

# DS4200 Final Project

## Group 19

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Website Link: [Vehicle Crashes Website](#)

### **Visualization 1: Crash Rate per 10,000 Residents (D3.js)**

This D3-based bar chart compares normalized crash rates across Boston, Cambridge, and Somerville. The bars are scaled by population to allow fair comparisons, helping us determine where crashes occur most frequently.

### **Visualization 2: Total Crash Count (D3.js)**

The second visualization uses D3.js bar chart to show the total number of crashes that were reported in each of these cities, without accounting for the population. This chart provides context for the first, indicating which city has more incidents overall. For example, Boston had the most incidents overall, which was expected given it has the largest population size compared to Cambridge and Somerville and more crash data is available about Boston in our dataset.

### **Visualization 3: Crash Severity Distribution by City (Altair - Stacked Bar Chart)**

This stacked bar chart built with Altair shows how crash severity (none, minor, serious, fatal) is distributed across cities. Each city's bar is color-coded by severity level, and tooltips reveal exact counts. It helps users understand not just how many crashes occur, but how severe they are. The chart is interactive via filter dropdowns for specific severity categories.

### **Visualization 4: Crash Flow by City and Severity (Sankey Diagram)**

This Sankey diagram visualizes the flow of crash events from each city (Boston, Cambridge, Somerville) into their corresponding severity levels (Property Damage Only, Injury, Fatality, Unknown) after normalization. It's designed to clearly show how different cities contribute to various crash types and highlight where the most severe incidents are occurring. The interactive dropdown feature allows users to focus on specific flows, understand the magnitude of each transition, and avoid clutter that typically accompanies static diagrams.

### **Visualization 4: Heatmap - Crash Type vs. Severity (Altair)**

Design Idea: This heatmap explores the relationship between grouped weather conditions and crash severity, allowing users to filter by city. It uses a blue color scheme to highlight areas of high crash counts. Rows represent weather types, while columns represent severity levels, from fatal to property damage. It gives a clear insight into whether certain weather types lead to more severe crashes or just more crashes in general.

### **Visualization 5: High-Risk Intersections in the Boston Metro Area (Altair)**

This visualization was added to pinpoint the most dangerous intersection hotspots within each city by providing a bar plot for each city. It tells the user which intersections need surveillance to prevent future crashes. The interactive tooltip allows the user to see the intersection and its crash count.

### **Visualization 6: Hourly Trends in Crash Types Across Cities (Altair)**

This interactive line chart is built with Altair to visualize the hourly trend of vehicle crashes. A drop down allows users to select a crash type and city, while a slider filters the minimum hour displayed. This visualization will provide insights into when crashes are most frequent, which can help implement targeted safety measures. The interactive features help users explore multiple crash types and cities without needing to see multiple static plots. It also helps in identifying time-specific risks across regions.