

## Abstract

Flooding is one of the biggest environmental issues that New York City has to deal with. 311 is the administration which receives calls related to flooding issues. Due to the prominence of flooding, it is crucial for 311 to be able to identify vulnerable areas of New York City. In this project, a webpage was created using CSS, HTML, JavaScript and the HighCharts library. A map of New York City was created and divided into census tracts. The reason for this is to allow for minute examination of each part of the city and to make vulnerable sections easily identifiable. Another reason that the city was split up by census tract was so that more data that is collected by census tract could be added in the future. For example, charts pertaining to income level or population could be added in order to see if there is a connection between socio-economic variables and flooding.

## Objective

The goal of this project was to improve the existing map of 311 calls relating to flooding in New York City. The code was somewhat sloppily written and needed to be organized. This was necessary in order to reduce lag on the webpage as well as make the webpage more accessible to any future contributors. In addition to this, the aesthetics of the webpage needed to be changed. The purpose of this was to make the information the website provided easier to understand as well as to increase the ease with which a user could manipulate the comparisons between census tracts.

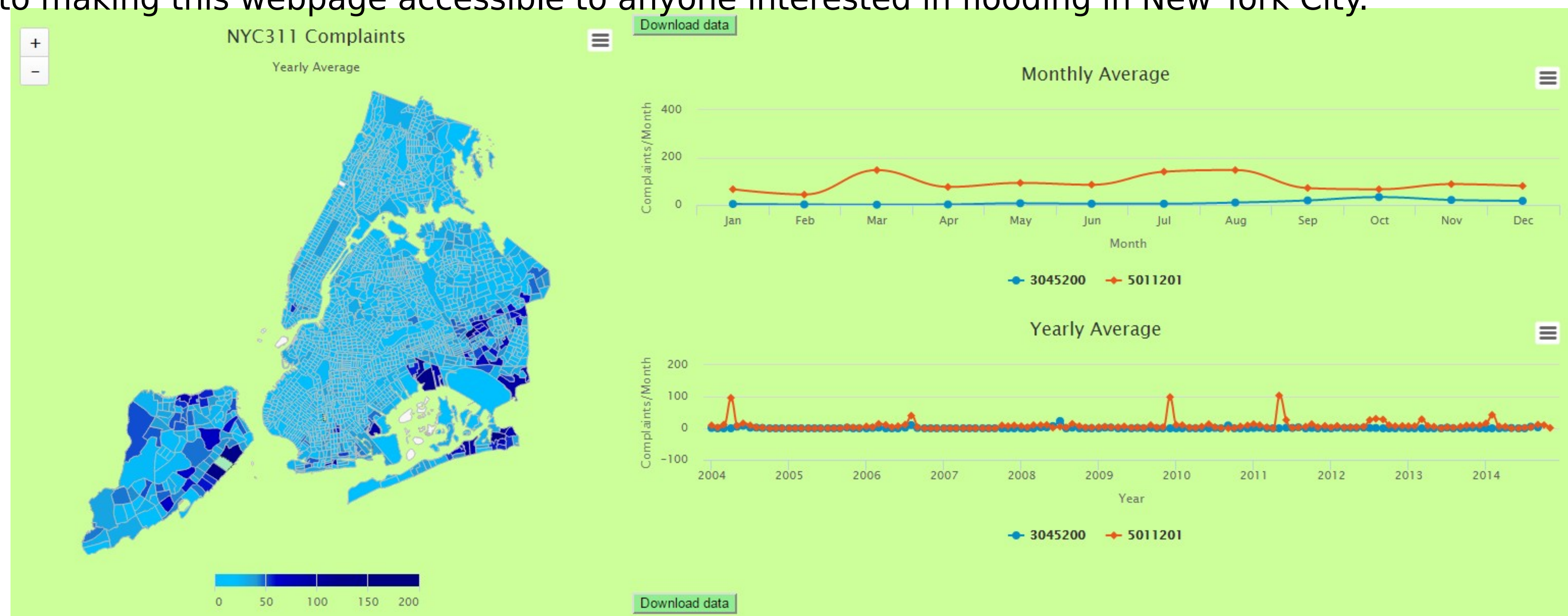
## Materials and Methods

The programming languages we used to aid us in this project were CSS, HTML, JavaScript, and the HighCharts library for JavaScript. In order to familiarize ourselves with these languages before beginning the project, we completed Code Academy courses on CSS, HTML, and JavaScript. Once there was a basic familiarity with those languages, it was possible to begin work on the visualization web page.



## Results and Observations

In the end, while the functionality of the webpage remained consistent, it became much more user friendly and informative. In order to increase the ease with which a user could utilize the webpage, the size of the map was increased. This made it easier to hone in on specific census tracts. Initially the graph that displayed the monthly average of 311 calls was cut off. By editing the <div> elements of the HTML of the webpage, this issue was resolved. These fixes were crucial to making this webpage accessible to anyone interested in flooding in New York City.



## Inferences and Conclusions

By using the webpage, we were able to create graphs such as the two seen above. These graphs were used in order to compare different census tracts and reach conclusions about flooding in New York City. One of the interesting things that was seen on the yearly graphs was that big storms such as Hurricane Irene and Hurricane Sandy left "signatures". Signatures in this context are large spikes in calls which occurred around the time of the storm. In 2011 around the time of Hurricane Sandy, you can see a spike in the red line in the image below. This was likely caused by flooding that resulted from Hurricane Sandy.

In terms of the monthly graph, it was possible to see in what months each census tract tended to have the most flooding. If a census tract had its peaks in April-September, that meant that they mainly suffered from flash flooding. Large peaks at other times of year may have been caused by coastal flooding, especially in areas that border the Atlantic Ocean. In the future, these graphs could be used to determine which areas may need to take preventative steps in order to protect themselves from future flooding. The longer that 311 exists, the more accurate these findings will become.

## Acknowledgements

This research was funded by NOAA CREST (NOAA CREST-Cooperative Agreement No: NA11SEC4810004) and The Pinkerton Foundation. We would also like to thank our mentors Dr. Emiko Morimoto and Dr. Sina Kashuk for providing us with this opportunity as well as assisting us with our research

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