

ITSoS- Pedestrian Intersection Safety Index

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Theme One: Urban Informatics for Transportation Operations, Planning and Decision-Making

Project Name: “iCity: Urban Informatics for Sustainable Metropolitan Growth”



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Pedestrian Activity in Toronto

Just like many North American Cities, Toronto is embracing the importance of active transportation...



Fosters Complete Community Living



increases health and Environment benefit

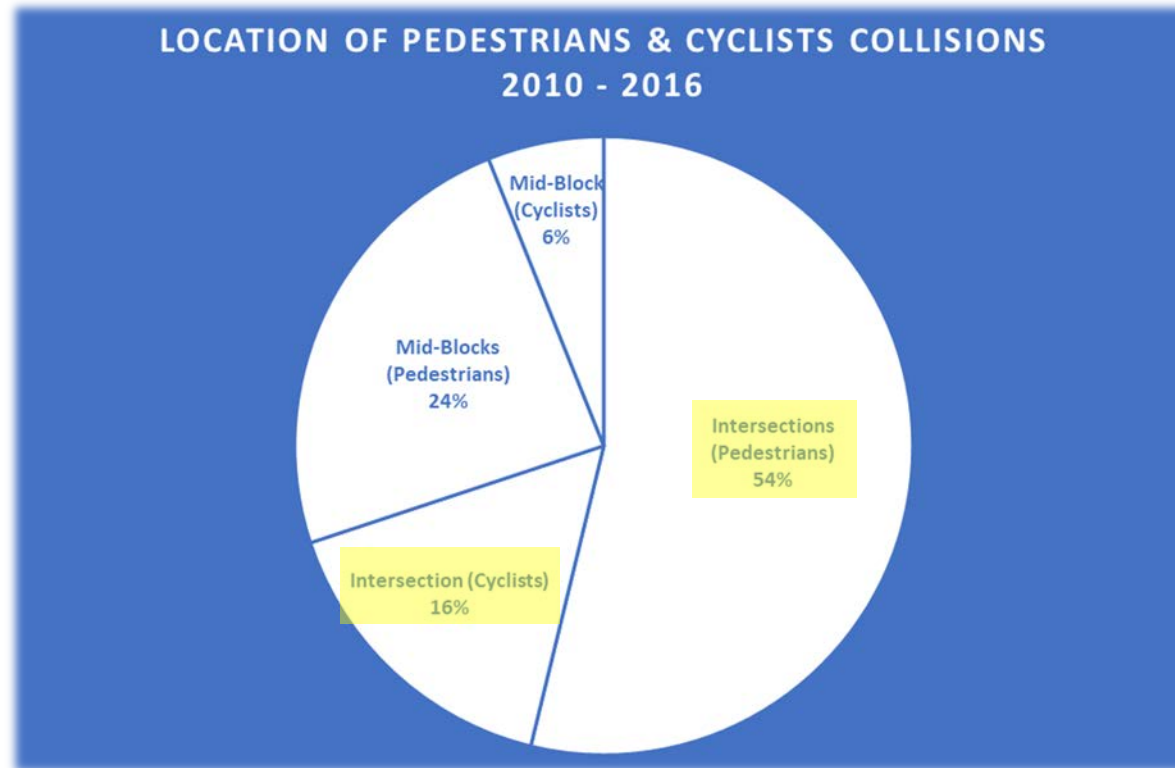


Reduces traffic congestions



Safety Concerning Pedestrians

According to **Police Data & TCAT**, majority of collisions between automobiles with pedestrians and cyclists occur on either high speed arterial streets, and at intersections.



Solutions to resolve

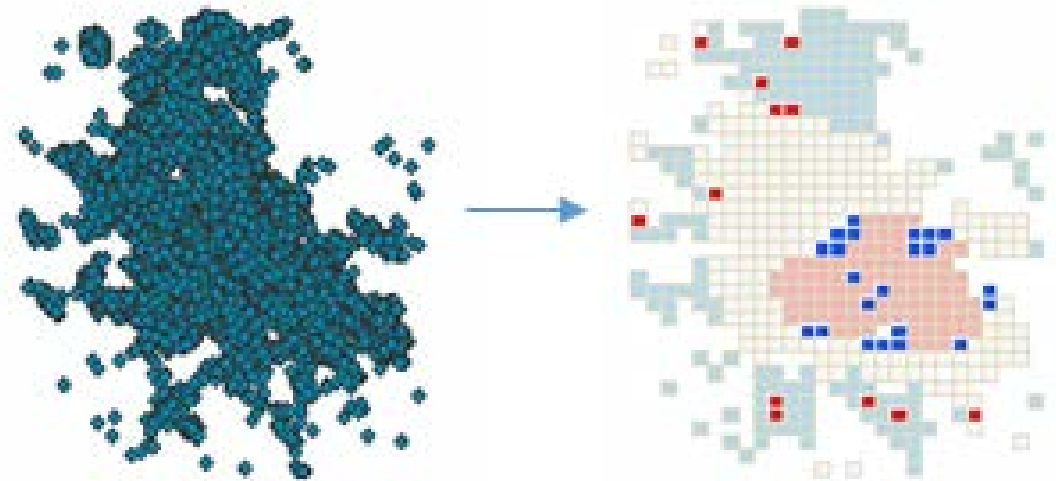
- Understand the “**where**”; predict the likelihood of accidents occurrences
- Identify areas that requires improvements
 - Streets that **separates** pedestrians, cyclists, vehicle, **slowing traffic down**
 - Cities that supports such redesign have the most success



GIS Spatial Analysis – Clustering & Outliers

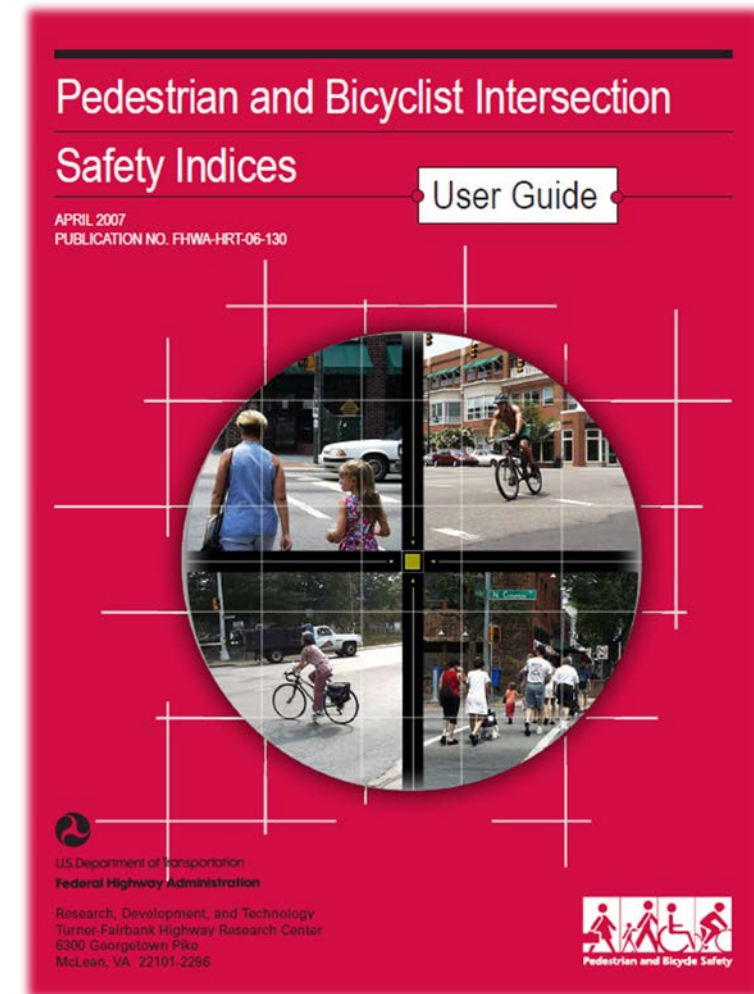
- Identifying **ALL** intersections with a safety score is possible, but it's time consuming
- GIS Spatial Analysis using **Clustering & Outliers** can help locate within the Cities' boundary of statistically significant areas that are prone to pedestrians collisions
- Local Moran's I statistic of spatial associations

$$I_i = \frac{x_i - \bar{X}}{S_i^2} \sum_{j=1, j \neq i}^n w_{i,j} (x_j - \bar{X})$$



Pedestrian Safety Intersection Index

- The **safety intersection index** is derived from a research by the U.S. Department of Transportation
- Uses a **variety of variables** to determine whether the intersection **requires attention or not**
 - AADT, number of Through lanes, street infrastructure presence etc.



Pedestrian Safety Intersection Index

Pedestrians Safety Index

$$\text{Ped ISI} = 2.372 - 1.867\text{SIGNAL} - 1.807\text{STOP} + 0.335\text{THURLNS} + 0.018\text{SPEED} + 0.006(\text{MAINADT} * \text{SIGNAL}) + 0.238\text{COMM}$$

Ped ISI	<i>Safety Index Value (pedestrian)</i>	
SIGNAL	Signal-controlled crossing	0=no 1=yes
STOP	Stop-sign controlled crossing	0=no 1=yes
THURLNS	Number of through lanes on street being crossed (both direction)	1,2,3,....
SPEED	85 th percentile speed of street being crossed	Speed in miles per hour
MAINADT	Main street traffic volume	AADT in thousands
COMM	Predominant land use on surrounding area is commercial development	0=not predominantly commercial area 1=predominantly commercial area



Pedestrian Safety Intersection Index

- **The index provides a value range between 1 to 6**
 - 1-2: Lowest Priority
 - 3-4: Medium Priority
 - 5-6: High Priority
- Overall, the Safety Intersection Index provides a good idea of which intersections **require attention**



Discussion...

