Geospatial Analysis of Crime Patterns in Kelaniya Police Division Sri Lanka

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Abstract

This research explores with depth to the Kelaniya Police Division's Crime Pattern and Hotspots using a Geographic Information Systems approach. This study identifies the major contributing elements that influence crimes, as well as analyzes spatial and temporal trends, highlighting hotspots needing special intervention. This integrates both primary and secondary data on crime records, population density, road networks, land use, and socio-economic variables in one comprehensive review of the crime dynamics in the region. Advanced GIS methodologies, such as Kernel Density Estimation and Ordinary Least Squares (OLS) regression, were employed to reveal significant crime hotspots that are located in high-population and commercially active zones. Temporal analyses show that the crimes have a peak period of time, underpinning the relationship between the spatial and temporal factors. Some major contributors to the spread of crimes are inadequate urban design, poor lighting, and lack of surveillance, which together facilitate conditions that enhance criminal activities. The findings highlight targeted interventions as critically needed. Specially areas like Peliyagoda, Wattala, Kelaniya town areas show a significant growth in most of the crime activities overall years and higher level of crime density. Crime mitigation suggested by the study include enhanced urban planning to guarantee clear sightlines and regulated access to vulnerable areas, alongside community-driven initiatives put in place to encourage vigilance and local ownership. Using GIS-based analytical tools, this research provides evidence-based crime database that can be used by law enforcement agencies in resource optimization and implementing evidence-based crime prevention. This will, in turn, contribute to the broader objective of fostering safer and more secure communities within the Kelaniya Police Division and use other police divisions in the country.

Keywords: crime analysis, Geographic Information Systems (GIS), crime hotspots, spatial patterns, temporal trends, crime prevention strategies