NavSafe
A Safer Way To Get Around

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NavSafe Objective

NavSafe seeks to meet the following objective:

- Determine the safest route for a person to travel on based on data of collisions in the Seattle area.

Scope

Features required to accomplish this project:

- ▶ Fast sorting and searching algorithms
- ▶ Custom edge-weighted graph (bidirectional)

    Vertices = Intersection

    Edges = Path between pair of intersections

    Weight of an edge/vertex based on cumulative severity indices

- ▶ Shortest path algorithm (i.e., Dijkstra) to find safest route

Motivation

- ▶ Vehicle collisions
  - ▶ Potential risk of **injury** or **death**
- ▶ Many high-risk intersections with flawed designs
  - ▶ Factor out of the traveler's control
  - ▶ Mistakes by pedestrian or driver has a higher chance of being fatal in these intersections
- ▶ Areas where flawed design could occur:
  - ▶ Road width
  - ▶ Speed limit
  - ▶ Markings and signs
  - ▶ Intersection infrastructure such as dividers and shoulders

Dataset(s) Used

- "Collisions" from Seattle GIS Open Data
  - Number of Collisions
  - Weather, road, and daylight conditions
  - Type of collision (pedestrian/vehicle)
  - Collision details (left/right turn, etc.)
  - Severity of collision
- Intersections dataset from the City of Seattle's data site

Requirements Specification

- ► Functional Requirements
  - ► Read Module
  - ► Collision ADT Module
  - ► Intersection ADT Module
  - ► Graphing Module
  - ► Sort Module
  - ► Searching Module

- ► Non-Functional Requirements
  - ► Reliability
  - ► Accuracy of Results
  - ► Performance
  - ► Human-computer Interface Issues
  - ► Constraints

Design Specification

Verification and Validation

Quality Control Procedures

- ▶ Unit Testing
    - ▶ Verify that individual units of code work as intended
- ▶ Continuous Integration Testing
    - ▶ Verify compatibility with existing modules
- ▶ System Testing
    - ▶ Verify the program and specification are aligned

Demo

We will now demonstrate our implementation.