National High-Injury Network Analysis Tool (NHAT)

Tool that generates a map of the most dangerous roads, empowering communities to make targeted changes for road safety.


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Abstract

Traffic crashes are the leading cause of death in the U.S. for people ages 1-54. Transportation planners and Metropolitan Planning Organizations (MPOs) redesign and manage roads to reverse this trend and reduce roadway deaths and injuries.

We created a free national tool that allows communities to generate interactive High Injury Network (HIN) maps and to understand the relationship between crashes, safety, equity, and other contextual factors. Communities can use this information to prioritize streets with the highest need for roadway infrastructure improvement funding.

This tool uses national and state crash datasets to generate the HIN map with weights for attributes such as crash severity, lighting, and pedestrian involvement. Additionally, our tool uses Justice40 data to highlight areas that are historically disadvantaged with an equity overlay on the map and equity weighting in the HIN.

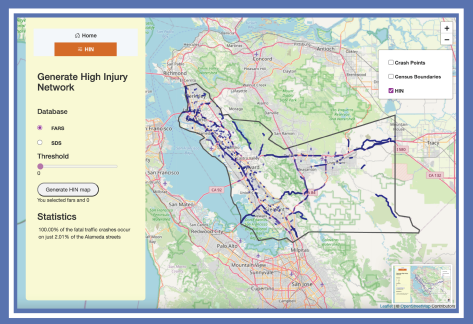
What is HIN?

A High Injury Network (HIN) is a mapping of the section of roads where high numbers of severe car crashes and injuries happened. Most crashes occur on a disproportionately small amount of roads, and this approach is helping city staff figure out where those roads are and focus limited resources on them. It can tell us how a relatively small percentage of cities' street networks account for a disproportionately higher portion of traffic deaths and serious injuries.

Impact

1. Available **Nationwide**
2. Available to **Anyone**, for **Free**
3. **Customizable** Weight
4. **Fatal** and **Non-Fatal** Data
5. Incorporate **Equity**

App Features



HIN Generation

Navigate to the MPO or county of interest by clicking the map.

Choose between national fatal crash data (FARS) and state crash data (SDS) for the HIN generation data source.

Adjust the HIN threshold value - a higher threshold narrows the amount of crashes and road miles on the HIN.

Interpreting the HIN

Crash Overlay

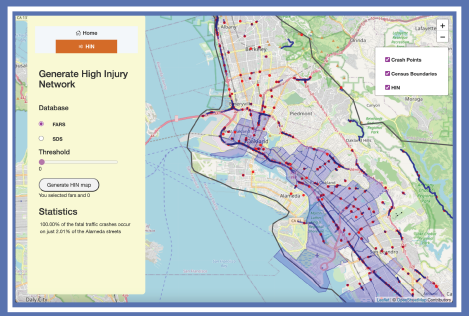
Displays crash data that was used to generate the HIN for further analysis.

Equity Overlay

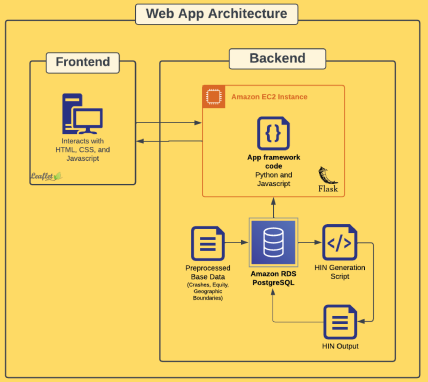
Highlights disadvantaged census tracts identified by Justice40 based on indicators including Transportation Access, Health, Environmental, Economic, Resilience, and Equity factors.

Summary Statistic

Captures the percent of crashes included in the HIN.



Our Method



The base data is first preprocessed and stored in a AWS Relational Database (RDS) PostgreSQL instance. The HIN generation script then uses this data to compute HINs, which are again stored in the RDS. Finally, the App Framwork allows users to access the HIN through a intuitive user interface.

Future Work

Add Weighting Options
to highlight additional crash factors (ex: road condition, time of day) and provide more HIN statistics.

More HIN Analysis Statistics
that MPOs can use to understand the HIN at a glance and to use in grant proposals.

Improve HIN Algorithm
to be more efficient, customizable, and more accurate.

Expand Crash Datasets
to include crash data from more states and support custom dataset uploads.