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Canada

Crime Analytics: Research and Development

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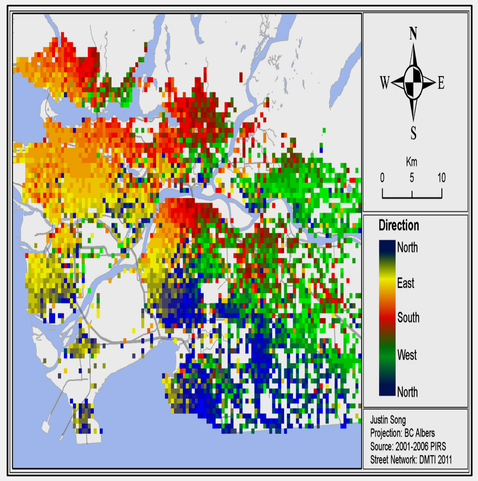
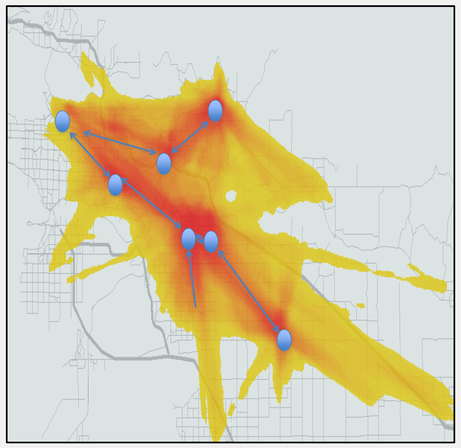
CRIME RIDGES

The following presents a new approach for analyzing crime patterns that merges the concepts of crime attractors and the pull of certain locations on offender movement. This directionality, inherent to city infrastructure, underlies the decision processes of offenders when choosing movement paths towards attractors. We explore the aggregate movement patterns of offenders within six municipalities of metropolitan Vancouver, British Columbia. In particular, this research focuses on the relationship between multiple strong crime attractors, offender movement and the formation of crime ridges. This new visualization technique shows how the flow of offenders towards crime attractors creates associated crime ridges connecting the crime attractors. Future research will look at other metropolitan regions that have different urban configurations and dynamics. This research will also integrate vector-based simulation modeling and agent-based modeling.



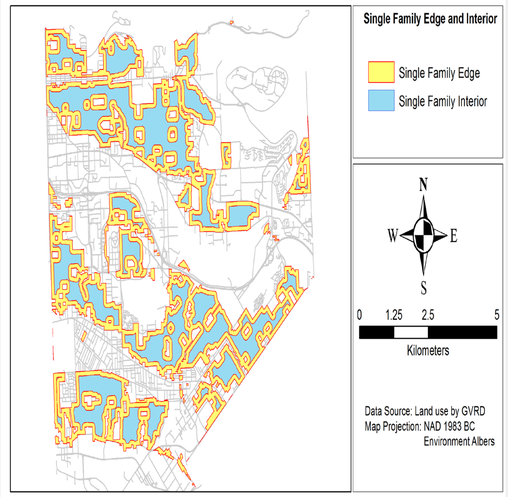
This figure displays aggregate offender movement from residence to crime location within Metro Vancouver. Colours are used to illustrate directionality with blue showing a predominant northern movement, red southern, green western and yellow eastern.

Offender directionality can be converted into directional vectors to display aggregate offender movement in a metro area. The blue dots represent city centres throughout Metro Vancouver and displays aggregate offender movement.



THE EDGE EFFECT

Pattern Theory offers a theoretical framework for a micro-level explanation of the dynamics of crime in an urban environment. This research focuses on the novel use of the concept of boundaries or edges to analyze micro-level differences in crime, in various urban neighborhoods. Edges are identified where there is dissimilarity between adjacent areas. Crime is more likely to occur along edges. Edges can be physical, social, temporal and economical or a combination of these dimensions. This study compares crime data from the Municipality of Burnaby in British Columbia, Canada, with patterns in land use data. Single family residential neighborhoods are constructed by joining adjacently-zoned single family areas. The edges of these neighborhoods are areas where the single family zoning changes to commercial, parks and higher density residential zoning The results find crime is sixty four percent higher at these edges than in the interior of the neighborhoods. Future research will concentrate on delving further into these edges to discover the intricacies of the edge effect. Furthermore, this finding will be tested using crime information from other jurisdictions to verify consistency in the edge effect.



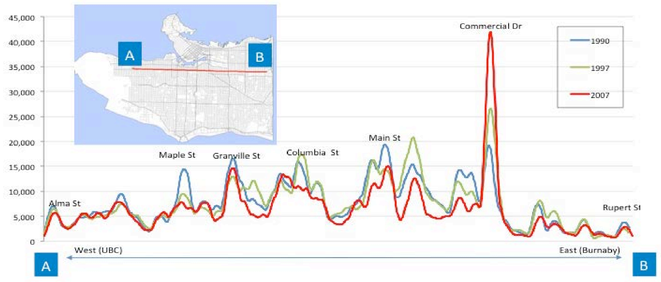
Edges are created by parceling out residential areas where there are single family dwellings from adjacent areas that have different zoning. The single family edges are the locations where crime is more prevalent and the desistance is very rapid with crime decreasing by 64% within 30 meters from the edge. These results can have a significant impact on crime reduction strategies as the edge effect helps to specifically locate where crime is optimal.

Crime density varies according to the type of land use adjacent to the edge. The following table compares and contrasts edges with various types of land use.

Edge	Dwellings	Crime Count	Crime Density
Edge – Commercial	3,410	5,676	1.66
Edge – Multiple Family	5,010	7,885	1.57
Edge – Institutional	5,197	8,464	1.63
Edge – Natural Areas	6,215	8,492	1.37
Edge – Industrial	1,199	2,485	2.07
Edge – Utility	1,016	1,716	1.69

CRIME CORRIDORS

The transit station located at Broadway Avenue and Commercial Drive in Vancouver is currently the largest mass transportation hub in western Canada. The transit station and the services at this location have grown significantly from 1990 to 2007. This overall growth represents a 58.7% increase in ridership on the system from 2000 to 2008. From a perceptual perspective, the station is located on a highly pedestrian-oriented street. However, the access to this pedestrian street from the transit station is bisected by a deep ravine called the Grandview cut and part of the station is located deep within this ravine. The perceptual break that is caused by this physical edge dissociates the transit station from what is considered a very cohesive and social neighbourhood. This isolation of the station within the urban domain coupled with ridership growth creates temporal crime dynamics across the Broadway corridor. The following diagram displays the horizontal impact of such growth on a street scape.



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