SPOT
Safe Path Optimization Tool

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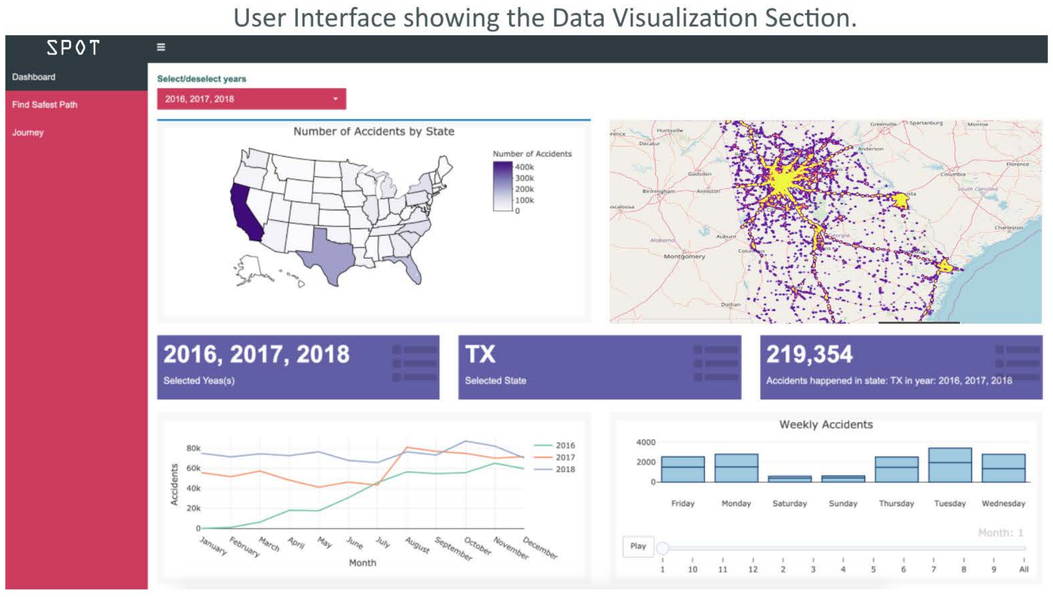
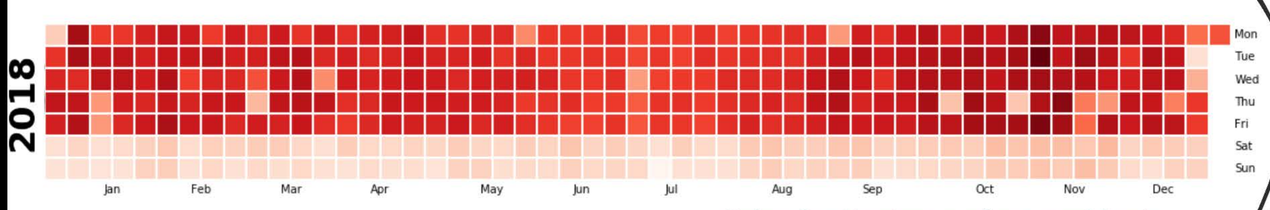
Summary:

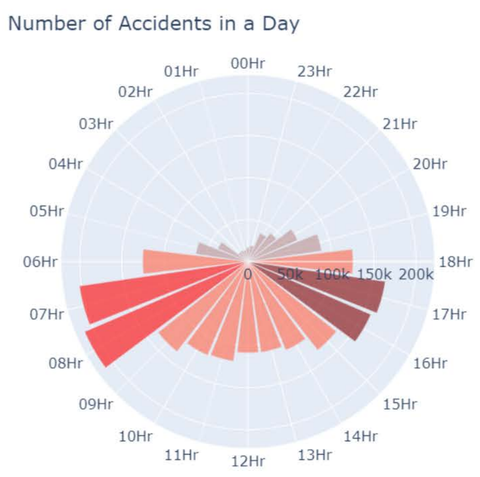
Safe Path's goal is to help commuters decrease thier chance of involving in an accident by providing them with a safe path and short path with fewer accidents. The analytics and visualization of the historical data provided insights for design of the algorithm. The user interacts with the app and can explore the data as well. This would provide better safety to commuters and will reduce deaths and damage to property and the environment.

User Interface showing the Data Visualization Section.





Calendar Heatmap of no. accidents



Data and Visual Analytics:

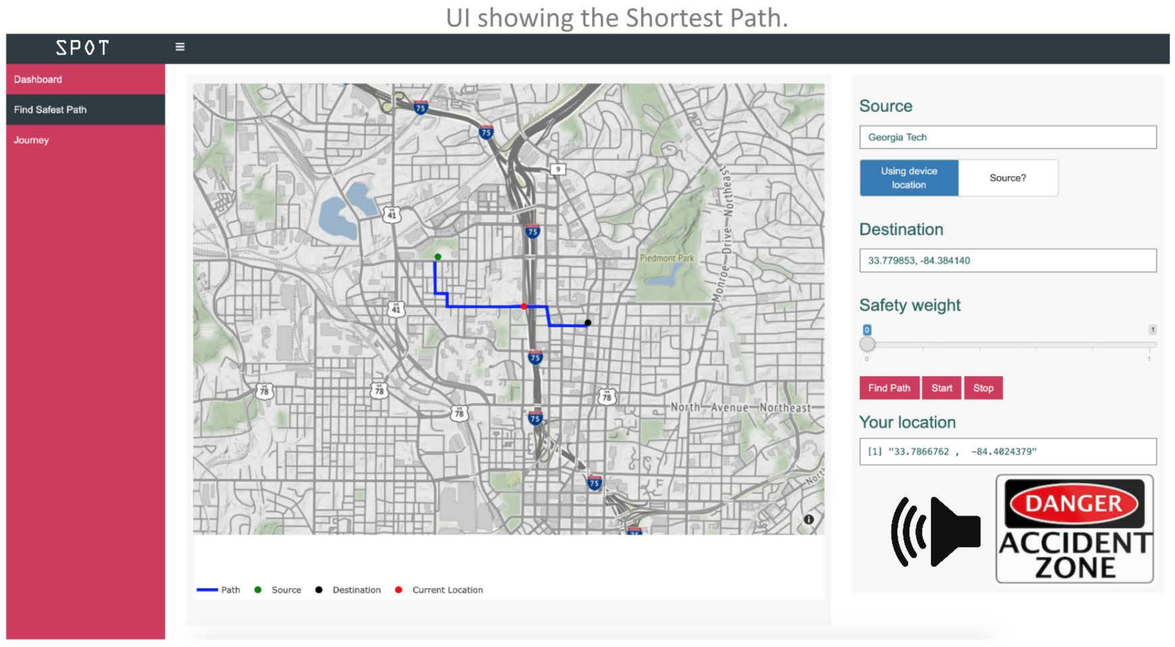
The data was downloaded from Kaggle. It consists of 2.25 Million accident records from 2016 to 2019 collected from various sources. It covers 49 states of USA. This dataset has been preprocessed to clean data and some interesting insights have been discovered by analysing and visualizing the data. Most of the accidents occur in the office rush hours and more in the mornings than in the evenings. Weather also plays an important role especially the winter snow causes most of the accidents in the United States.

Methodology:

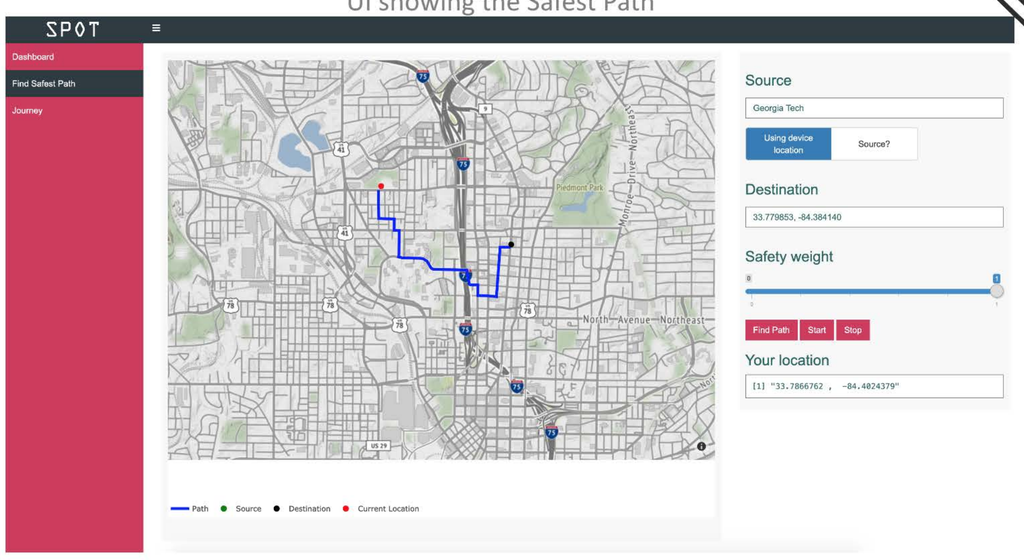
The Map is considered as a network with nodes as intersections and edges as roads connecting them. Based on accidents the edges are updated with weights. This weighted network is used to calculate the shortest and the safest path to the destination. User can select how much priority the algorithm should give for the safety. The UI gives the ability to choose the parameters and explore the accident data and visualize for a better understanding.

Based on accident density calculated using KDE, an alert is generated when the user reaches close to an accident prone area.

UI showing the Shortest Path.



UI showing the Safest Path



Conclusion and Future Work:

Accidents can happen anywhere and anytime, but, we hope that with applications like this will help reduce the numbers.

In future work the algorithm can take weather and road conditions as input to give better suggested routes and give prediction capabilities.

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