

Crime Buster Application

Testing Report

Presented to

Mr. Jonathan Pautsch of
Next Century Corporation

Software Engineering I

CMSC 447

By

Angel Cheng

Sam Mendimasa

Katelyn Seitz

Zach Vance

25 April 2018

Crime Buster Application

Testing Report

Table of Contents

1. Introduction
 - 1.1 Purpose of This Document
 - 1.2 References
2. Testing Process
 - 2.1 Description
 - 2.2 Testing Sessions
 - 2.3 Impressions of the Process
3. Test Results

Appendix A - Peer Review Sign-off

Appendix B – Document Contributions

1. Introduction

1.1 Purpose of This Document

This document is intended for system administrators, quality assurance teams, and other users interested in reviewing the test procedure used in developing the first version of the Crime Buster web application. This report describes and analyzes the testing process as well as the results from the testing process.

1.2 References

1. Crime Buster System Requirements Specification Document

2. Testing Process

2.1 Description

The use cases described in the SRS documentation influenced each iterative and incremental development (IID) testing procedure. Team members were tasked with verifying specific test conditions derived from the original use cases. Accomplishing the verification of each of these test conditions drove the project development and allowed us to be confident in the next iteration, coding a larger piece of the Crime Buster web application.

There was further testing for the website that is not described and was beyond the planned test conditions. The testing technique followed for the iterative and incremental process is as follows: design, implement, test, repeat. For example, when testing the use cases for filtering correctly, at first the logic for the SQL query was incorrect (design flaws using OR's instead of a nested query). So, we went back to the design phase, came up with a new strategy to implement and test. The process is repeated until the desired result is verified. Once each of the use cases were verified, the final product was tested for it's requirements such as load time.

This is the general process we followed for the development of our website. We are still in the development phase and have not verified all of the requirements. It follows that the test results may change before the completion of the website.

2.2 Testing Sessions

For each testing session, specify the date, location, time started, time ended, who performed the tests, and which use case(s) was covered.

Date	Location	Time Started	Time Ended	Performed By	Use Cases
4/07/18	Home	7:00pm	8:00pm	Angel Cheng	Load the web application
4/25/18	UMBC Library	3:00pm	5:00pm	Katelyn Seitz	Visualization type selection
4/25/18	UMBC Library	3:00pm	5:00pm	Katelyn Seitz	Display tooltips
4/21/18	UMBC Library	12:00pm	2:00pm	Sam Mendimasa	Enter/Display a comment for a Crime
4/21/18	UMBC Library	2:00pm	4:00pm	Sam Mendimasa	Display all comments for a Crime
4/21/18	UMBC Library	12:00pm	3:00pm	Angel Cheng	Zoom in and out on a map view
4/21/18	UMBC Library	10:00am	3:00pm	Zach Vance	Filter the data based on crime type / Filter the data based on the date/time the crime was committed
4/23/18	Home	5:00pm	7:30pm	Zach Vance	Filter the data based on the location (District) / Filter the data based on Weapons

2.3 Impressions of the Process

We believe our testing process is the most effective way to go about testing the web application. It is effective because it allows you to focus on a smaller section of code at one time, making it easier to debug. The code rarely works the first time, and when you program incrementally, when it does not work, you know exactly where the problem is within your code since you are building off of code you know for a fact works perfectly. Prior to testing, the quality of the program is not the best as there are bugs that exist in the code. After repairs are made the quality goes up dramatically as it is updated to handle any of the test cases. Therefore, the testing process allowed us to find what code worked and what did not work so that we could repair as necessary and ultimately create the best web application possible.

We believe the best modular unit in the program is the implementation of data retrieval from the database. The web application connects to a large database of crimes and through the use of SQL queries, it is able to retrieve information from that database. For example, the sidebar of filters updates the array of crimes being used by all of the data visualizations currently displayed on the screen. The SQL queries retrieve the correct crimes from the database based on the selected filters from the sidebar. Much time and testing went into making sure these queries run perfectly as this affects the entire display of correct information to the web page. For this reason, we choose the retrieval of information from the database to be the “best” modular unit in the program as it has a small likelihood of containing flaws.

We believe the “worst” modular unit in our program is currently the bar / line graphs. This is because we are concerned about the usability of this feature for the web application. We are able to create a bar / line graph but want to format it in the most useful way to police officers. One of the pieces we are concerned with is giving the officer enough flexibility to create the exact graph they desire. After going through the process of creating a graph, we are unsure if it is flexible enough or if in some situation an officer may desire a different graph. So, in terms of usability we are most concerned with the bar / line graphs as the likelihood of remaining flaws overall is higher than in the other areas of our website.

3. Test Results

3.1 Testing Suite

The description of how testing was partitioned and implemented is outlined below.

Use Case	Load the web application
Valid Loading Page Situation	User click on the link on any device (phone, any computer), the page loads successfully.
Invalid Loading Page Situation	User has not internet connection.
purpose	To test if the page can successfully load on any devices (Windows/Mac web page, Cellphone)
Expected Results for Valid Situation	On any device, the web page load successfully with all the filters and visualization type selected.
Expected Result for Invalid Situation	No internet connection notification from the web page
Boundary condition	Lose internet after getting into the page will cause the web app lose all the functionality

Use Case	Account Details
Valid Account Details Situation	After user click the person icon, a account setting page will pop up and allows user to set their account details
purpose	To test the ability for user to change/log in their account details, such as making the comments private or public and changing their name
Expected Results for Valid Situation	User is able to see the pop up page and change their account detail in it, and after clicking apply, the changes will be made in the database that corresponded to the account details
Boundary condition	Users made changes, and do not click

	apply, then those changes will not be made in database
--	--

Use Case	Visualization type selection
Valid Type Selection Situation	User selects any combination of visualizations to be displayed or hidden
Purpose	To let the user customize how the data is presented and derive different information from it
Expected Results for Valid Situation	Visualizations with checkboxes are displayed while those with unchecked boxes are hidden
Boundary Condition	No visualizations selected or all visualizations selected

Use Case	Display tool details
Valid Tooltip Display Situation	User selects a single crime on the map and the tooltip for that crime is displayed
Purpose	To allow users to view details about a specific crime
Expected Results for Valid Situation	A tooltip is displayed over the selected crime point featuring information specific to that crime
Boundary Condition	Clicking a cluster of data points merely zooms in on the map rather than open a tooltip

Use Case	Display/input new comment
Valid Situation	Authenticated user selects a crime on the Map and choose add or view comments

Invalid Situation	Unauthenticated user tries to add or view comments on the application
Purpose	To allow users to make notes about a particular crime that could be useful for themselves or others
Expected results for valid situation	User is able to write comments that is save in the database and can review comments later
Expected results for invalid situation	User redirected to Corporate sign in page
Boundary Conditions	Inputting blank comments is not save to the database

Use Case	Display comments on a crime
Valid Situation	Authenticated user select view comments and is able to see all comments of a crime at the bottom of the page
Invalid Situation	Unauthenticated user tries to view crime comments on the application
Purpose	To allow users to see all the comments of a particular or related crimes
Expected results for valid situation	Display the comment information for the crime on the bottom of the page in less than 3 seconds
Expected results for invalid situation	User redirected to Corporate sign in page
Boundary Conditions	Selected crime does not have comments at which an alert is shown

Use Case	Zoom in and out on a map view
Valid Map Zoom in/out Situation	After the map loads, user are able to zoom in and out using double click on a place on a map; scroll on the control

	panel; or click the plus or minus button on the map
Invalid Map Zoom in/out Situation	Users mouses are on the web page rather than map
purpose	To test if the map is easy to zoom in and out
Expected Results for Valid Situation	The map will zoom in based on user's choice, and the data clusters will take apart into smaller ones based on how much user zooms in
Expected Result for Invalid Situation	when they scroll, the page will scroll down rather then zoom in/out on the page
Boundary condition	When the map hits the maximum zoom in/out condition, it won't zoom in/out anymore

Use Case	Filter the data based on crime type
Valid Crime Type Selection	The crime type filter is made up of a check box option for each description of the crime. There is no invalid way to possibly select these check boxes, anywhere from none to all of the boxes may be checked at any time.
Check results when all boxes are checked.	These tests are run filtering only by crime type, so the result is independent from the other filters. We initially test with 1000 crimes in our database for simplicity. When all boxes are checked, we correctly receive 1000 filter results since all of the crimes are included by the given filter selections.
Check results when none of the boxes are checked.	When none of the boxes are checked, we correctly receive 0 filter results since the user desires to see crimes that do not fit any of the crime types up for selection (none).
Check the results when 1 crime type is checked and the others are	When 1 crime type is selected, only the crimes of that type are displayed. This can be proven

not.	by looking at the map. Select only the crime type “shooting” to ensure only the 4 shooting crimes of the 1000 are shown.
Check results when 2 crime types are checked.	When 2 crime types are selected, only the crimes of these types are displayed. This can be proven by looking at the map. Select only the crime type “shooting” and “robbery - residence” to ensure only the 4 shooting crimes added with the 9 robbery - residence crimes show for a total of 13 of the 1000.
Testing Cases Covered	Following these tests all cases should be covered, edge cases of none or all are covered and several in the middle are covered with the rest acting in the same as the middle cases. Also, seeing that when they are all clicked and everything returns ensures all variables are spelled correctly in the query.

Use Case	Filter the data based on the date/time the crime was committed
Valid Date / Time Selection	The date / time filter is made up of a drop down calendar. The drop down calendar prevents the user from entering an invalid start or end date. If an invalid time frame is given, it is auto corrected to a valid one and the user should see their attempted adjustment was not applied.
Check results when all dates are included.	These tests are run filtering only by date / time, so the result is independent from the other filters. We initially test with 1000 crimes in our database for simplicity. When the widest time range is selected, we correctly receive 1000 filter results since all of the crimes are included by the time range.
Check results when none of the boxes are checked.	When the time range has the start and end time equal, we correctly receive 0 filter results since there is no crime at that

	specific time.
Check the results for a time range of a month.	When a month date range is selected, only the crimes within that time frame are displayed. This can be proven by looking at the map. Select a time frame of a month and ensure that times within the frame are displayed while those outside are not.
Testing Cases Covered	Following these tests all cases should be covered, edge cases of none or all are covered. As well as a case with a limited time frame with the rest acting the same as this case.

Use Case	Filter the data based on the location (District)
Valid District Selection	The district filter is made up of a check box option for each district of Baltimore in the database. There is no invalid way to possibly select these check boxes, anywhere from none to all of the boxes may be checked at any time.
Check results when all boxes are checked.	These tests are run filtering only by district, so the result is independent from the other filters. We initially test with 1000 crimes in our database for simplicity. When all boxes are checked, we correctly receive 1000 filter results since all of the crimes are included by the given filter selections.
Check results when none of the boxes are checked.	When none of the boxes are checked, we correctly receive 0 filter results since the user desires to see crimes that do not fit any of the districts up for selection (none).
Check the results when 1 district is checked and the others are not.	When 1 district is selected, only the crimes within that district are displayed. This can be proven by looking at the map.

	Select only the district “northern” to ensure only the 125 northern crimes of the 1000 are shown (also see the map to prove they are in northern Baltimore).
Check results when 2 districts are checked.	When 2 districts are selected, only the crimes within these districts are displayed. This can be proven by looking at the map. Select only the districts “northern” and “southern” to ensure only the 125 northern crimes added with the 90 southern crimes show for a total of 215 of the 1000. Also see the markers added to the map in the northern and southern locations.
Testing Cases Covered	Following these tests all cases should be covered, edge cases of none or all are covered and several in the middle are covered with the rest acting in the same as the middle cases. Also, seeing that when they are all clicked and everything returns ensures all variables are spelled correctly in the query.

Use Case	Filter the data based on Weapons
Valid Weapon Type Selection	The weapon type filter is made up of a check box option for each weapon type within the database. There is no invalid way to possibly select these check boxes, anywhere from none to all of the boxes may be checked at any time.
Check results when all boxes are checked.	These tests are run filtering only by weapon type, so the result is independent from the other filters. We initially test with 1000 crimes in our database for simplicity. When all boxes are checked, we correctly receive 1000 filter results since all of the crimes are included by the given filter selections.

Check results when none of the boxes are checked.	When none of the boxes are checked, we correctly receive 0 filter results since the user desires to see crimes that do not fit any of the weapon types up for selection (none).
Check the results when 1 weapon type is checked and the others are not.	When 1 weapon type is selected, only the crimes of that type are displayed. This can be proven by looking at the map. Select only the crime type "Firearm" to ensure only the 66 firearm crimes of the 1000 are shown.
Check results when 2 weapon types are checked.	When 2 weapon types are selected, only the crimes of these types are displayed. This can be proven by looking at the map. Select only the crime type "Firearm" and "hands" to ensure only the 66 firearm crimes added with the 179 hands crimes show for a total of 245 of the 1000.
Testing Cases Covered	Following these tests all cases should be covered, edge cases of none or all are covered and several in the middle are covered with the rest acting in the same as the middle cases. Also, seeing that when they are all clicked and everything returns ensures all variables are spelled correctly in the query.

Use Case	Data Selection
Valid Situation	Authenticated user selects and highlight a dataset on the map and the selected is display for the other visualizations
Invalid Situation	Unauthenticated user tries to highlight a data set on the map. Authenticated user highlight parts of the map that do not contain any datasets.
Purpose	To have consistency across visualizations

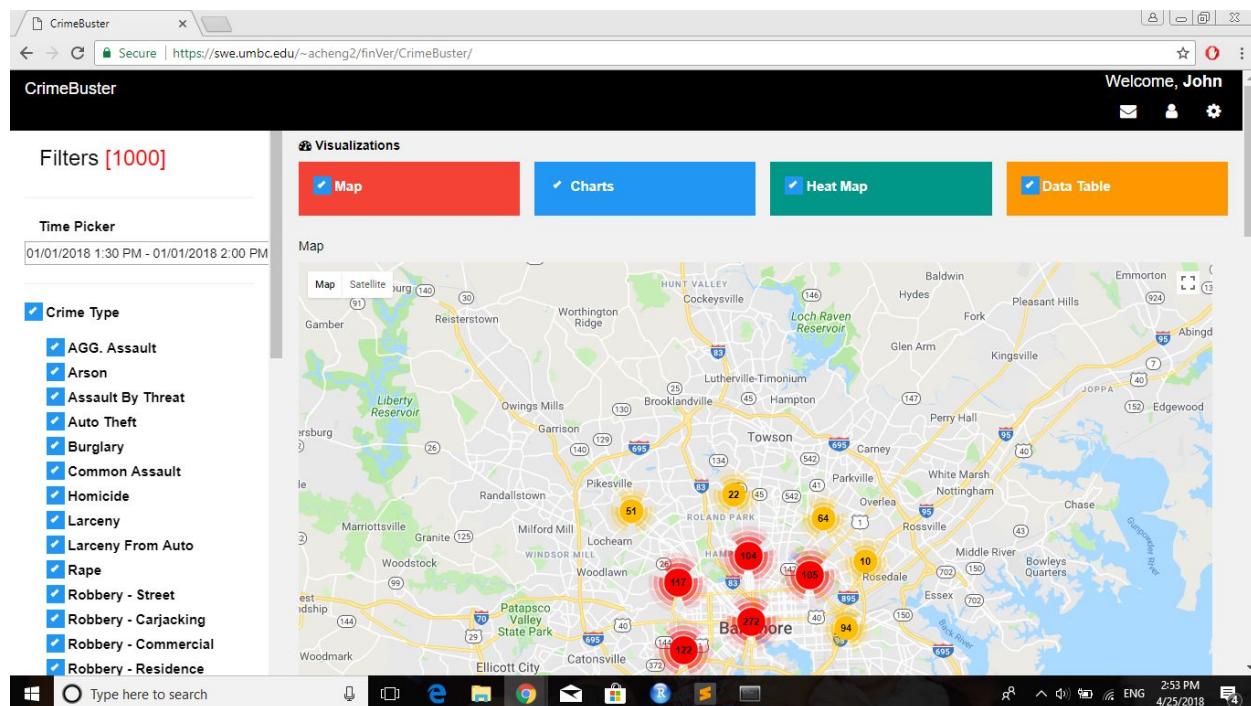
Expected results for valid situation	Highlighting selected data on one visualization will highlight it on all other visualizations
Expected results for invalid situation	User redirected to Corporate sign in page when they are unauthenticated. Selecting areas of the map that are not datasets will have no effect.
Boundary Conditions	Highlighting something that is not a dataset on the map will have no effect

3.2 Test Results

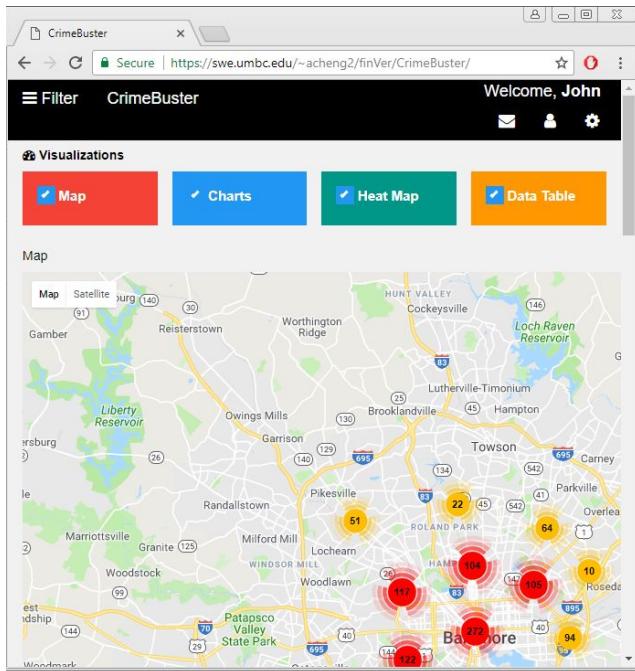
3.2.1 Load the web application

Tester: Angel Cheng

Valid Load web application Result:



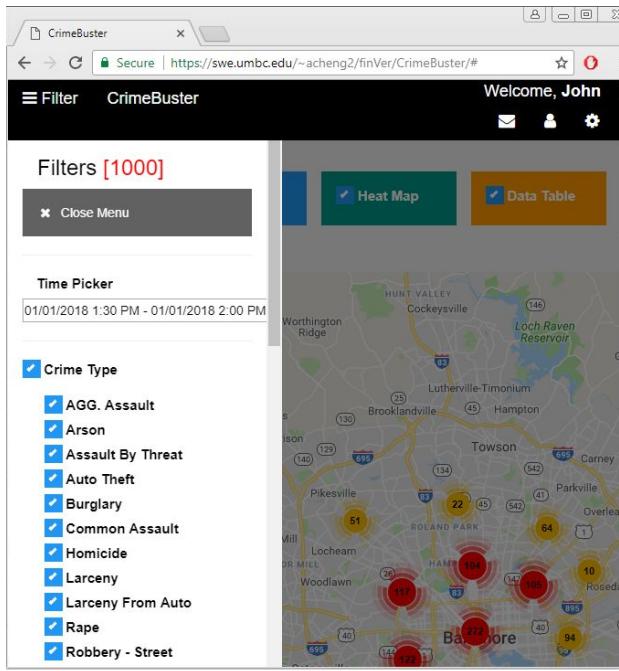
Webpage display all the visualizations with all the filters on



Open the web page with a smaller web window (the sidebar will disappear)



A filter selection button will show up



Open the web page using smaller web window with the sidebar showing

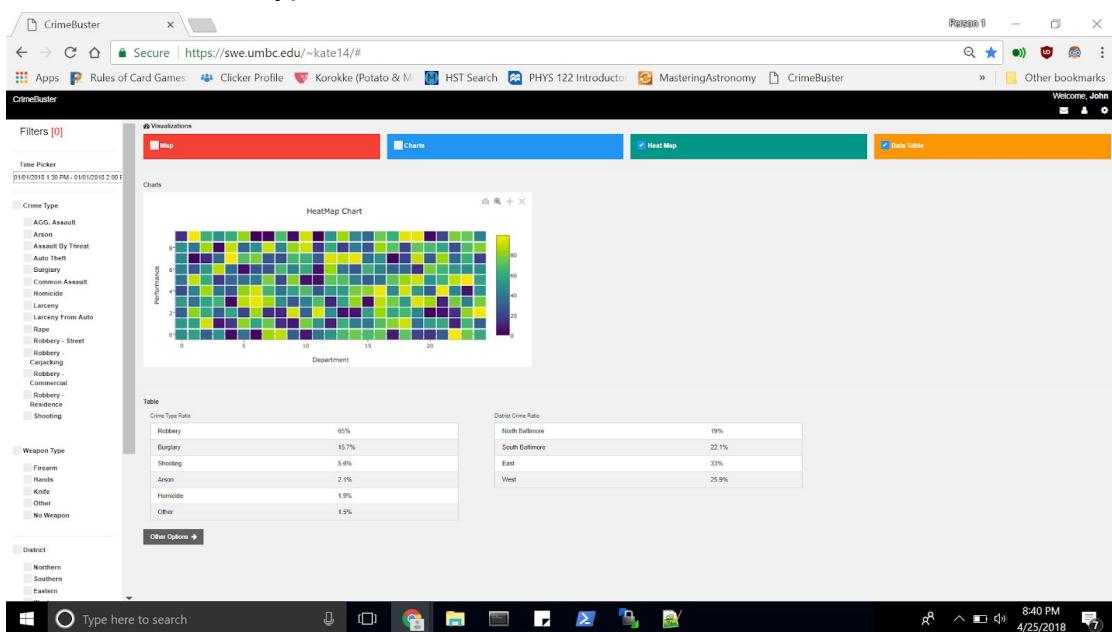
3.2.2 Account Detail

We currently do not have this feature implemented.

3.2.3 Visualization type selection

Tester: Katelyn Seitz

Valid visualization type selection result:

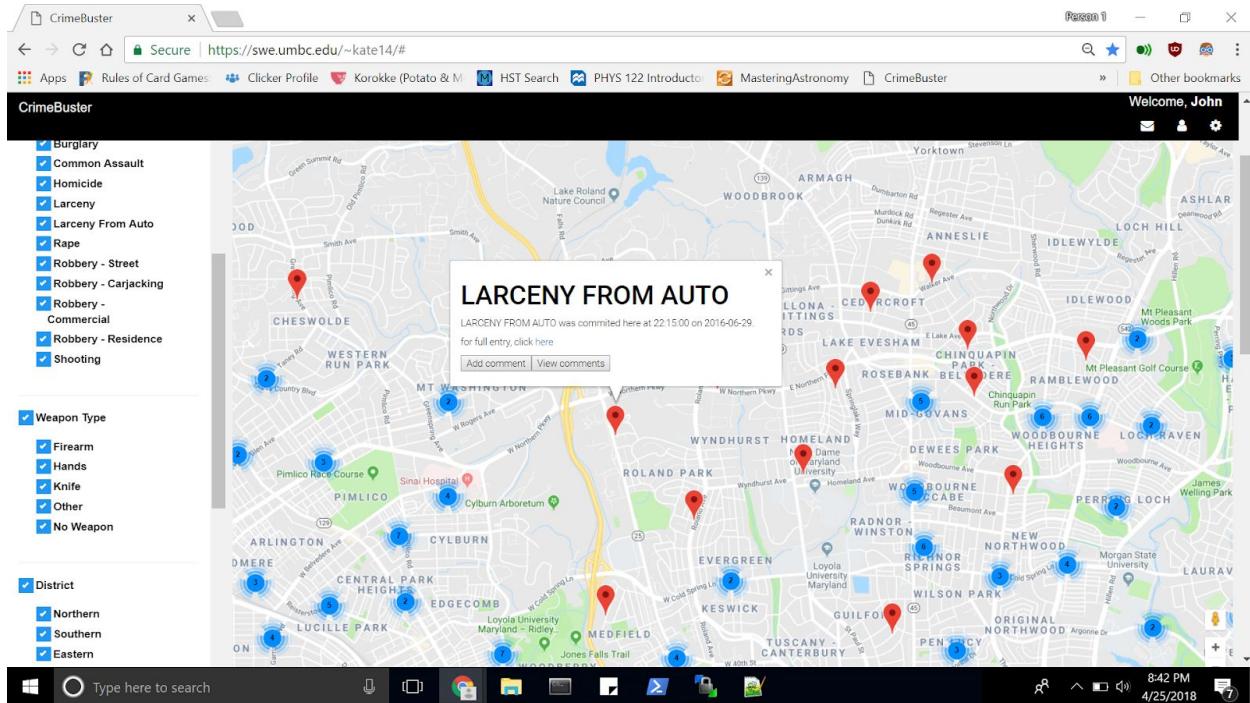


All selected visualizations (heatMap and table) are displayed on the webpage.

3.2.4 Display tooltip details

Tester: Katelyn Seitz

Valid tooltip display results:



Each individual data point displays its own tooltip upon selection.

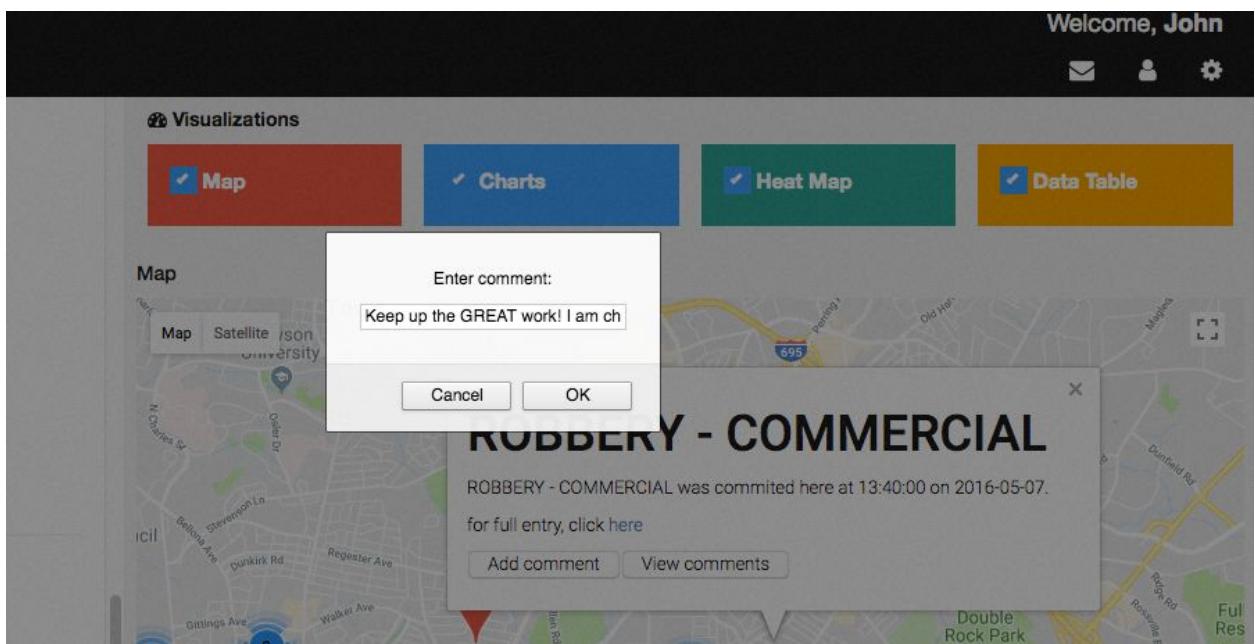
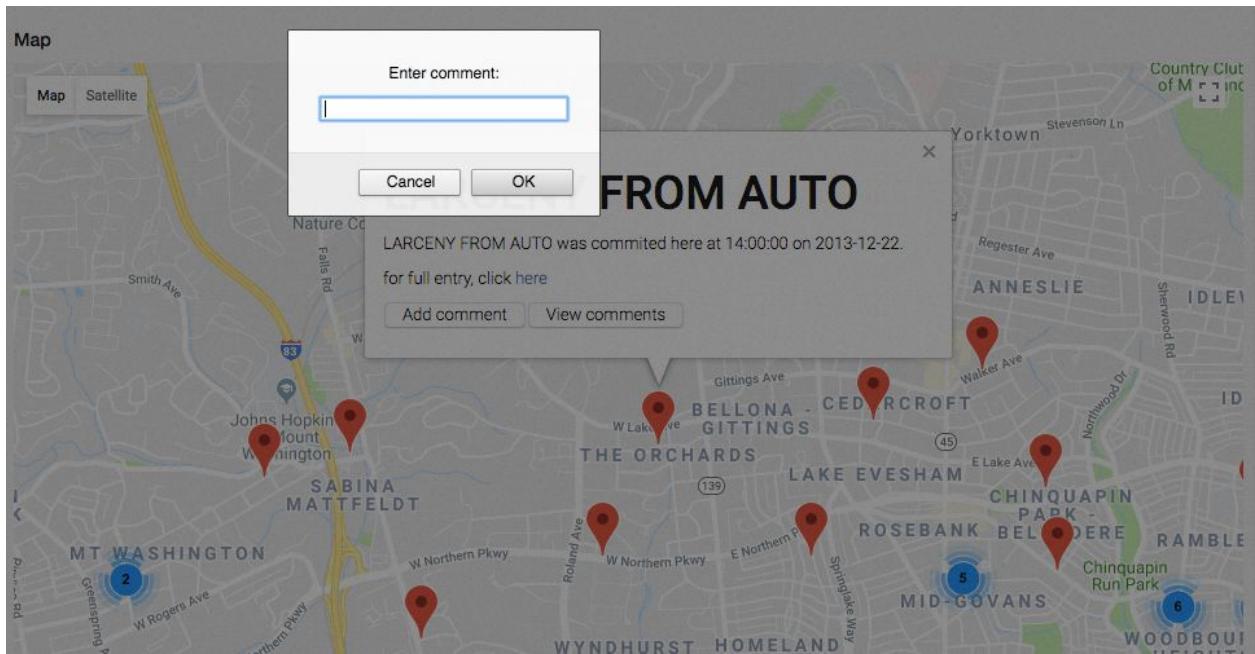
3.2.5 Enter/Display a comment for a Crime

3.2.6 Display all comments for a Crime

Tester: Sam Mendimasa

All results below are as expected.

Test 3.2.5 and 3.2.6 is combined. Enter a blank comment that display in the image below has no affect. Entering a valid comment is display in the comments section along with the user that added the comment. See images below.



Recent Comments

John April 21, 2018, 3:12 PM

Keep up the GREAT work! I am cheering for you!! Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.

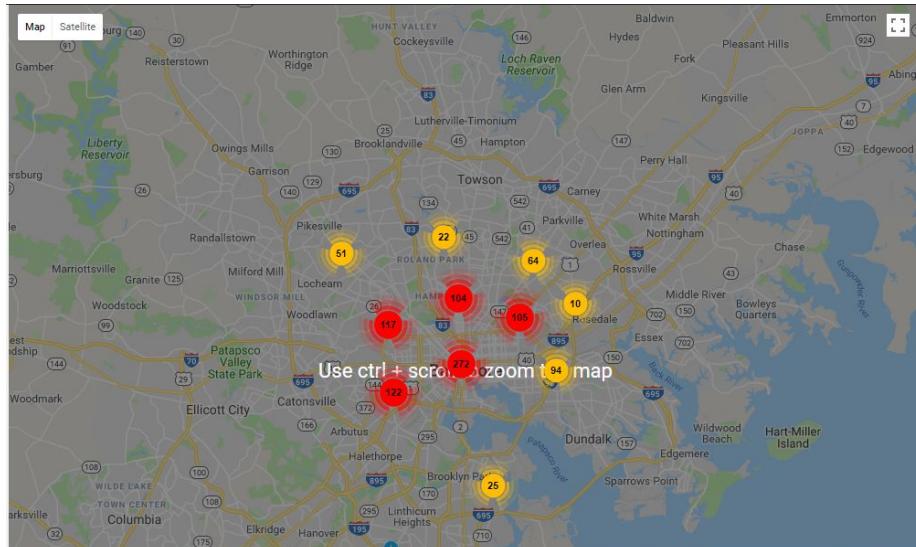
Bo April 21, 2018, 2:15 PM

Testing - Sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.

3.2.7 Zoom in and out on a map view

Tester: Angel Cheng

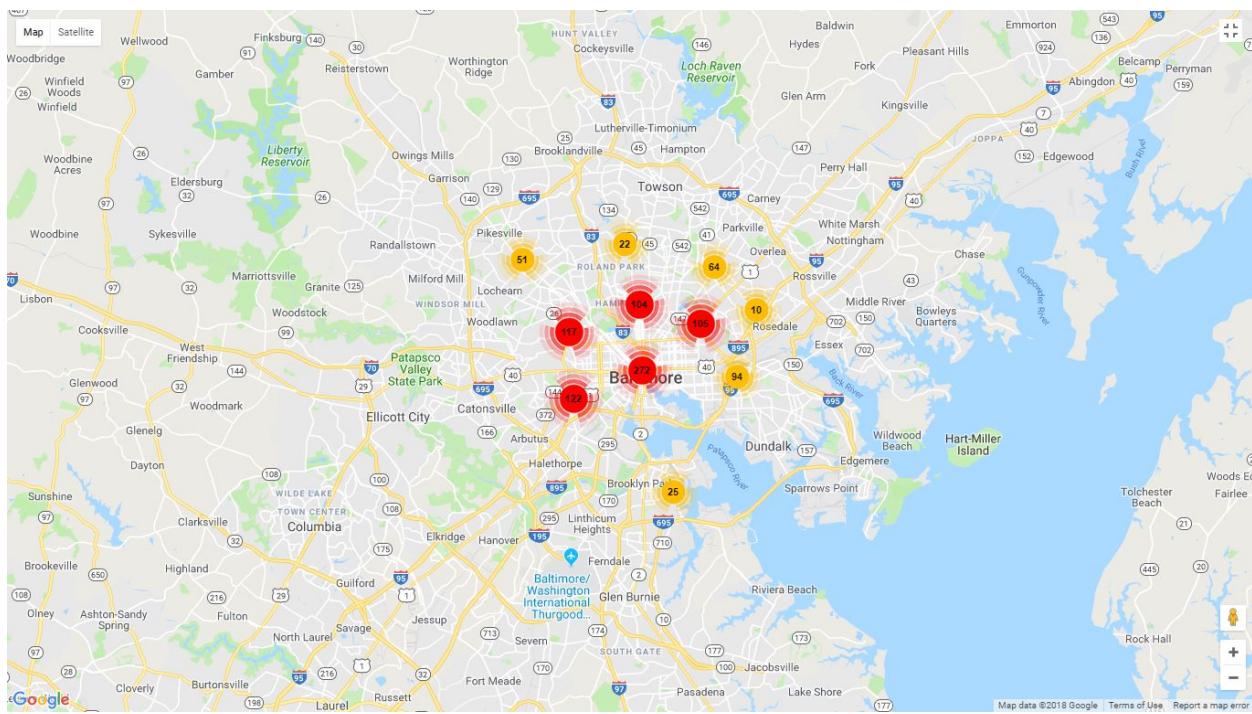
Valid Map Zoom in and out Result:



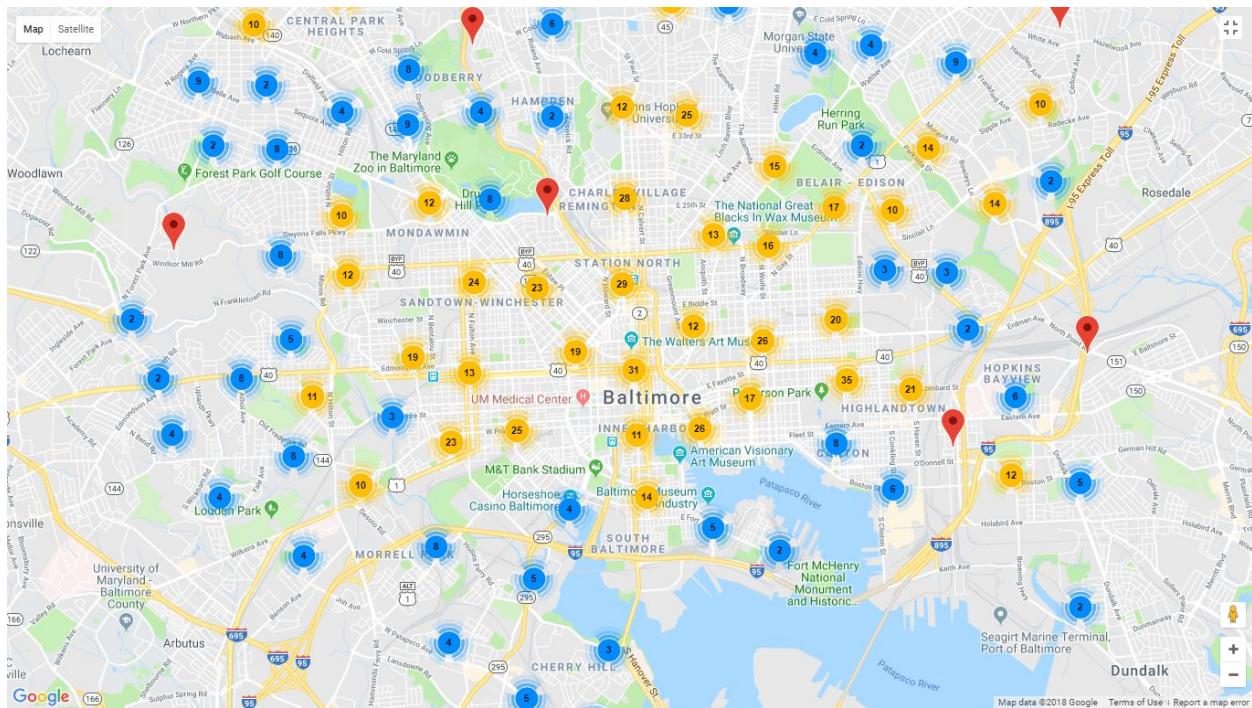
Map view for default zoom condition



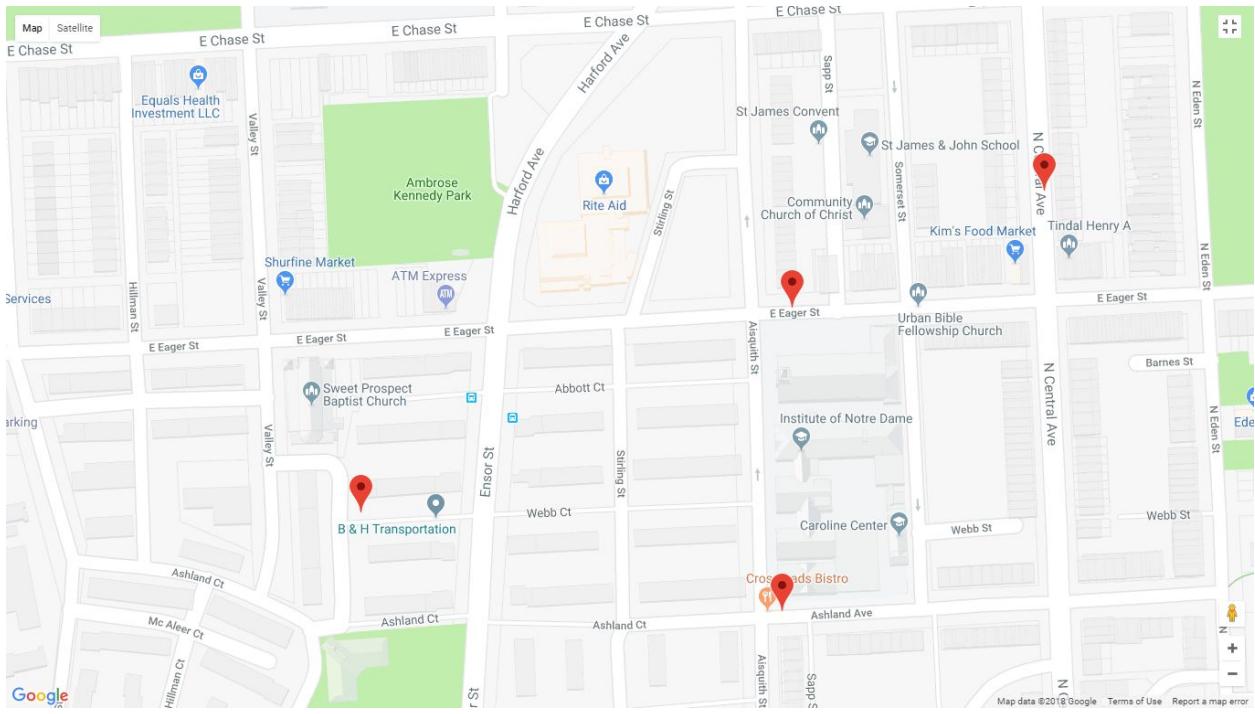
Button to make the map full page shows on the right top



Map view for full screen



Map view after zoom in one layer



Map view after zoom in a couple times

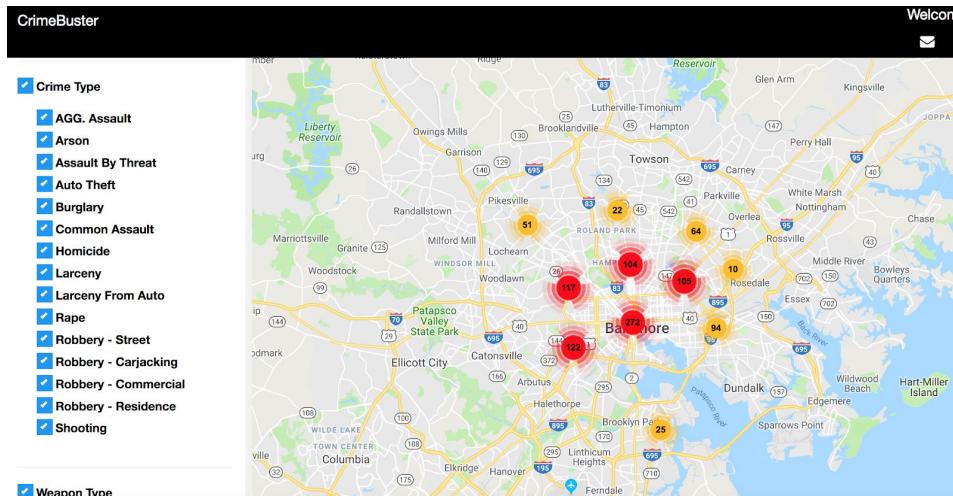
3.2.8 Filter the data based on crime type

Tester: Zach Vance

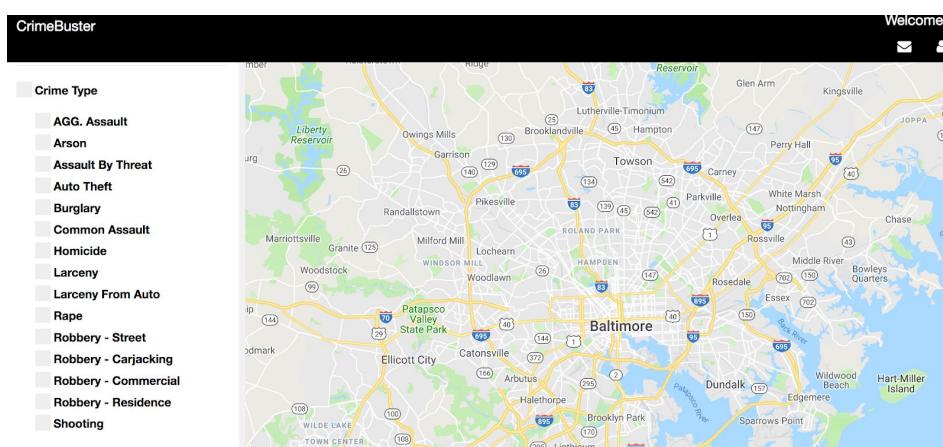
We did have to fix our logic for the SQL queries several times. The and / or logic we first used was an incorrect way to go about combining the queries for the filters and we found a nested query to work best.

All results below are as expected.

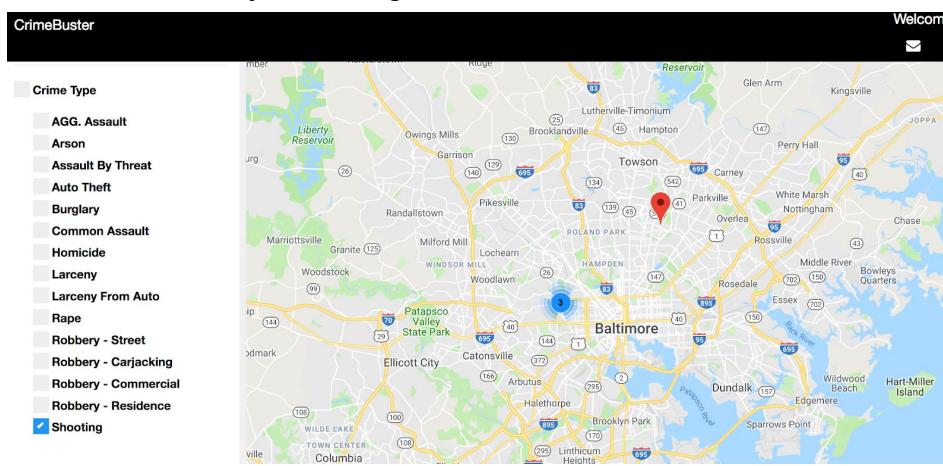
1000 results from all selected:



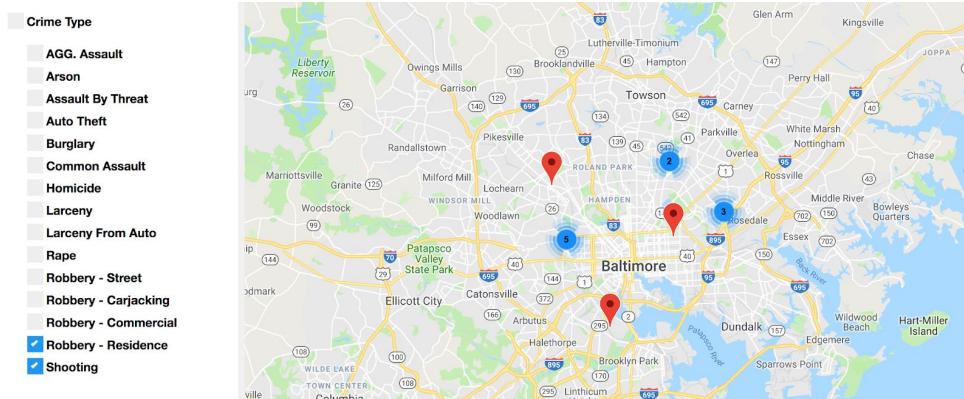
0 results from none selected:



4 results from only "shooting" selected:



13 results from "shooting" and "robbery - residence" selected:

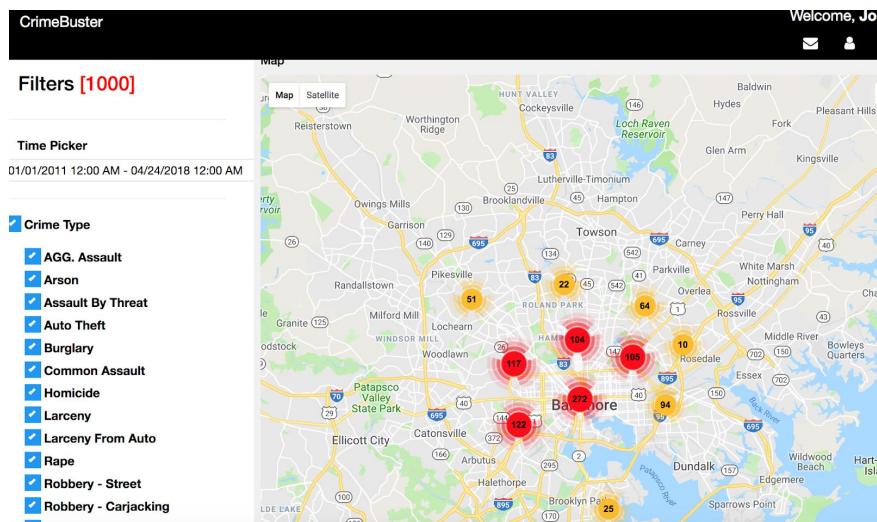


3.2.9 Filter the data based on the date/time the crime was committed

Tester: Zach Vance

All results below are as expected.

1000 results widest date / time range:



0 results from single date / time:

CrimeBuster Welcome, John

Filters [0]

Time Picker
04/24/2018 12:00 AM - 04/24/2018 12:00 AM

Crime Type

- AGG. Assault
- Arson
- Assault By Threat
- Auto Theft
- Burglary
- Common Assault
- Homicide
- Larceny
- Larceny From Auto
- Rape
- Robbery - Street
- Robbery - Carjacking

34 results from time range of a month:

CrimeBuster Welcome, John

Filters [34]

Time Picker
04/24/2016 12:00 AM - 05/24/2016 12:00 AM

Crime Type

- AGG. Assault
- Arson
- Assault By Threat
- Auto Theft
- Burglary
- Common Assault
- Homicide
- Larceny
- Larceny From Auto
- Rape
- Robbery - Street

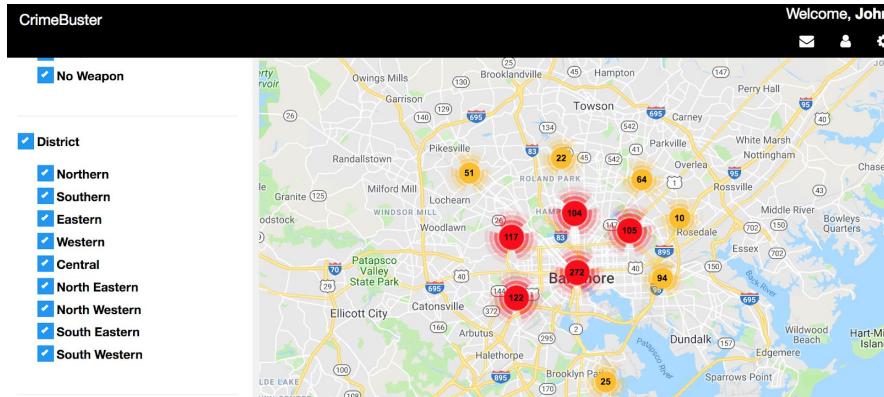
ROBBERY - COMMERCIAL
ROBBERY - COMMERCIAL was committed here at 13:40:00 on 2016-05-07.
for full entry, click here

3.2.10 Filter the data based on the location (District)

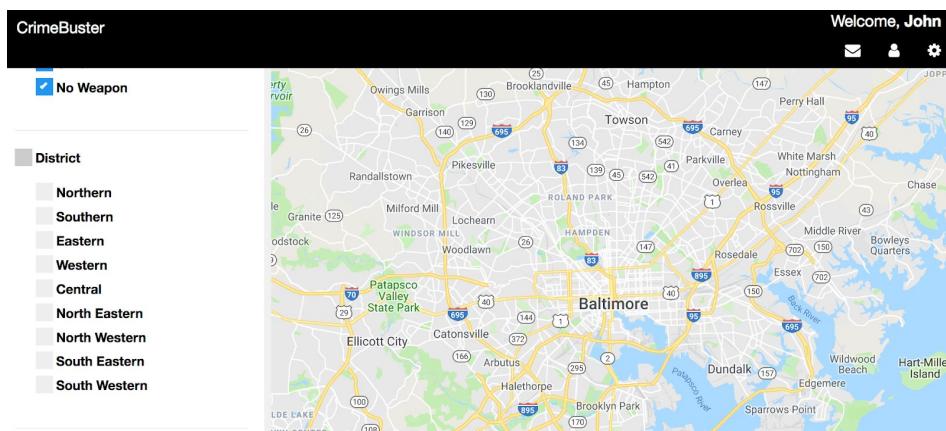
Tester: Zach Vance

All results below are as expected.

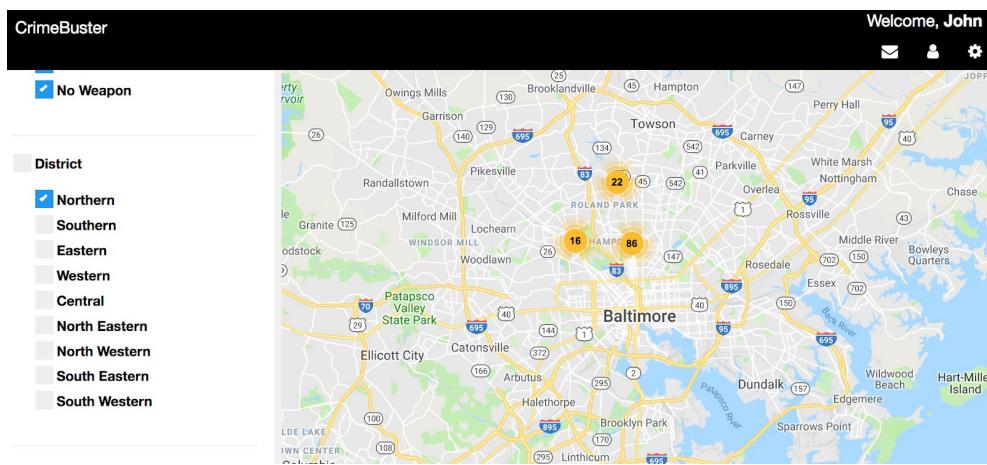
1000 results from all selected:



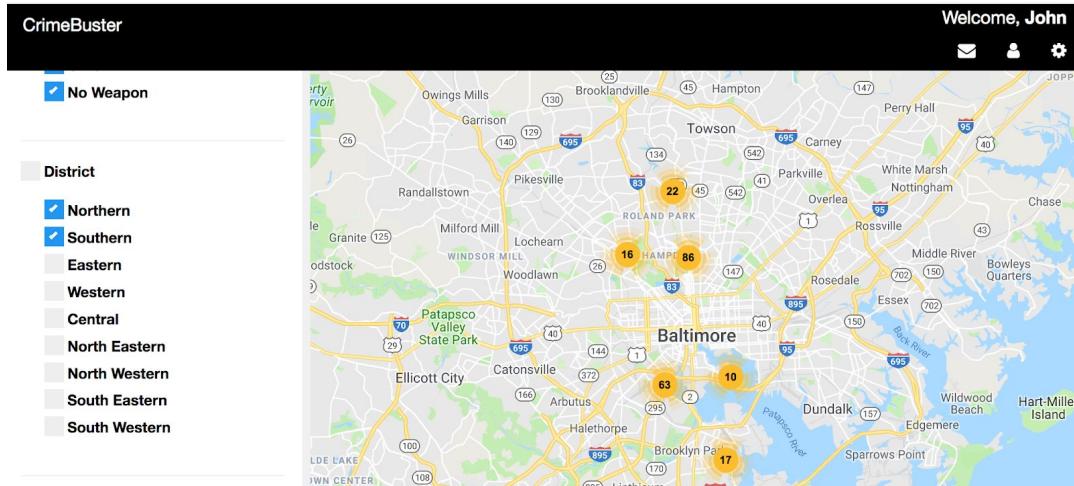
0 results from none selected:



125 results from only “northern” selected:



215 results from “northern” and “southern” selected:

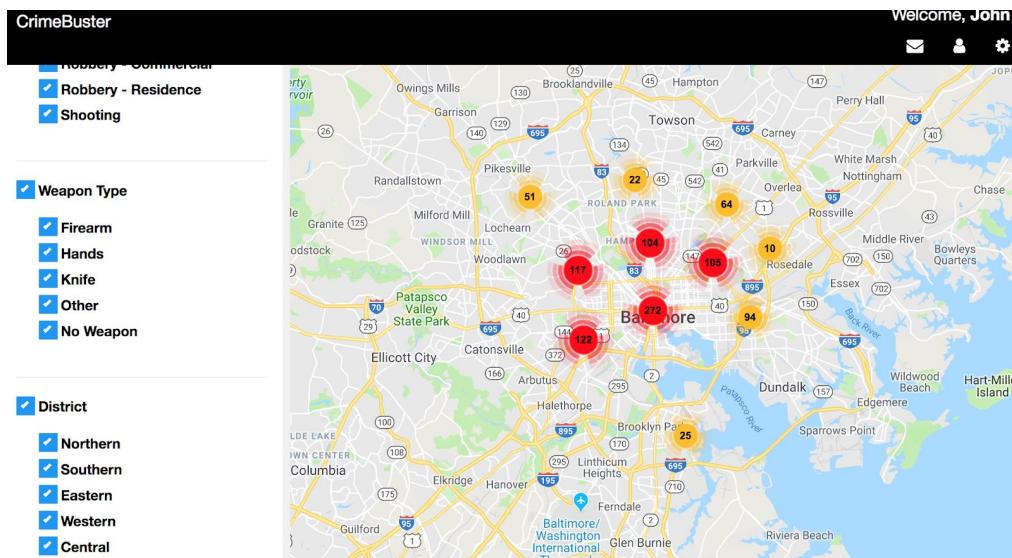


3.2.11 Filter the data based on Weapons

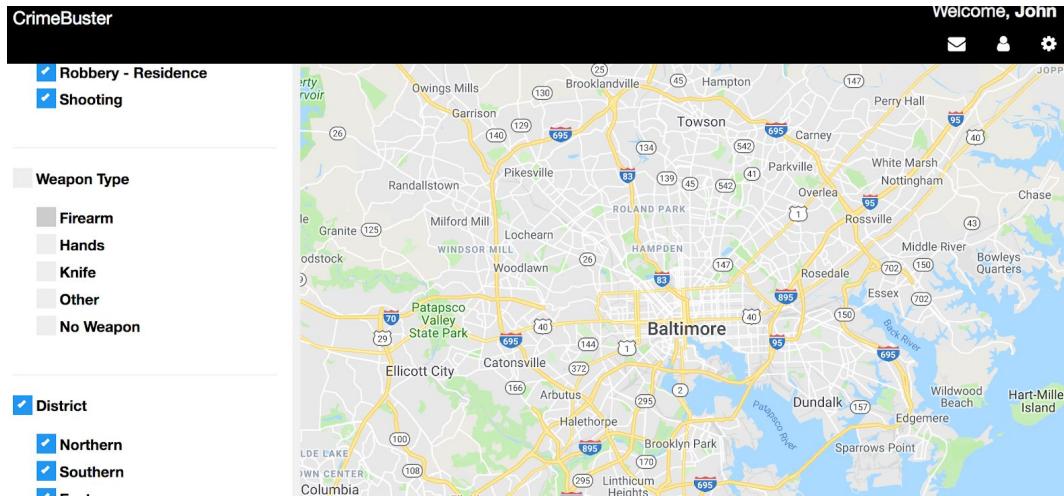
Tester: Zach Vance

All results below are as expected.

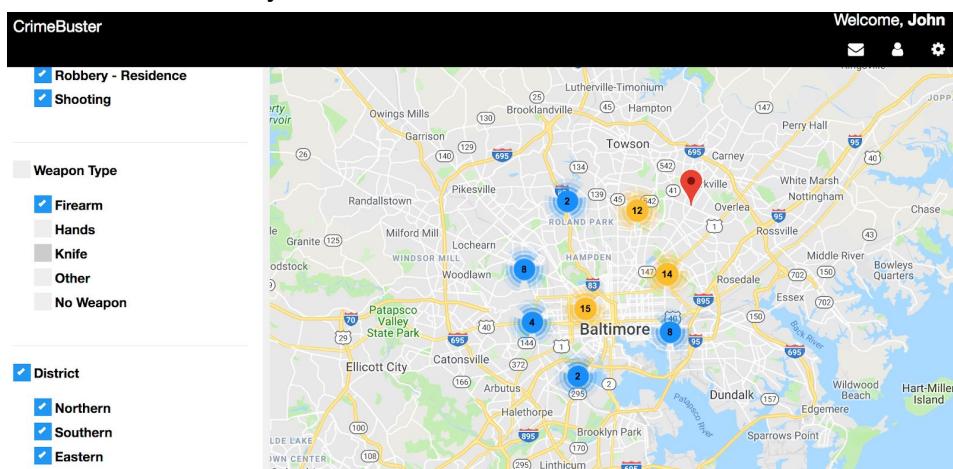
1000 results from all selected:



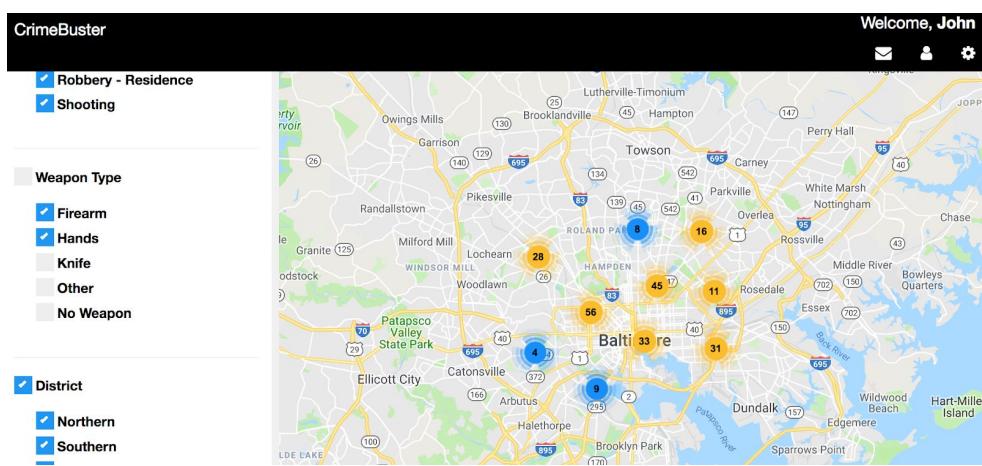
0 results from none selected:



66 results from only “firearm” selected:



245 results from “firearm” and “hands” selected:



3.2.12 Data Selection

We currently do not have this feature implemented.

Appendix A – Team Review Sign-off

This document has been collaboratively written by all members the team. Additionally, all team members have reviewed this document and agree on both the content and the format. Any disagreements or concerns are addressed in team comments below.

Team:

Name: Angel Cheng

Date: 04 / 25 / 2018


Angel Cheng

Signature

Comments

Name: Sam Mendimasa

Date: 04/25/2018


Sam Mendimasa

Signature

Comments

Name: Katelyn Seitz

Date: 04/25/2018


Katelyn Seitz

Signature

Comments

Name: Zachary Vance

Date: 04/25/2018


Zachary Vance

Signature

Comments

Appendix B – Document Contributions

Throughout the development of this document, each team member contributed in some way, hence the overall work distribution split evenly across all members (Angel 25%, Sam 25%, Katelyn 25%, and Zach 25%). The specific breakdown of work contribution is also divided across all sections, as we all worked on this document together.

TITLE	TR
FILE NAME	TR
DOCUMENT ID	1e78a31f2b65bc9f2a81939a6a2ebfd2680f8b29
STATUS	● Completed

This document was requested from script.google.com

Document History

	04/26/2018 01:05:51 UTC	Signed by Anqi Cheng (acheng2@umbc.edu) IP: 130.85.59.148
	04/26/2018 01:06:11 UTC	Sent for signature to Sam Mendimasa (sam34@umbc.edu), Katelyn Seitz (kate14@umbc.edu) and Zach Vance (zvance1@umbc.edu) from acheng2@umbc.edu IP: 130.85.59.148
	04/26/2018 01:07:27 UTC	Viewed by Zach Vance (zvance1@umbc.edu) IP: 24.35.59.156
	04/26/2018 01:07:48 UTC	Signed by Zach Vance (zvance1@umbc.edu) IP: 24.35.59.156
	04/26/2018 01:08:38 UTC	Viewed by Katelyn Seitz (kate14@umbc.edu) IP: 130.85.59.147
	04/26/2018 01:09:32 UTC	Signed by Katelyn Seitz (kate14@umbc.edu) IP: 130.85.59.147

TITLE	TR
FILE NAME	TR
DOCUMENT ID	1e78a31f2b65bc9f2a81939a6a2ebfd2680f8b29
STATUS	● Completed

This document was requested from script.google.com

Document History

	04/26/2018 01:10:28 UTC	Viewed by Sam Mendimasa (sam34@umbc.edu) IP: 130.85.247.231
	04/26/2018 01:11:06 UTC	Signed by Sam Mendimasa (sam34@umbc.edu) IP: 130.85.247.231
	04/26/2018 01:11:06 UTC	The document has been completed.