

# Analysis on Crash Accidents at Night Time

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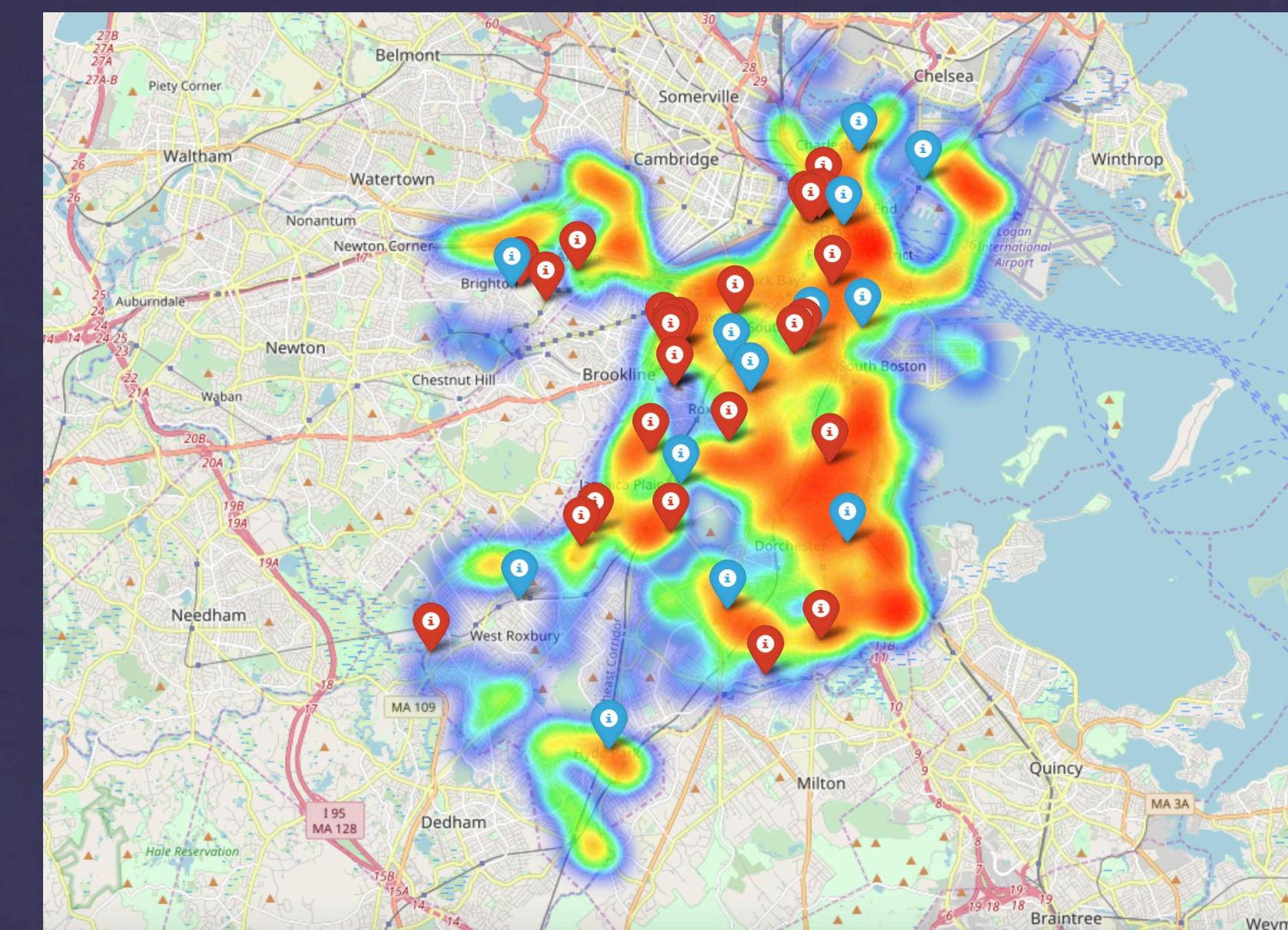
Boston University

## Introduction

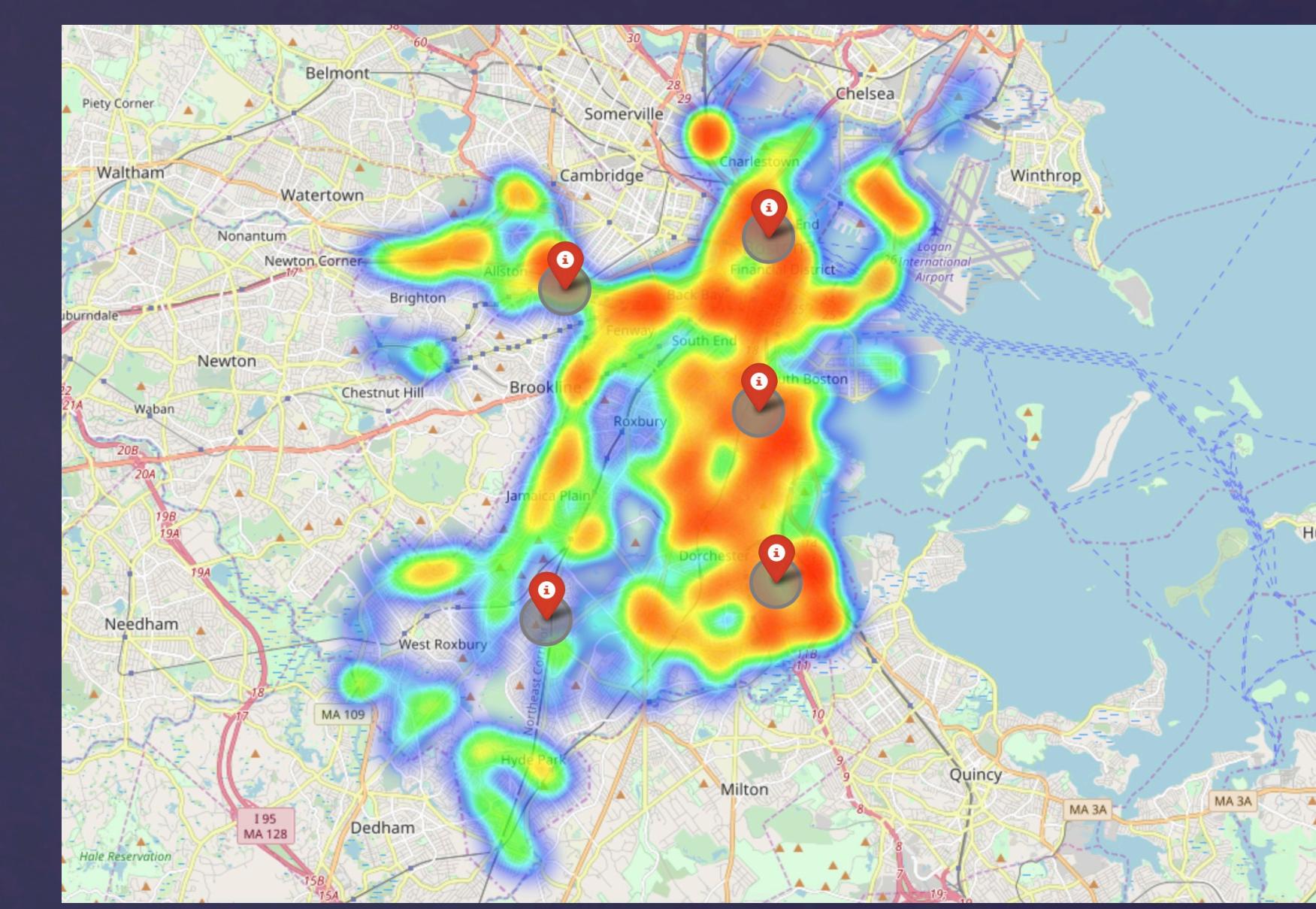
- ◆ According to national data, 49% of fatal crashes happen at night, with many factors that is controllable or not controllable.
- ◆ Nearby street furniture such as street light or traffic signal may play a role in crash accident prevention.
- ◆ Also, while some accidents cannot be prevented, the reaction time of nearby hospitals and police stations is crucial for handling the situations.
- ◆ This project aims to find out whether the lack of lights at night would cause more crash accidents, and to explore possible places for constructing new facilities that will benefit the citizens. Our analysis will be focus on Boston area.

## Visual Representations

*Accident density with existing facilities*



*Accident density with K-mean clustering*



## Dataset and Analysis

- ◆ We collect the crash accident data in year 2015, Boston, and extract ones that occurred at nighttime (PM 6:00 ~ AM 6:00). And for facilities, we use spatial data of street lights, traffic signals, police stations, and hospitals.
- ◆ We used K-means algorithm to obtain clustering of accident “hot spots” to further analysis whether the existing facilities have similar pattern that cover the places that accidents are more dense.
- ◆ We used street lights, traffic lights and crash accidents to create a score that tells the safety score in a given accident point.
- ◆ We used hospitals, police stations and crash accidents to find the nearest facility for each accidents, and calculate the average distance between the two for a given range in K-mean.

## Conclusion

- ◆ The first visualization, the darker the area is represents there are more accidents near the area. By examining the graph, we can conclude that the crash accidents are clustered and more dense in some areas than others. Thus, it would be more efficient to have facilities near the clustered areas.
- ◆ The second figure provides a possible optimization strategy, using K-mean. The figure shows the five possible centers points of all accident data collected. Ensuring there exists facilities near such points would maximize benefits for the citizens around the area.

Reference: [https://www.forbes.com/2009/01/21/car-accident-times-forbeslife-cx\\_he\\_0121driving.html#3430f6cb6fc0](https://www.forbes.com/2009/01/21/car-accident-times-forbeslife-cx_he_0121driving.html#3430f6cb6fc0)



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