

City harnesses big data to study crime

Advanced analytics tool spots trends

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Social workers and neighbourhood police officers hope a new data tool will clarify the characteristics in each neighbourhood that are inviting property or violent crime.

The new interactive dashboard, based on 233 potential factors, uses advanced computer analytics to drill down to a level roughly the size of a city block.

Now the downtown Neighbourhood Empowerment Team, a crime-prevention unit composed of police beat officers and social and youth workers, will test the data in a year-long pilot project starting in January.

"I think it fundamentally shifts the way we look at crime. It's not about bad people," said Kris Andreychuk, who supervises the crime prevention teams. "It's a conversation changer."

Andreychuk and Stephane Contre, the city's senior information architect, started eight months ago with a literature review that found 18 factors thought to cause crime, including "rowdy teenagers." They pulled in experts from the University of Alberta, MacEwan University and the Edmonton Police to expand the list with factors such as begging, trauancy, alleys, pawnshops and body-rub centres.

Using that as a guide, they found 233 geographically based data sets — among



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Edmonton's senior information architect Stephane Contre, left, and Kris Andreychuk, who supervises the Neighbourhood Empowerment Teams, have worked together to map and analyze sometimes-surprising factors related to crime.

them, city light poles, noise complaints, school sites, picnic sites, front yards in bloom awards, retirees, vacant buildings — from sources that included Statistics Canada, police, 311, the Yellowpages and other city departments.

To analyze the data, they used a base layer of crime statistics, and then used a computer program to systematically attempt to match the crime statistics with all of the other data sets, on their own and in combination, to see which ones could be statistically correlated to high or low crime.

That generated 92 rule sets that predict the presence of

crime. But it's still pretty high-level stuff.

It turned out, nothing is significant enough to be a predictor of crime on its own.

But, for example, rule set 43 says that 100 per cent of the time you can find a high incidence of property crime in those areas where you find:

- a high number of recovered stolen vehicles,
- plus a high number of noise complaints,
- plus a high concentration of youth services,
- combined with a low concentration of picnic sites/fire pits.

"I would have never

thought that picnic sites have skin in the game," said Andreychuk.

There's a lot of work to be done before anyone fully understands what each of these rule sets means, whether stolen vehicles are important on their own or if they simply signify an area where neighbours don't know each other.

But it's a neat improvement over acting only on the basis of where crimes have happened in the past, Andreychuk said. It will be a starting point for a long conversation with members of the community where the crime is occurring.

This type of analytics is

modelling" that takes maps of several factors known to increase crime and layers them on top of each other.

Based on factors such as the presence of bars, it predicts where crime and where specific crimes are most likely to occur, even if it has not yet happened there yet.

Contre and Andreychuk's project moves in the same direction but also includes positive factors show to decrease crime.

"Really cool stuff. It's really thought-provoking and stimulating," Veitch said. "It's what's happening behind the dots. Why are some communities always chronic?"

The crime tool is one of several Contre's team is working on for the City of Edmonton.

With their developing capacity in analytics, they worked with city security to find patterns in the number of false alarms they get every day. The computer program has led them to identify specific security guards failing to close a door properly, for example, and its reduced the number of human-induced false alarms by 50 per cent last year.

They had another project to analyze poverty data to see where Green Shack dollars would be best spent. They hope to work with Edmonton's fleet services to bring this approach to vehicle maintenance, and help with the mayor's task force on the elimination of poverty.

City council approved two more full-time positions for their five-member team in the 2015 operating budget.

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at the forefront of new policing models, said Supt. David Veitch, head of the co-ordinated policy division, which includes several units considering new risk-based approaches.

"Math and crime are closely associated today," Veitch said. In Edmonton, police have seen good results with a heat map approach, mapping crime in almost real time and increasing their presence where problem-spots appear.

But in the United States, police are starting to incorporate predictive police models. Rutgers University in New Jersey developed a system called "risk terrain