StepSafe

By: Alice Ip, Meijing Li, Robert Vardy, Indika Wijesundera
Group 05

The Problem

- Toronto's crime rate has increased
- Distinct high crime areas
- Current mapping software disregards unsafe areas
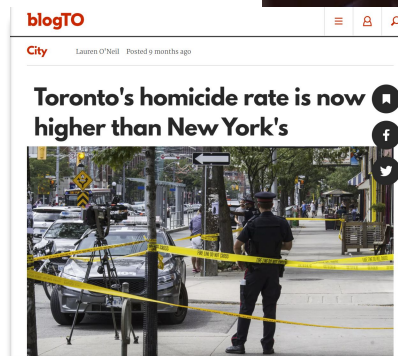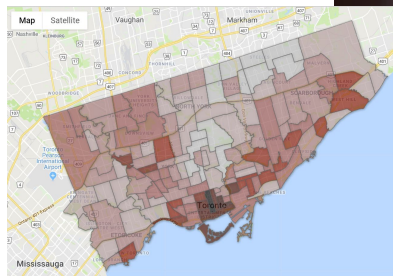
What can StepSafe do for you?

StepSafe avoids dangerous areas based on crime history

Provides efficient directions to get to your destination

Fast, reliable and easy to use system

Datasets

- Toronto Police Service MCI 2014-2018
- Major Crime Indicators (MCI)
    - Date
    - Location
    - Type of crime
- 167 525 Nodes
- http://data.torontopolice.on.ca/datasets/mci-2014-to-2018

Google Maps

- Accessed Through Python
- Used to Access
  - Alternative Routes
  - Intersection Locations
  - Navigation Instructions
- Used to Create Nodes and Edges for Our Graphing Algorithm

Specifications

- Functional: Takes input of a starting location and destination, and outputs directions between the two locations
- Non-functional:
    - **Usability:** Simple interface with detailed directions
    - **Reliability**: Utilizes google maps API to provide reliable directions
    - **Portability**: Designed as web app portable in all systems
    - **Efficiency:** Efficient algorithms to optimize response time
    - **Security:** User information kept secure and private

Design Specifications

- Crime Event ADT
- Intersection ADT
- Path ADT
- Input:
    - Origin location as addresses
    - Destination location as addresses
- Output:
    - Directions to travel from origin to destination
- Challenge:
    - Embed python scripts inside java class to
      interact with Google API

**Edge Weighted Directed graph**
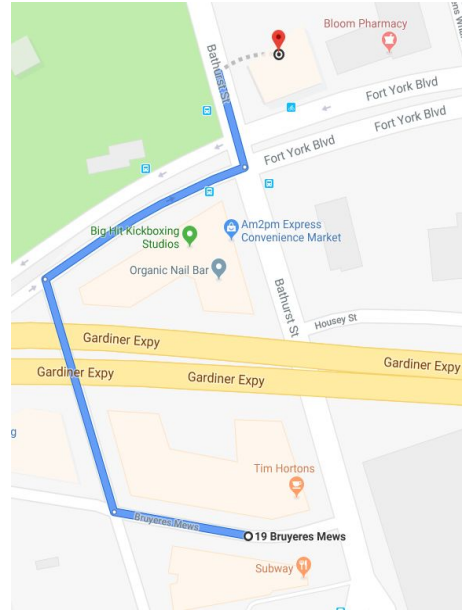
Dijkstra's Algorithm
Shortest Path

Quick Sort
Coordinates of Crime

Sequential Search
Crimes near route

Verification of Implementation

- Compare the output with other driving directions solutions
- Verify that the starting and ending location are consistent with the users requests
- Ensure that unsafe areas are avoided by referencing the dataset
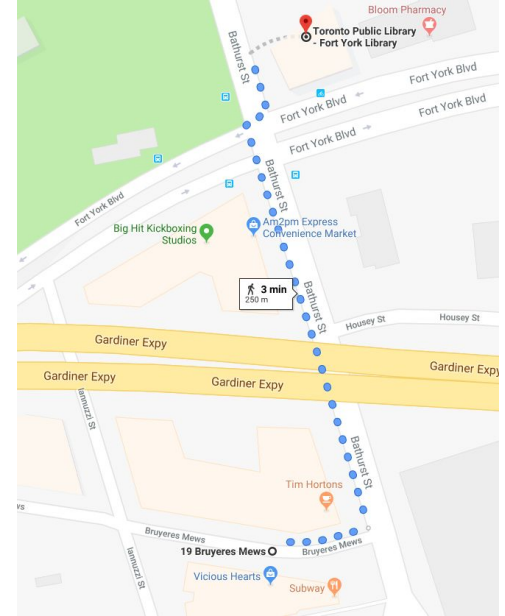
StepSafe 🧭

Where are you?

Where to go?

Start

Start:19 Bruyeres Mews, Toronto, ON
End:Toronto Public Library

The optimal path is:

Head **east** on **Bruyeres Mews** toward **Bathurst St**
Turn **left** onto **Bathurst St**
Continue straight to stay on **Bathurst St**
Turn **right** onto **Bloor St W**
Turn **left** onto **Bay St**
Turn **right** onto **Cumberland St**
Turn **left** onto **Yonge St**
Destination will be on the left

StepSafe 🧭

19 Bruyeres Mews, Toronto, ON

Toronto Public Library

Start