | | |
| | | Commercial* | 0.071 | 0.00 | | | |
| | | Educational* | 1.651 | 0.001 | | | |
| | | Green space | 0.326 | 0.495 | | | |
| | | Cultural* | -4.836 | 0.038 | | | |
| | | Warehousing* | -0.611 | 0.047 | | | |
| | | Farms and gardens | 0.812 | 0.06 | | | |
| | | Unclassifiable | -0.002 | 0.841 | | | |
| | | Students* | -0.005 | 0.035 | | | |
| Model V | Dependent variable | Motorcycle theft | | 0.00 | 0.761 | 0.659 | 31 |
| | Independent variables | Constant | 34.648 | 0.1 | | | |
| | | Residential | 0.004 | 0.06 | | | |
| | | Commercial* | 0.024 | 0.006 | | | |
| | | Educational | 0.3 | 0.233 | | | |
| | | Green space | 0.173 | 0.512 | | | |

| Model | Variable type | Variable name | Coefficient | Probability | $R^2$ | Adjusted $R^2$ | N |
|---|---|---|---|---|---|---|---|
| Model VI | | Cultural | -2.341 | 0.06 | | | |
| | | Warehousing | -0.081 | 0.62 | | | |
| | | Farms and gardens* | 0.575 | 0.019 | | | |
| | | Unclassifiable | -0.001 | 0.917 | | | |
| | | Students | -0.002 | 0.137 | | | |
| | Dependent variable | Home burglary | | 0.00 | 0.941 | 0.915 | 31 |
| | Independent variables | Constant | -2.142 | 0.939 | | | |
| | | Residential* | 0.2 | 0.00 | | | |
| | | Commercial* | -0.024 | 0.043 | | | |
| | | Educational* | 1.32 | 0.001 | | | |
| | | Green space* | 1.393 | 0.001 | | | |
| | | Cultural* | -6.318 | 0.001 | | | |
| | | Warehousing | 0.069 | 0.758 | | | |
| | | Farms and gardens | 0.529 | 0.104 | | | |
| | | Unclassifiable* | 0.023 | 0.01 | | | |
| | | Students* | -0.004 | 0.01 | | | |
| | * Significant at the 0.05 level. | | | | | | |




The R-Squared values in Table 2 indicate that a substantial proportion of the variance in the dependent variables is explained by the independent variables, suggesting that the provided models effectively account for crime occurrence in the city. According to the first model, cultural facilities play a significant role in reducing robbery rates across Mashhad's police station districts. Likewise, higher student density appears to decrease crime. Conversely, farms and gardens, green spaces, educational, residential, and commercial facilities are associated with increased robbery occurrences. Specifically, car theft is positively influenced by green spaces, educational, and commercial facilities. Shoplifting is more prevalent in districts with higher concentrations of residential and warehousing facilities. Street robbery, which does not follow a clustered pattern, decreases in districts with more cultural facilities, students, and warehousing units, but increases with greater numbers of educational and commercial facilities. Motorcycle theft is more frequent in areas with abundant farms, gardens, and commercial facilities. Home burglary tends to be lower in districts with more students, cultural, and commercial facilities, while it rises in areas with higher numbers of educational, residential, unclassifiable facilities, and green spaces.

## DISCUSSION

Examining the occurrence and spatial distribution of robberies in Mashhad provides valuable insights for socio-physical planners, policymakers, and law enforcement officers, guiding them in developing effective strategies for crime prevention.

As Brantingham et al., (2017) suggested, action spaces for crimes are more overlapped with places where the poverty rate is higher (Tillyer et al., 2020; Fouladiyan & Rezaeebahrabad, 2019; Alimoheseni & Zoghdarmoghadam, 2018; Shahivandi et al., 2017; Bazargan et al., 2017). According to the twofold role of poverty in criminal acts level, and results provided in the previous section, it can be declared that in contrast to what Cook (1986) mentioned, poverty has not reduced opportunities in the Mashhad context. In fact, although beneficial opportunities may have diminished owing to the concentrated poverty, home burglary, motorcycle theft and shoplifting are increasing because of two primary reasons.

First, as Fouladiyan and Rezaeebahrabad (2019) suggest, individuals in these areas are more prone to commit a crime to meet their basic needs owing to their unemployment, illiteracy and low level of life satisfaction. Moreover, these areas are also where most of the addicts, who are responsible for most of the pilfering, are located. Second, as Larsson (2006) declares, these people are more exposed to robbery and more specifically property crime (home burglary and motorcycle theft) owing to their inability to lead a normal life and safeguard their properties. The great correlation between shoplifting and poverty is associated with the fact that robbery in Mashhad is usually for meeting families' basic needs and it has little to do with beneficial opportunities (Kimpton et al., 2016).

Therefore, according to routine activity theory (Felson, 2017) poor areas of the city are where motivated offenders such as addicts are frequent, interesting targets such as poor households, who cannot protect their goods, exist and there is a lack of guardian in the urban environment, which can be explained by low level of social sustainability in these areas (Mafi & Abdoulahzadeh, 2017). Consequently, the idea of rational offenders (Cornish & Clarke,

2017) as a general theme can be questioned in impoverished parts of Mashhad, where robbery has more to do with life necessities than weighing opportunities and harms. However, Car theft and street robbery spatial patterns suggest that their occurrence is not necessarily because of poverty, and car thieves and street robbers are more likely to be considered rationalists. For instance, the dispersed pattern of street robbery in Mashhad suggests that offenders try to find the most beneficial and the least risky targets in different parts of the city, so their spatial action can be as great as the city's area.

Considering routine activities and crime pattern theory, results also suggest that physical characteristics, activities, and capable guardians could affect crime occurrence (Felson, 2017). Physical characteristics are usually defined based on urban facilities, which affect guardians and activities as well. Crime generators, detractors and attractors are what this part of the study wanted to focus on. However, distinguishing crime generators and attractors in the Mashhad context seems challenging because crime generators such as bars and alcohol outlets (Tillyer et al., 2020; Livingston et al., 2014) are mainly forbidden in Mashhad owing to religious and cultural considerations regarded as two main forces for governing city relations. Other urban facilities studied in this context are not mainly facilities that are in close connection with offenders, so they can barely be introduced as crime generators.

According to the results of Wilcox and Eck (2011), most of the facilities attract crime in Mashhad. Commercial facilities seem to be somehow the most significant robbery attractors for all types of robbery except home burglary (Bernasco & Block, 2011; Meshkini et al., 2016; Mohamadi et al., 2017). Not only commercial facilities could act as interesting targets but they are also capable of attracting all walks of life. They usually seem to be located next to main streets (Figure 8) mobbed by passersby, shops, and cars, where motivated offenders, potential victims and lack of guardians exist (Mafi & Abdoulahzadeh, 2017). In contrast, they can act as a crime detractor for home burglary because shoplifting seems to be less risky and more interesting than home burglary. Residential units also play the role of a crime attractor for robbery (Sypion-Dutkowska & Leitner, 2017) and are a strong exploratory variable for predicting crime-prone areas (Meshkini et al., 2016; Mohamadi et al., 2017). Residential units are interesting targets for home burglars and that is why home burglary constitutes almost one-third of the five studied types of robbery in Mashhad. Moreover, as Figure 8 suggests, there is an overlap between residential and commercial facilities. It means that they are located adjacent. This adjacency, as well as the fact that robbery, has to do with poverty elucidate why residential units play the role of a crime attractor for shoplifting.

Green spaces and educational facilities can also act as robbery attractors owing to the close and daily relationships of individuals with them (Zhang et al., 2021), although Branas et al., (2011) and Zamiri and Sharifi Noghabi (2021), in their studies in American and Iranian contexts, stated that green areas reduce crime rates (Shepley et al., 2019; Wolfe & Mennis 2012). Alizadeh and Anbari (2017) in their study in Mashhad indicated that parks, as one of the main green spaces, include defenseless spaces as well as social anomalies, which lessen security and boost criminal acts. Farms and gardens usually located in cities' peripheries (Figure 8) also act as crime attractors because they play the role of second houses, and are not permanently inhabited by their owners. According to a study carried out by Izadi and Solhjoo (2018) in Mashhad, 35.6 and 31.6 percent of these second houses are mainly used 51 to 75 and 76 to 100 days per year, respectively. Consequently, the lack of guardians owing to the emptiness and homogeneity in terms of land-use (Taghvaee et al., 2011) provides great opportunities for offenders. These facilities could also act as crime generators because they are located in places where less social sustainability and fewer guardians exist (Mafi & Abdoulahzadeh, 2017). Warehousing also follows the same pattern of farms and gardens and that is why they act as crime attractors. However, they act as street robbery's detractors since they are mainly located in cities' peripheries and close to main roads and cities' entrances (Figure 8). Therefore, there are fewer individuals on the streets and the rate of street robbery is also lower.

On the other hand, in contrast to Sypion-Dutkowska and Leitner (2017) and along with Sajadyan et al., (2015), regression analysis indicated that cultural facilities lessen the number of total robberies, street robberies and home burglaries. Since their coefficients are much greater than the corresponding numbers for other urban facilities, it can be declared that their role in deterring robberies and criminal acts is quite significant. Moarrab et al., (2018), in the Iranian context, suggest that cultural facilities and centers can improve social capital, so they are quite effective in improving social resiliency and lessening social vulnerability and ignoring them can cause more aggressive behavior, delinquency and crime (Ebadinezhad et al., 2009). Sajadyan et al., (2015) also explain that there should be a sensible relation between cultural facilities and population density; otherwise, criminal acts will increase.

Reviewing Mashhad's developmental plans suggests that although addressing cultural facilities' shortages has been taken into account, they have not been redistributed evenly (Figure 8) and policies that predispose these settings to make them places for social encounters have been neglected (Ghazaie et al., 2021a). The disequilibrium in the distribution of cultural facilities in Mashhad and the lack of them in Northern districts, along with concentrated poverty, have deteriorated the situation and consequently caused more criminal acts in these areas.

Moreover, in favor of Cullen and Levitt (1999) and Kim (2020), and in contrast with Barberet et al., (2004) and Allinson (2006), students also act as crime detractors in Mashhad's districts. An inquiry that might arise is why educational facilities attract robberies, and students, as those who use these facilities are crime deterrents. In response, it should be said that the variable of educational facilities refers to the places where students study while the variable of the total number of students refers to their places of living. Besides, Mashhad's educational facilities are usually located next to commercial facilities and green spaces, which also act as crime attractors. It means that the existence of students in urban environments, their daily commutes from home to schools and universities, and their cultural expressiveness could decrease the potential of crime occurrence in the city and affect residents' attitudes and behaviors (Kenna, 2011; Hubbard, 2008; Fabua et al., 2017). According to what Andell et al., (2002) coined, it can be stated that students in Mashhad are taking part in student-led crime prevention unconsciously.

Consequently, culturally related facilities and studentification can act as crime detractors, reducing total robbery as well as street robbery and home burglary. Therefore, a culture-led crime prevention strategy could serve as an effective approach for Mashhad and similar urban contexts to mitigate crime. Such a strategy, on one hand, emphasizes planning, locating, and redistributing cultural facilities across the city—particularly in districts with higher crime rates and a concentration of crime attractors. These cultural facilities can create secure action spaces that prevent crime both objectively and subjectively. On the other hand, the strategy can leverage the cultural influence of students and pupils, relying on their presence in urban environments to reduce crime. Although the students' impact on crime appears largely spontaneous rather than policy-driven, equipping them with the necessary knowledge and skills and raising awareness of their potential role could enhance their effectiveness in mitigating criminal activity.

## CONCLUSION

The current study, by investigating the spatial distribution of different types of robbery and analyzing their relationships with urban facilities and one of Mashhad's most dominant social groups—students—demonstrated how studentification and the urban environment influence robbery patterns. Findings revealed that shoplifting, motorcycle theft, car theft, and home burglary follow a clustered pattern, whereas street robbery displays a random spatial distribution. This suggests that robberies and offenders tend to concentrate in specific parts of the city, often coinciding with areas of poverty and marginalization. Robbery in Mashhad does not necessarily appear to be an organized crime but often emerges from basic life necessities. However, the spatial distribution of street robbery and car theft points toward rational offender theory, given their weak correlation with poverty.

The analysis identified residential, commercial, educational, green spaces, farms and gardens, and warehousing as **crime-attracting facilities**, while cultural facilities and students acted as **crime-detracting factors**. These results highlight the potential of a **culture-led crime prevention strategy** grounded in environmental and behaviorist perspectives as a viable pathway for urban crime prevention.

The following recommendations are proposed as policy takeaways for a culture-led approach to crime prevention:

- **Integrating cultural priorities** into urban development plans, treating cultural concerns as a core principle of planning.
- **Ensuring both social and physical interventions**, particularly by constructing cultural facilities that enhance opportunities for social encounters.
- **Providing government financial support** for cultural facility development in low-income districts, where private investment is less attractive.
- **Redistributing cultural facilities and services equitably** across the city, both qualitatively and quantitatively.
- **Prioritizing cultural infrastructure and events** in crime hotspots, including libraries, cinemas, galleries, cultural centers, theaters, and community halls.
- **Enhancing cultural programs for students**, empowering them as "cultural ambassadors" who are aware of their critical role in crime prevention.

• **Developing comprehensive cultural plans** that explicitly recognize students' presence and behavior as a significant mitigating factor in reducing crime rates.

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