Spatial and temporal analysis of traffic crashes in Washington, DC

Brittney White
Motor Vehicle Crashes in the United States

- Each day, 100 people die
- Each year, more than 2.5 million people are treated in emergency departments
- Each year, more than $63 billion is spent on medical care and loss of productivity

Centers for Disease Control and Prevention, n.d.
Traffic fatalities in Washington, DC

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>26</td>
</tr>
<tr>
<td>2016</td>
<td>28</td>
</tr>
<tr>
<td>2017</td>
<td>30</td>
</tr>
<tr>
<td>2018</td>
<td>36</td>
</tr>
</tbody>
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Metropolitan Police Department, 2019

Photo by Tae Kim on Unsplash
Goals and Objectives

Analyze and visualize the spatial and temporal trends in the reported crashes in Washington, DC before and after the Vision Zero initiative was implemented.

• Is there statistically significant clustering of traffic crashes?
• How have the spatial clustering of crashes changed over time?
• Are there consistently dangerous road segments?
• Do these dangerous road segments vary by mode of transit (vehicle, bicycle, or pedestrian)?
• What time of day do the most crashes occur?
• Which day of the week do the most crashes occur?
Data

- Crashes in DC
- Street centerlines
- Washington DC boundary

Technology

- ArcGIS Pro 2.3
Literature review

Acquire the data

Prepare data

Perform quantitative analysis
1. Visualize and quantify space-time patterns
2. Visualize and quantify crash hot spots on the road network
3. Compare all crash hot spots with fatality hot spots on the road network
4. Determine number of crashes based on day of week and hour of day attributes
5. Visualize hot spot maps for different day/time combinations
6. Repeat for bicycles and pedestrians
Expected Results

- Test the hypothesis that there are areas where there are a statistically significant high number of traffic crashes, indicating dangerous road segments.
- These results can help the District of Columbia prioritize dangerous road segments to implement crash reduction measures.
## Summary of Project Milestones

<table>
<thead>
<tr>
<th>Date</th>
<th>Milestone</th>
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<tbody>
<tr>
<td>May 3rd</td>
<td>Peer review presentation</td>
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<tr>
<td>May 15th</td>
<td>Summer classes begin</td>
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<tr>
<td>Week of May 27th</td>
<td>Complete quantitative analysis</td>
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<tr>
<td>May 31st</td>
<td>Deadline to submit abstract for <a href="https://example.com">Lightning Talk</a> at Esri UC</td>
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<tr>
<td>July 8th</td>
<td>596B presentation at Esri UC</td>
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<tr>
<td>Week of July 22nd</td>
<td>Submit final capstone project paper</td>
</tr>
<tr>
<td>July 24th</td>
<td>Summer classes end</td>
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</table>

Photo by [Maria Oswalt](https://unsplash.com) on Unsplash
References
