LEVERAGING BIG DATA TO DETECT AMENITY GAPS TO IMPROVE PUBLIC SAFETY

Date: November 25, 2020

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KEY EVENTS

On November 25, 2020, UrbanLogiq Data Scientist & Engineer Duong Vu presented *Leveraging Big Data to Detect Amenity Gaps to Improve Public Safety* at the 2020 CASIS West Coast Security Conference. The presentation was followed by a question-and-answer period with other speakers. The key points of discussion focused on how information obtained from identifying and analysing amenity gaps can be utilized to improve public safety.

NATURE OF DISCUSSION

Ms. Vu centered her presentation on examples of how the fact that some groups in society have unequal access to infrastructure necessary to their essential needs (amenities) can impact public safety. The essential role of big data as a source of contextual information in the amenity gaps analysis was highlighted.

BACKGROUND

From a public safety point of view, detecting amenity gaps might be utilized in a preventative manner to make a society safer. Amenity gaps can be defined as different groups of people having unequal access to amenities — services or infrastructure necessary to fulfil someone's essential needs, e.g. primary health care centre, fire station, police station, parks, etc. These amenity gaps can be one of two forms: either a shortage of amenities or the existence of amenities that do not meet the needs of local residents.

Duong Vu outlined a few examples of how the analysis of amenity gaps can be used to improve public safety:

- Analyzing the relationship between the location of emergency rooms and dangerous intersections or areas of high-volume traffic where it is more likely that a crash could happen. Such data shows that the longer it takes for an ambulance to take a victim to an emergency room, the higher the fatality rate.

- Analyzing the relationship between community-based/recreational facilities and young delinquency or juvenile recidivism to develop social programs or build/improve community centres. According to research using algorithms from Harvard Kennedy School and the U.S. National Institute, youth provided with high-quality/high-expectation programs and early work experience will be more likely to get back on track and move forward on the school-to-work pathway (McCarthy et al., 2016).

- Analyzing the relationship between employment and the exploitation of youth by extremist groups to develop counter violent extremism programs. In a United Nations Development Programme survey, 13% of respondents who had joined a violent extremist group in Africa reported doing so for employment opportunities (UNDP Regional Bureau for Africa, 2017). Data also shows that insufficient employment opportunities and the inability to pay high school fees have been exploited by al-Shabaab recruiters (UNDP Regional Bureau for Africa, 2017).

According to Duong Vu, an essential source for analyzing amenity gaps is big data that can be obtained from many different sources, and the most commonly used one is open source intelligence data (OSINT), which provides contextual information that most amenity gaps projects will need. The speaker listed the following OSINT data as the ones often used in projects conducted by UrbanLogiq:

- zoning
- average age
- average income
- speed limit in a given area
- number of bus stops
- number of bike lane
- building footprints
- population density
- mobility data - movement patterns collected via mobile phone or vehicle sensor
- school hours
- family counselling
- location of emergency shelters
- health statistics
- juvenile recidivism rates
- historical crash data
- emergency data

There are two steps to detect amenity gaps: a) to identify at-risk communities, which translates into a community's need for an attainable amenity — e.g. a large population of children between the age of 5 and 18 is a risk factor that may indicate the need for additional public school facilities; and b) to measure access to amenities, which can be obtained by collecting movement data — e.g. the closest amenity is just a few minutes away, but residents seem to be travelling farther to a different healthcare facility, either because the closer one is too crowded or the farther is perceived to be better.

KEY POINTS OF DISCUSSION

- An amenity gap is identified by the shortage of amenities where they are needed, or by the existence of amenities that do not meet the needs of local residents.
- Movement data combined with contextual data could potentially provide helpful information to detect amenity gaps.
- Detecting amenity gaps might aid in drafting long-term policies and solutions that could be used to improve public safety in the community.

References

McCarthy, P., Schiraldi, V., & Shark, M. (2016). *The future of youth justice: A community-based alternative to the youth prison model*. U.S. Department of Justice Office of Justice Programs National Institute of Justice.

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